Australian Government

UET09 Transmission, Distribution and Rail Sector Training Package

Release: 3.0

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UET40109 Certificate IV in ESI - Power Systems 1322
UET40209 Certificate IV in ESI - Substation 1324
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UET60109 Advanced Diploma of ESI - Power Systems 1331
UETSS00001 Skill Set - Apply Access Procedures to Work On or Near Electrical Network Infrastructure 1334
UETSS00002 Skill Set - Apply ESI Safety Rules, Codes of Practice and Procedures for Work On or Near Electrical Apparatus 1336
UETSS00003 Skill Set - Perform Cable Pit/Trench/Excavation Rescue 1338
UETSS00004 Skill Set - Perform Cable Pit/Trench/Excavation Rescue and CPR 1340
UETSS00005 Skill Set - Perform CPR 1342
UETSS00006 Skill Set - Perform EWP Controlled Descent Escape 1344
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UETTDRCJ01B Lay electrical cables 1368

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UETTDRCJ02B Install and maintain de-energised LV underground paper insulated cables. 1380
UETTDRCJ03B Install and maintain de-energised HV underground paper insulated cables. 1392
UETTDRCJ04B Joint and maintain energised LV underground paper insulated cables 1404
UETTDRCJ05B Perform straight through HV paper insulated to polymeric transition joint 1417
UETTDRCJ06B Install and maintain de-energised LV underground polymeric cables. 1429
UETTDRCJ07B Install and maintain de-energised HV underground polymeric cables. 1441
UETTDRCJ08B Joint and maintain energised LV underground polymeric cables 1453
UETTDRCJ09B Install oil and gas filled specialised underground cables 1465
UETTDRCJ10B Maintain oil and gas filled specialised underground cables 1477
UETTDRCJ11B Install and maintain polymeric specialised underground cables 1489
UETTDRCJ12B stall and maintain oil and gas pressure systems for specialised underground cables 1501
UETTDRCJ13B Install and maintain network infrastructure LV underground cables 1514
UETTDRCJ14B Install and maintain network infrastructure HV underground cables 1528
UETTDRDP01B Inspect overhead structures and electrical apparatus (poles /structures) 1541
UETTDRDP02B Maintain overhead energised LV conductors and cables 1552
UETTDRDP03B Maintain energised high voltage distribution overhead electrical apparatus (stick) 1564
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UETTDRDP05B Inspect, maintain and restore energised LV overhead distribution network infrastructure 1590
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UETTDRDS25B Design transmission and sub-transmission substation earthing 1883
UETTDRDS26B Design transmission, sub-transmission and zone substation - civil and structural components 1895

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UETTDRDS27B Design overhead transmission systems 1907
UETTDRDS28B Design underground transmission systems 1919
UETTDREL01B Apply environmental and sustainable energy procedures 1931
UETTDREL02B Operate plant and equipment near live electrical conductors/apparatus 1943
UETTDREL03B Comply with environmental and incidental response procedures 1955
UETTDREL04B Working safely near live electrical apparatus as non electrical worker 1966
UETTDREL05B Respond to technical enquiries and requests 1978
UETTDRIS01B Install electrical equipment (network infrastructure). 1990
UETTDRIS02B Maintain electrical equipment (Network Infrastructure). 2003
UETTDRIS03B Perform LV field switching operation to a given schedule 2015
UETTDRIS04B Perform high voltage field switching operation to a given schedule 2027
UETTDRIS05B Perform substation switching operation to a given schedule 2039
UETTDRIS06B Install and maintain network infrastructure electrical equipment 2051
UETTDRIS07B Sample, test, filter, and reinstate insulating oil 2064
UETTDRIS08B Develop HV switching schedule 2075
UETTDRIS09B Develop LV switching schedule 2086
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Modification History

Version modification history

The version details of this endorsed Training Package which contains the vocational standards for industry is in the table below. The latest information is at the top of the table.

Version	Release Date	Authorisation	Comments
UET09 Version 3	**TBA**	**NQC**	Version 2 of UET09 includes the following new components: New Units of Competency UETTDRIS81A New Qualification UET20511 Certificate II in National Broadband Network Cabling (Electricity Supply Industry Assets) New Imported Units UEENEEE037B; UEENEEK042A; UEENEEC001B; UEENEEC008B; UEENEEC010B; UEENEEE051B; UEENEEF006B; UEENEEF007B; CPCCCM2007A; TLID3507C ; TLILIC508A; CPCCOHS1001A; RIIOHS202A; RIIOHS204A ; RIIOHS205A
UET09 Version 2.1	5 August 2010	**EE-Oz 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. UET20110**Certificate II in ESI — Vegetation Control**

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UET09 Version 2.0	12 February 2010	NQC	Version 2 of UET09 includes the following new components: New Units of Competency UETTDRRF01A UETTDRRF02A UETTDRRF03A UETTDRRF04A UETTDRRF05A UETTDRRF06A UETTDRRF07A UETTDRRF08A UETTDRRF09A UETTDRRF10A New Imported Unit HLTCPR201A Perform CPR New Identified Skill Sets Apply Access Procedures to Work On or Near Electrical Network Infrastructure Apply ESI Safety Rules, Codes of Practice and Procedures for Work On or Near Electrical Apparatus Perform Pole Top Rescue Perform Tower Rescue Perform Rescue from Switchyard Structures at Heights Perform EWP Controlled Descent Escape Provide First Aid in an ESI Environment Perform CPR Perform Pole Top Rescue and CPR Perform EWP Rescue and CPR

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			Perform Tower Rescue and Provide First Aid Perform Switchyard Rescue at Heights and Provide First Aid Perform Rescue from a Live LV Panel and CPR Perform Cable Pit/Trench/Excavation Rescue and CPR Perform Cable Pit/Trench/Excavation Rescue Perform Rescue from a Live LV Panel Perform EWP Rescue
UET09 Version 1	30 October 2009	NQC	Reviewed under **the 2008 Training Package Development and Endorsement Processes.** The following continuous improvement changes were made to the preceding Training Package UET06 Version in developing UET09 Version 1. Category 2 changes made as a result of the 2007-08 Training Package Structure Review and the 2007-08 Continuous Improvement Plan. Changes and Additions made include: New Units of Competency UETTDRSO15A Operate and monitor system equipment (SCADA) UETTDRSO16A Monitor and control the activities of field staff UETTDRSO17A Coordinate HV transmission network UETTDRSO18A Respond to discrete/interdependent protection operations UETTDRSO19A Coordinate system operations in a regulated energy market UETTDRSO20A Respond to complex protection operations UETTDRSO21A Manage network

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			power flows UETTDRIS28A Analyse and develop solutions for problems in extra-low voltage, single path circuits UETTDRIS29A Analyse and develop solutions for problems in multiple path d.c. circuits UETTDRIS30A Analyse and develop solutions for problems in electromagnetic circuits UETTDRIS31A Analyse and develop solutions for problems in single and three phase low voltage circuits Revised Units of Competency Changes were made to various sections of the following units including changes to Performance Criteria, Range of Variables, Critical Aspects and EKAS: UETTDRCJ05B; UETTDRCJ11B; UETTDRCJ12B; UETTDRCJ13B; UETTDRDP01B; UETTDRDP02B; UETTDRDP03B; UETTDRDP04B; UETTDREL01B; UETTDREL02B; UETTDREL03B; UETTDREL04B; UETTDREL05B; UETTDRIS02B; UETTDRIS03B; UETTDRIS04B; UETTDRIS05B; UETTDRIS06B; UETTDRIS07B; UETTDRIS08B; UETTDRIS09B; UETTDRIS10B; UETTDRIS11B; UETTDRIS13B; UETTDRIS14B; UETTDRIS15B; UETTDRIS16B; UETTDRIS17B; UETTDRIS18B; UETTDRIS19B; UETTDRIS20B; UETTDRIS21B; UETTDRIS22B; UETTDRIS23B; UETTDRIS24B; UETTDRIS25B; UETTDRIS26B; UETTDRIS27B; UETTDRRT11B; UETTDRRT13B; UETTDRSB01B; UETTDRSB02B; UETTDRSB03B ; UETTDRSB04B ; UETTDRSB05B ; UETTDRSB06B; UETTDRSB07B; UETTDRSB09B; UETTDRSB10B; UETTDRSB11B; UETTDRSB12B; UETTDRSB13B; UETTDRSB14B; UETTDRSB15B;

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			UETTDRSB16B; UETTDRSB17B; UETTDRSB18B; UETTDRSO03B; UETTDRSO09B; UETTDRTP02B; UETTDRTP03B; UETTDRTP04B; UETTDRTP05B; UETTDRTP07B; UETTDRTP08B; UETTDRTP09B; UETTDRTP10B; UETTDRTP11B; UETTDRTP12B; UETTDRTP13B; UETTDRTP14B; UETTDRTP15B; UETTDRTS01B; UETTDRTS02B. Changes to unit pre-requisites were made to the following units: UETTDRCJ01B; UETTDRDP05B; UETTDRDS01B; UETTDRDS02B; UETTDRDS03B; UETTDRDS04B; UETTDRDS05B; UETTDRDS06B; UETTDRDS07B; UETTDRDS08B; UETTDRDS09B; UETTDRDS10B; UETTDRDS11B; UETTDRDS12B; UETTDRDS13B; UETTDRDS14B; UETTDRDS15B; UETTDRDS16B; UETTDRDS17B; UETTDRDS18B; UETTDRDS19B; UETTDRDS20B; UETTDRDS21B; UETTDRDS22B; UETTDRDS23B; UETTDRDS24B; UETTDRDS25B; UETTDRDS26B; UETTDRDS27B; UETTDRDS28B; UETTDRIS01B; UETTDRIS12B; UETTDRSO02B; UETTDRSO04B; UETTDRSO05B; UETTDRSO06B; UETTDRSO07B; UETTDRSO08B; UETTDRSO10B; UETTDRSO11B; UETTDRSO14B; UETTDRTP06B; UETTDRTS03B; UETTDRTS04B; UETTDRTS05B; UETTDRTS06B; UETTDRTS07B; UETTDRTS08B; UETTDRTS09B; UETTDRTS10B; UETTDRTS11B; UETTDRTS12B; UETTDRTS13B; UETTDRTS14B; UETTDRTS15B; UETTDRTS16B; UETTDRVC01B; UETTDRVC02B; UETTDRVC03B; UETTDRVC04B; UETTDRVC05B; UETTDRVC06B; UETTDRVC07B; UETTDRVC08B; UETTDRVC09B; UETTDRVC10B. Editorial changes described below were made to the above revised units and also

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			to: UETTDRCJ02B; UETTDRCJ03B; UETTDRCJ04B; UETTDRCJ06B; UETTDRCJ07B; UETTDRCJ08B; UETTDRCJ09B; UETTDRCJ10B; UETTDRCJ14B; UETTDRRT01B; UETTDRRT02B; UETTDRRT03B; UETTDRRT04B; UETTDRRT05B; UETTDRRT06B; UETTDRRT07B; UETTDRRT08B; UETTDRRT09B; UETTDRRT10B; UETTDRRT12B; UETTDRRT14B; UETTDRRT15B; UETTDRSO12B; UETTDRSO13B. Revised Qualifications The following qualifications have been revised: UET20109 Certificate II in ESI-Vegetation Control UET20209Certificate II in ESI-Transmission Line Assembly UET30209 CIII in ESI – Distribution UET30309 CIII in ESI – Rail Traction UET30409 CIII in ESI – Cable Jointing UET30109 CIII in ESI – Transmission UET50109 Diploma of ESI - Power Systems UET60109 Advanced Diploma of ESI - Power Systems Imported Units The following imported units have been included in the Training Package as updated or replacements for superseded imported units. UEENEED004B Use engineering applications software UEENEED017B Install and configure internetworking systems UEENEED027B Develop structured programs to control external devices UEENEED028B Develop and test code

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			for microcontroller devices UEENEEE001B Apply OHS practices in the workplace UEENEEE002B Dismantle, assemble and fabricate electrotechnology components UEENEEE003B Solve problems in extra-low voltage single path circuits UEENEEE004B Solve problems in multiple path d.c. circuits UEENEEE005B Fix and secure equipment UEENEEE006B Apply methods to maintain currency of industry developments UEENEEE007B Use drawings, diagrams, schedules and manuals UEENEEE008B Lay wiring/cabling and terminate accessories for extra-low voltage circuits UEENEEE024B Compile and produce an electrotechnology report UEENEEG001B Solve problems in electromagnetic circuits UEENEEG002B Solve problems in single and three phase low voltage circuits UEENEEG047B Provide computational solutions to power engineering problems UEENEEG048B Solve problems in complex multiple path power circuits UEENEEG049B Solve problems in complex polyphase power circuits UEENEEH002B Carry out basic repairs to electronic apparatus by replacement of components UEENEEH012B Troubleshoot digital subsystems UEENEEH039B Troubleshoot basic amplifiers

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			BSBFLM303C Contribute to effective workplace relationships BSBFLM305C Support operational plan BSBFLM306C Provide workplace information and resourcing plans BSBFLM309C Support continuous improvement systems and processes BSBFLM311C Support a workplace learning environment BSBFLM312B Contribute to team effectiveness BSBWOR401A Implement effective workplace relationships BSBMGT402A Implement operational plan BSBINM401A Implement workplace information system BSBMGT403A Implement continuous improvement BSBWOR402A Promote team effectiveness BSBWOR501A Manage personal work priorities and professional development BSBMGT502B Manage people performance BSBMGT515A Manage operational plan BSBINM501A Manage an information or knowledge management systems BSBCUS501A Manage quality customer service BSBMGT516A Facilitate continuous improvement BSBINN502A Build and sustain an innovative work environment BSBLED501A Develop a workplace learning environment BSBWOR502A Ensure team effectiveness

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			BSBFIM501A Manage budgets and financial plans BSBSUS501A Develop workplace policy and procedures for sustainability ICTTC013D Perform an accurate customer premises cable and system test ICTTC064D Haul underground cable ICTTC065D Splice carrier/service provider optic fibre cable ICTTC066D Joint and terminate coaxial cable ICTTC068D Install telecommunications service to a building ICTTC069D Install network cable equipment ICTTC104D Maintain an electronic system ICTTC127D Supervise worksite activities ICTTC131C Install an above ground equipment enclosure ICTTC133C Construct underground telecommunications infrastructure ICTTC134C Fix aerial cable ICTTC135C Joint metallic conductor cable Access Network Editorial changes to all units resulting from the 2007-08 Training Package Structure Review and this review include: • Removal of spaces in any of the unit or qualification codes. • Replace ‘Version No. 2.1’ with ‘Version No. 2.1’ in all footers across the whole Training Package. 3. 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

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			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 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. Amendment of prerequisites section of the of the units:: UETTDRCJ13B; UETTDRCJ14B; UETTDRIS06B; UETTDRIS07B; UETTDRIS27B; UETTDRRT14B; UETTDRRT15B; UETTDRSB01B; UETTDRSB02B; UETTDRSB03B; UETTDRSB04B; UETTDRSB05B; UETTDRSB06B; UETTDRSB07B; UETTDRSB09B; UETTDRSB10B; UETTDRSB11B; UETTDRSB12B; UETTDRSB13B; UETTDRSB14B; UETTDRSB15B; UETTDRSB16B; UETTDRSB17B; UETTDRSB18B;

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			UETTDRTP14B; UETTDRTP15B; To include: Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence. This better reflect the fact that the ERAC requirements can be met via a number of qualifications from the UEE07 Electrotechnology Training Package. This statement also reduces the prerequisite chain for these units.
1	2006	NQC	Primary Release of Revised Training Package UET06 replacing UTT98

Layout of the Training Package

Layout of the Training Package

This 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

Current Membership of the National Transmission, Distribution and Rail Training Group

The Electricity Supply Industry

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**

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- 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

Part Number	Discipline	Discipline Code
2.1.1	Cable Jointing Competency Standard Units	CJ
2.1.2	Distribution Competency Standard Units	DP
2.1.3	Design Competency Standard Units	DS
2.1.4	Entry Level Cross Discipline Competency Standard Units	EL
2.1.5	Industry Specific Cross Discipline Competency Standard Units	IS
2.1.6	Refresher Training Units	RF
2.1.7	Rail Traction Competency Standard Units	RT
2.1.8	Substation Competency Standard Units	SB
2.1.9	System Operations Competency Standard Units	SO
2.1.10	Transmission Competency Standard Units	TP
2.1.11	Testing Competency Standard Units	TS
2.1.12	Vegetation Competency Standard Units	VC
2.1.13	Imported Competency Standard Units	Own Code
2.1.14	Possible Skill Sets CSUs	N/A
2.1.15	Identified Skill Sets	N/A

2.2 Essential Knowledge and Associated Skills

Volume of: Knowledge and Associated Skills — Reference Codes and Reference Names

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Table of Essential Knowledge and Skills to Unit Matrix

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 National Training Information Service (www.ntis.gov.au) and locating information about the Training Package. Alternatively, contact EE-Oz Training Standards,www.ee-oz.com.auto 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).

Electricity Supply Industry - Transmission, Distribution and Rail Training Package (UET09)

The Electricity Supply Industry - Transmission, Distribution and Rail Training Package

The revised Electricity Supply Industry – Transmission, Distribution and Rail 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.

This Training Package for the Electricity Supply Industry – Transmission, Distribution and Rail (UET09) 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 DEEWR. EE-Oz Training Standards operates under a charter from DEEWR as a declared National ElectroComms and EnergyUtilities 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 sector of the Electricity Supply Industry was released in 1998, as the *Training Package for the Electricity Supply Industry – Transmission and Distribution Sector of the Utilities Industry* (UTT98). 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 two version changes. The changes incorporated Certificate IV qualifications and subsequently a Rail Traction qualification as well as other minor amendments.

In its revised form the Electricity Supply Industry – Transmission, Distribution and Rail Training Package has gone even further in improving currency and relevance to industry by enhancing the range of qualifications and Competency Standard Units available with added flexibility to the industry. It includes an array of new and revised Competency Standard Units, pathways and design features.

The previous competency standard units have been revamped, reorganised and updated over 200 new Competency Standard Units across five levels of the AQF. The result is a Training Package that is more relevant to the industry. It 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.

Industry coverage

The formal industry coverage is under ANZSIC Code 3610 in which the sector is defined as consisting of units mainly engaged in the generation, transmission or distribution of electricity.

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

Notwithstanding these changes the Competency Standards in this Package 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 ESI Transmission, Distribution and Rail sector of the Industry contributes greatly to the economic and future needs of Australia.

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, program, test or repair of; 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 operation of wiring systems and associated circuits involving equipment, apparatus and systems, public safety, safety and health of individuals who work on lines/circuits, systems and apparatus/equipment and other codes and practices related to the environment in which they operate.

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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 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. The following websites can be a useful starting point for the latest information:

www.fed.gov.au	www.standards.org.au
www.nsw.gov.au	www.erac.gov.au/
www.qld.gov.au	http://www.acma.gov.au
www.sa.gov.au	http://www.dewr.gov.au/
www.nt.gov.au	http://www.ascc.gov.au/
www.act.gov.au	http://www.workplace.gov.au/tra
www.wa.gov.au	http://www.DEEWR.gov.au/
www.tas.gov.au	http://training.com.au/

Other industry standards

It is recognised that the National Transmission and Distribution Sector Standards do not cover all the competencies, which are likely to be required and applied within Electricity Supply 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.

Responsibility for Maintenance of the Training Package

The Training Package for the Electricity Supply Industry (ESI) Transmission, Distribution and Rail sector is to be managed and maintained by the National Transmission, Distribution and Rail Training Group (NTDRTG). See below for membership details.

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NTDRTG is a standing working group of the ElectroComms and Energy Utilities Industry Skills Council Ltd trading as EE-Oz Training Standards, a DEEWR declared Industry Skills Council (ISC). The Group is representative of the Transmission, Distribution and Rail Industry and related stakeholders. It includes Registered Training Organisations (RTOs) from around Australia and is also represented by employers and unions, making it bipartite. EE-Oz Training Standards Board and Sector Council determine its composition. The Board and Sector Council may vary its membership from time to time.

The initial composition of the NTDRTG is included below.

The charter of the NTDRTG is to monitor, review and maintain the National Transmission, Distribution and Rail Training Package which contains the vocational standards for industry. This Charter encompasses the following responsibilities:

- *Maintenance of Competency Standards* – to initiate and respond to the need to review, vary, delete and add to the Transmission, Distribution and Rail Competency Standard Units, as part of the sector's standards inventory.
- *Maintenance of Competency Delivery Processes* – to monitor the effectiveness of the delivery of competency and so initiate and respond to issues, which may impact on those processes.
- *Maintenance of Assessment Guidelines* – to monitor the effectiveness of the Assessment Guidelines and supporting systems; to initiate and respond to issues which impact, or are likely to impact, on the quality of the assessment systems; and to promote quality improvements throughout the system.
- *Maintenance of the Qualifications and Recognition Systems* – to monitor the effectiveness of the application of the Qualification and Recognition Systems contained in the Training Package which contains the vocational standards for industry; and to review/revise the system as required.
- *Effectiveness and validation of the valuation of imported Competency Standard Units* – for the purpose of their inclusion in the Training Package which contains the vocational standards for industry qualifications framework.

The NTDRTG meets at least annually to review and plan the Industry maintenance and management processes related to the Training Package which contains the vocational standards for industry. The majority of the considerations by the Group will require prompt response and, therefore, business and decisions will normally be handled by electronic/mail means. Support for the NTDRTG will be provided by the EE-Oz Training Standards, who will act as secretariat.

The NRDRTG is an integral part of the Electricity Supply Industry and EE-Oz Training Standards Electricity Supply Industry Sector Council consultative mechanisms.

Content of this Training Package

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

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The Competency Standard Units have been written to reflect the technical and operational needs of industry and include appropriate language and literacy requirements. A new section related to literacy and numeracy skills has been included 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 respective unit, in terms of reading, writing and numeracy skill levels.

Volume 1: Structure and Overview

Part 1 – Qualification Framework

Information in Part 1 outlines how the qualifications are structured, along with their 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 list of qualifications to be issued are also included.

Part 2 – Competency Standards

Information in 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 is provided. 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 any regulatory arrangements, for which the Competency Standard Units may apply is also included. Importantly, each Competency Standard Unit is interrelated and linked with the Definitions/Glossary and Essential Knowledge and Associated Skills (EKS) sections of the Volume. Each Unit must not be used in isolation or exported without these interrelated components.

There are over 200 Competency Standard Units included in Volume 2, each listed according to their respective industry discipline area.

Part 3 – Assessment Guidelines

Information in Part 3 outlines how the assessment guidelines inform an RTO about the infrastructure requirements they will need 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 Registered Training Organisations, assessment pathways, recognition arrangements, assessor qualifications and sources of information.

Volume 2: Competency Standard Units

Volume 2 contains the Competency Standards Units in their respective disciplines, e.g. Transmission units, Distribution units, Rail Traction units. Included is a list of Competency Standard Units imported from other endorsed Training Packages into this Package.

Volume 2 also contains the Essential Knowledge and Associated Skills (EKAS), a Matrix Map and the Definitions/Glossary section, which provides a description of certain/assigned words that appear in this document. The two volumes form an integrated whole and must not be used independently of each other.

Also included is information relating to literacy and numeracy skills.

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This Training Package can be used by all those involved in the delivery and assessment of competencies that cover, Transmission, Distribution, Rail, Cable Jointing, Substations, Vegetation Control, Design, System Operations and Testing. This includes:

- State training and recognition authorities who will use the Training Package as the pre eminent industry's advice to government; and 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/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 the Training Package.

Language, Literacy, Numeracy and Key Competencies

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 respective unit, in terms of reading, writing and numeracy skill levels.

A specific section for Literacy and Numeracy Skills has been included in Volume 2 of this Training Package. In addition, there is an explanation on their relationship to the performance criteria and assessed 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 Transmission, Distribution and Rail sector of the EnergyUtilities Industry are comprehensive with many employment opportunities available. The competency standards reflect the range of knowledge and skills required in the Industry. They are written in a non-exclusive manner so as to increase the participation rates of under-represented groups and to minimise unintentional bias.

As a matter of policy in the Electricity Supply 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.

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Preliminary Information

Preliminary Information

The Electricity Supply Industry — Transmission, Distribution and Rail

The Electricity Supply Transmission and Distribution Industry conveys electricity from the generating power stations to the consumer by means of a reticulation system that includes the following component sections:

- The distribution of electricity by means of overhead conductors and poles. This is usually reticulation in built up areas in both industrial/commercial and residential settings or rural settings.
- The distribution of electricity by means of underground cables where installation and cable jointing are specific skills. This is usually reticulation in built up areas in both industrial/commercial and residential settings.
- The transmission of electricity by means of overhead conductors suspended from towers (or larger concrete or wooden poles) at voltages substantially higher than those used for distribution
- The transmission of electricity by means of underground cables that are usually oil or gas filled requiring special skills in installation and maintenance.

In addition to mainstream linework and cable jointing functions, powerline workers are being called on, in some areas, to undertake such tasks as substation installation and maintenance, specialised testing, revenue meter installation and the like. Some electrical distributors are multi-skilling their powerline personnel with additional mainstream electrical skills, such as those held by electricians.

The industry has undergone rapid changes in work methods, staffing levels, management approaches and the sub-contracting of many work functions to external contractors. The industry has always had a commitment to training and safety and is now embracing the spirit of the National Training Reform Agenda.

The main activities of the industry are installation, service, maintenance, diagnosis and repair of electrical cabling systems, apparatus and equipment in relation to:

- Overhead lines (distribution)
- Overhead lines (transmission)
- Cable jointing
- Equipment installation.

Examples of Electricity Supply Industry – Transmission, Distribution and Rail sector vocations are Overhead powerline worker (distribution); Overhead powerline worker (transmission); Rail Traction Lineworker and Cable jointer.

Technological innovation in the range of work activities and the vocations involved in Electricity Supply Industry — Transmission and Distribution sector systems provide good career opportunities.

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There are three specific areas that provide individuals with the chance to enter an exciting career in the Transmission and Distribution sector of the Electricity Supply Industry and gain a nationally recognised qualification.

Transmission (Powerline)

Work in the area of Electricity Transmission involves installing and maintaining towers and associated hardware as well as stringing and maintaining overhead conductors and cables. Trainees in this program will be exposed to a range of experiences, designed to give them the expertise required for a career in this sector.

Distribution (Powerline)

The distribution of electricity throughout Australia involves the installation and maintenance of underground cables, overhead conductors, associated hardware and public lighting. This program enables trainees to acquire the skills and knowledge needed for a career in power line distribution.

Rail Traction (Powerline)

The distribution of electricity used for transporting of people and goods by various types of rail traction vehicles (e.g. tram and train) involves the carrying out of construction, maintenance and inspection of overhead traction wiring systems and equipment in accordance with legislative rules and regulations.

Current Membership of the National Transmission, Distribution and Rail Training Group (NTDRTG)

Name	Title	Organisation
Tom Emeleus (Chairperson)	Training Manager	Energy Australia
Noel Arandt	Infrastructure Training Manager	MainCo Melbourne Pty Ltd
Lindsay Baxter	Manager Training	Power Training Services WA
Adam Beel	Field Practices & Training Manager	Jemena
Rolfe Brimfield	Training and Compliance Manager	Aurora Energy
John Britten	Senior Infrastructure Safety Compliance Office	Work Standards Tasmania
Vic Camilleri	Consultant	Cammatech Pty Ltd
Rod Clarke	Field Protection Team	Western Power

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	Leader	
Steven Cornell	Technical Training Manager	Transgrid
Gerard Cooke	Training Manager	SP AUSNET
Mick DeGraaff	Program Leader	Gippsland TAFE
Noel Frappell	Managing Director	EnerSafe
Ken Gardner	Director	Energy Safe Victoria
Rod Gunton	Apprentice & Curriculum Manager	Integral Energy
Craig Hobbs	Asset Design Manager	Powercor
Mike Horne	Training Manager	Electro Group Training Company
John Ingram	Assistant National Secretary	CEPU
Craig Jones	Power Industry Training Consultant	NMIT
Bob Lowe	Manager	Industry Consultant
Greg McLean	Assistant National Secretary	Australian Services Union
Mark Olson	Training Manager	ETSA Utilities
Keith Owens	Power Systems Operations Training Manager	NEMMCO
Grant Palmer	Manager Training and Education Services	Connell Wagner
Brian Roach	Training Manager	ACTEWAgl
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- The Electricity Supply Industry Sector Council of EE-Oz Training Standards
- The Electricity Supply Industry – National Training Committee (ESI—NTC)
- The Transmission, Distribution and Rail National Steering Group (TDRNSG)
- The Transmission, Distribution and Rail National Steering Group (TDRNSG) Executive
- The National Transmission, Distribution and Rail Technical Advisory Group (NTDRTAG)
- 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
- OHS Skills Development and Practical Guidance Team of the National Occupational Health and Safety Commission
- Industry sector registered training organisations 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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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 recognised performance and determining training, recognising and assessing people's skills, and may also have optional support materials
- enables nationally recognised qualifications to be awarded through assessment against given industry Competency Standard Units
- encourages the development and delivery of flexible training and assessment which suits individual and industry requirements
- encourages learning and assessment in a work-related environment which leads to verifiable industry outcomes.

How do Training Packages fit within the National Training Framework?

The National Training Framework is made up of the nationally agreed quality arrangements for the vocational education and training sector, the Australian Quality Training Framework (AQTF), and Training Packages which contain the vocational standards for industry, endorsed by the National Quality Council (NQC).

How are Training Packages developed?

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

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

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 Competency Standard Units on its scope of registration, or that works in partnership with another RTO as specified in the AQTF Standards for RTOs.

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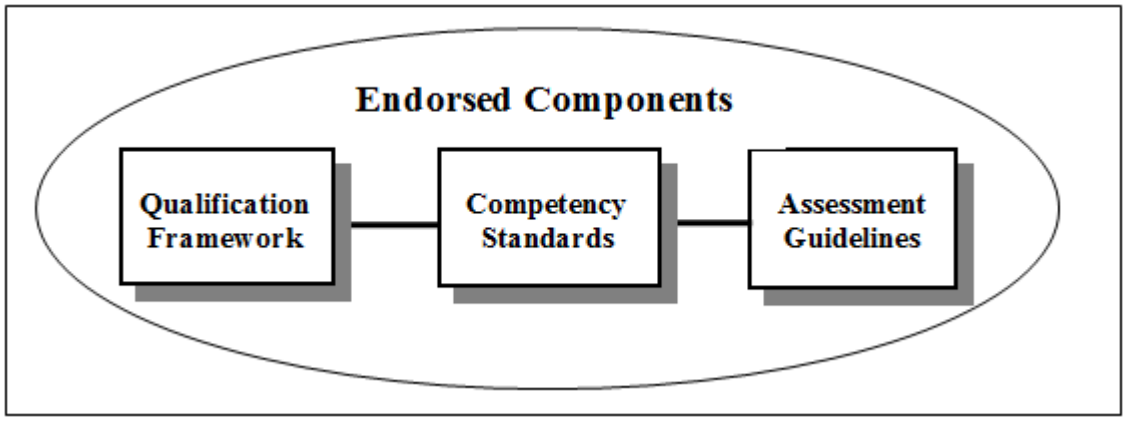
Training Package Components

Training Packages are made up of mandatory components endorsed by the NQC and optional support materials. The nationally endorsed components include the Qualification Framework, Competency Standard Units and Assessment Guidelines. These form the basis of training and assessment in the Training Package and must be used.



Qualifications Framework

Each Training Package provides details of the competency standards that must be achieved to award AQF qualifications or Statements of Attainment for part of a qualification. The rules, which determine which Competency Standard Units can be combined to make up a valid AQF qualification in the Training Package, are known as "package rules". These packaging rules must be followed to ensure the integrity of validating recognised qualifications issued.

Competency Standard Units

Each Competency Standard Unit 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 Competency Standard Units 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 assessment outcomes meet industry needs and the nationally agreed standards as expressed in the Training Package and the AQTF Standards for RTOs. The Assessment Guidelines must be followed to ensure integrity of assessment.

Training Package Support Materials

The endorsed components of a Training Package 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, RTOs and learners. In some instances the Industry Skills Council may have developed a Training Package and industry support material to assist RTOs in delivering the preferred industry approach. These support materials should be considered by RTOs in accordance with the relevant AQTF standard in an effort to support increased national consistency and assure industry of the quality of outcomes.

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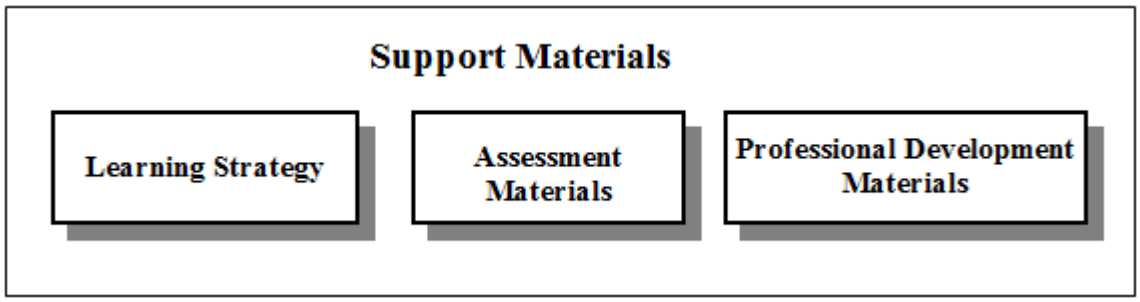
A Training Package can relate to single or multiple competency standard units, an industry sector, a qualification or the whole Training Package. They tend to fall into one or more of the categories below.



A range of stakeholders can produce a Training Package support materials, however, to ensure national consistency, partnership or collaborative approaches are preferred. Support materials developers include Industry Skills Councils, RTOs, individual trainers and assessors, private and commercial developers and government agencies.

Where support materials have been quality assured through a process of 'noting' by the NQC, they display the official logo, shown below. Noted support materials are listed on the National Training Information Service (NTIS), together with a detailed description and information on the type of product and their availability (www.ntis.gov.au).

It is not compulsory to submit support materials for noting, any resources that meet the requirements of the Training Package can be used.

Training Package Codes

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

Each Training Package has a unique five-character national code assigned when the Training Package which contains the vocational standards for industry is endorsed, for example UET09. The first three characters are letters identifying the Training Package which contains the vocational standards for industry coverage and the last two characters are numbers identifying the year of endorsement.

Qualification Codes

Each Training Package qualification has a unique eight-character code, for example in this Training Package UET30109. In qualification codes, the:

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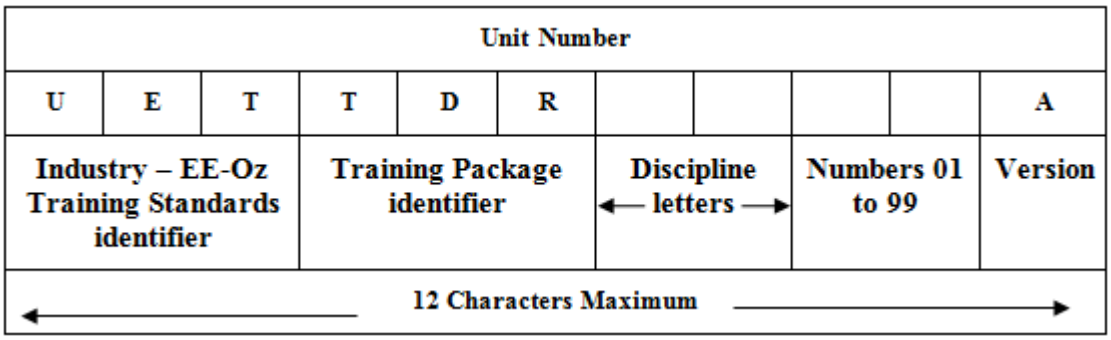
- first three characters are letters identifying the Training Package
- fourth is a number reflecting the AQF level for the qualification
- fifth and sixth characters represent the number of the qualification for the given level. That is in the case of UET30105, it is the first qualification of currently four AQF3 qualifications on offer in the Training Package.
- seventh and eighth numbers identify the year in which the qualification was endorsed. Any subsequent amendments to the qualification result in this number changing to reflect the new year of endorsement.

Competency Standard Unit Codes

Each Unit has a unique code. A typical code is made up of a maximum of 12 characters; normally a mixture of uppercase letters and numbers. For example in this Training Package the following approach has been adopted:



Where an amendment is made to a Competency Standard Unit the following applies:

- where changes do not affect the outcome of the unit the last character alpha identifier is incremented to indicate the new version. For example, UETTDRIS12**A** is changed to UETTDRIS12**B**.
- where changes alter the outcome, a new unit title and code is assigned.

Training Package, Qualification and Competency Standard Units 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 which contains the vocational standards for industry, and with the code always placed before the title.

Training Package Titles

The title of each endorsed Training Package is unique and relates to the industry's broad 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 or Advanced Diploma

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- this is followed by the words ‘in’ for Certificates I to IV and ‘of’ for Diploma and Advanced Diploma
- then the industry descriptor follows, for example Electricity Supply Industry (ESI) – Distribution, Transmission or Rail, and
- if applicable, the occupational or functional stream follows in brackets, for example (Powerline). For example Certificate III in ESI Distribution (Powerline) or Diploma of ESI Power Systems.

Competency Standard Unit Titles

Each competency standard unit title is unique. This title describes the competency outcome concisely, and is written in sentence case. For example:

- UETTDRIS04A Perform high voltage field switching to a given schedule
- UETTDRIS26A Manage an ESI OHS management system
-

Table 1 Summary of AQF Qualifications in this Training Package

Table 1 Summary of AQF Qualifications in this Training Package

The AQF qualifications in the Electricity Supply Industry — Transmission, Distribution and Rail Training Package are:

AQF	Qualification Title	Qualification code
1	Nil	
2	Certificate II in ESI — Vegetation Control Certificate II in ESI — Transmission Line Assembly Certificate II in National Broadband Network Cabling (Electricity Supply Industry Assets)	UET20110 UET20209 UET20511
3	Certificate III in ESI — Transmission Certificate III in ESI — Distribution Certificate III in ESI — Rail Traction Certificate III in ESI — Cable Jointing	UET30109 UET30209 UET30309 UET30409
4	Certificate IV in ESI — Power Systems Certificate IV in ESI — Substation Certificate IV in ESI — Network Infrastructure	UET40109 UET40209 UET40309
5	Diploma of ESI — Power Systems *Diploma of ESI — Network Infrastructure**	UET50109

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AQF	Qualification Title	Qualification code
6	Advanced Diploma of ESI — Power Systems	UET60109

** To be developed as part of continuous improvement*

Table 2 Relationship between UET06 Version 1 Units and UTT98 Version 3 Units

Table 2 Relationship between UET06 Version 1 Units and UTT98 Version 3 Units

This Table includes the relationship of UET06 Version 1 units to units in the former Training Package UTT98 Version 3 and Unit weighting points

Discipline – Cable Jointing

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
UETTDRCJ 01B	Lay electrical cables.	New Unit – Version 1	New Unit	UETTDREL 01A UETTDREL 02A UETTDREL 04A UEENEEE00 1A UEENEEE00 2A UEENEEG00 2A UEENEEE00 8A	2	30	Not
UETTDRCJ	Install and		Minor resemblan	UETTDRCJ0	3	100	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
02B	maintain de-energised LV underground paper insulated cables	UTTNTD307A	ce to previous unit. Unit has been updated, realigned and reformatted.	1A			
UETTDRCJ03A	Install and maintain de-energised HV underground paper insulated cables.	UTTNTD307A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ01A	3	100	Part

UETTDRCJ04A	Joint and maintain energised LV underground paper insulated cables	UTTNTD307A	Minor resemblance to previous unit. Unit has been updated, realigned	UETTDRCJ02A	3	100	Part

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			and reformatted.				
UETTDRCJ05A	Perform straight through HV paper insulated to polymeric transition joint	New Unit	New Unit	UETTDRCJ07A	3	90	Part
UETTDRCJ06A	Install and maintain de-energised LV underground polymeric cables	UTTNTD320A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ01A	3	90	Part
UETTDRCJ07A	Install and maintain de-energised HV underground polymeric cables	UTTNTD320A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ06A	3	90	Part
UETTDRCJ08A	Joint and maintain energised LV underground polymeric cables	UTTNTD320A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ06A	3	90	Part
UETTDRCJ09A	Install oil and gas filled		Minor resemblance	UETTDRCJ03A	4	120	Part

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	specialised underground cables	UTTNTD405A	to previous unit. Unit has been updated, realigned and reformatted.	& UETTDRCJ07A			
UETTDRCJ10A	Maintain oil and gas filled specialised underground cables	New Unit	New Unit	UETTDRCJ09A	4	120	Not
UETTDRCJ11A	Install and maintain polymeric specialised underground cables	UTTNTD405A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ03A & UETTDRCJ07A	4	130	Part
UETTDRCJ12A	Install and maintain oil and gas pressure systems for specialised underground cables	UTTNTD405A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ03A & UETTDRCJ07A	4	130	Part
UETTDRCJ13A	Install and maintain network infrastructure LV underground cables	New Unit	New Unit	UETTDRIS06A	4	120	Not
UETTDRCJ14A	Install and maintain	New Unit	New Unit	UETTDRCJ13A	4	130	Not

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	network infrastructure HV underground cables						

Discipline – Distribution

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRDP01A	Inspect overhead structures and electrical apparatus (poles and structures)	UTTNTD303A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS12A	3	90	Part
UETTDRDP02A	Maintain overhead energised LV conductors and cables	UTTNTD306A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS14A	3	100	Part

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UET06 Version 1 CSU Code	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)**	**AQF Align.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRDP03A	Maintain energised high voltage distribution overhead electrical apparatus (Stick)	UTTNTD404A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	BSBFLM412A & UETTDRDP02A & UETTDRIS02A & UETTDRIS25A	4	130	Part
UETTDRDP04A	Maintain energised high voltage distribution overhead electrical apparatus (Glove)	UTTNTD404A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	BSBFLM412A & UETTDRDP02A & UETTDRIS02A & UETTDRIS25A	4	130	Part
UETTDRDP05A	Inspect, maintain and restore energised LV overhead distribution network infrastruct	New Unit	New Unit	UETTDRIS06A UETTDRIS27A	4	130	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
	ure						

Discipline – Design

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRDS01A	Draft and layout an overhead distribution extension	UTTNTD402A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS22A & UETTDRIS23A & UEENEEE002A & UEENEEE019A & UEENEEE008A	4	110	Part
UETTDRDS02A	Draft and layout an underground distribution extension	UTTNTD403A	Minor resemblance to previous unit. Unit has been	UETTDRIS22A & UETTDRIS23A & UEENEEE002A &	4	110	Part

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UET06 Version 1 CSU Code	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)**	**AQF Align.**	**Weighting Points**	**Equivalent - Full, part or not**
			updated, realigned and reformatted.	UEENEEG002A & UEENEEE008A			
UETTDRDS03A	Draft and layout a street Lighting system	UTTNTD421A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS22A & UETTDRIS23A & UEENEEE002A & UEENEEG002A & UEENEEE008A &	4	110	Part
UETTDRDS04A	Draft and layout a distribution substation minor upgrade	UTTNTD403A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS22A & UETTDRIS23A & UEENEEE002A & UEENEEG002A & UEENEEE008A	4	120	Part
UETTDRDS05A	Design overhead distribution systems	New Unit	New Unit	UETTDRDS15A& UETTDRDS13A	5	140	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRDS06A	Design underground distribution systems	New Unit	New Unit	UETTDRDS15A& UETTDRDS13A	5	140	Not
UETTDRDS07A	Design distribution substations	New Unit	New Unit	UETTDRDS15A& UETTDRDS13A	5	140	Not
UETTDRDS08A	Design public lighting systems	New Unit	New Unit	UETTDRDS15A& UETTDRDS13A	5	140	Not
UETTDRDS09A	Prepare and manage detailed construction plans for electrical system infrastructure	New Unit	New Unit	BSBMGT507A and UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH01	5	140	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				2A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRDS10A	Prepare and appraise financial impact statements	New Unit	New Unit	UETTDRDS20A or UETTDRDS21A or UETTDRDS22A or UETTDRDS23A or UETTDRDS24A or UETTDRDS25A or UETTDRDS26A or UETTDRDS27A or UETTDRDS28A	6	200	Not
UETTDRDS11A	Manage electrical infrastructure projects	New Unit	New Unit	UETTDRDS10A	6	200	Not
UETTDRDS	Investigate	New Unit	New Unit	BSBMGT507	5	140	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
12A	quality of supply issues			A & UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRDS13A	Develop HV and LV distribution protection systems	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED02	5	150	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				7A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRDS14A	Design zone substations modifications	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG04	5	160	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				9A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRDS15A	Organise and implement line and easement surveys	New Unit	New Unit	UETTDRDS05A & UETTDRDS06A	5	140	Not
UETTDRDS16A	Develop planned outage strategies	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A &	5	140	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRDS17A	Review asset management strategies	New Unit	New Unit	UETTDRDS10A	6	180	Not
UETTDRDS18A	Analyse and appraise fault and outage data	New Unit	New Unit	UETTDRDS17A	6	180	Not
UETTDRDS19A	Establish and manage geographical information systems data	New Unit	New Unit	14MGT507A & UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE007A &	5	140	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				UEENEEG047A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRDS20A	Design customer substations	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH01	5	150	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				1A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRDS07A			
UETTDRDS21A	Manage transmission and subtransmission design process	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH01	6	180	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				1A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRDS09A & UETTDRDS14A			
UETTDRDS22A	Design transmission, subtransmission and zone substation buildings	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG04	6	200	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				9A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRDS09A & UETTDRDS14A			
UETTDRDS23A	Design transmission and subtransmission substation primary plant	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE00	6	220	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				7A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRDS09A & UETTDRDS14A			
UETTDRDS24A	Design transmission and subtransmission protection and control	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE00	6	220	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				2A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRDS09A & UETTDRDS14A			
UETTDRDS25A	Design transmission and subtransmission substation earthing	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED02	6	200	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				8A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRDS09A & UETTDRDS14A			
UETTDRDS26A	Design transmission, subtransmission and zone substation – civil and structural components	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED02	6	200	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				7A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRDS09A & UETTDRDS14A			
UETTDRDS27A	Design overhead transmission systems	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED01	6	200	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				7A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRDS15A			
UETTDRDS28A	Design underground transmission systems	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED01	6	200	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				7A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRDS15A			

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Discipline – Entry Level

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDREL01A	Apply environment and sustainable energy procedures	UTTNTD321A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	Nil	3	Core	Part
UETTDREL02A	Operate plant and equipment near live electrical conductors/apparatus	UTTNTD202A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	Nil	3	Core	Part
UETTDREL03A	Comply with environmental and incidence response	UTTNTD321A	Minor resemblance to previous	Nil	2	Core TLA and Possible Skill	Part

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UET06 Version 1 CSU Code	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)**	**AQF Align.**	**Weighting Points**	**Equivalent - Full, part or not**
	procedures		unit. Unit has been updated, realigned and reformatted.			Sets Unit	
UETTDREL04A	Working safely near live electrical apparatus as non electrical worker	New Unit	New Unit	Nil	2	Core TLA and Possible Skill Sets Unit	Not

Discipline – Industry Specific

UET06 Version 1 CSU Code	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)**	**AQF Align.**	**Weighting Points**	**Equivalence - Full, part or not**

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UET06 Version 1 CSU Code	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)**	**AQF Align.**	**Weighting Points**	**Equivalence - Full, part or not**
UETTDRIS01A	Install electrical equipment (Network Infrastructure)	UTTNTD308A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDREL01A & UETTDREL02A & UETTDREL04A & UEENEEE001A & UEENEEE002A & UEENEEG002A & UEENEEE008A	3	100	Part
UETTDRIS02A	Maintain electrical equipment (Network Infrastructure)	UTTNTD308A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS01A	3	100	Part
UETTDRIS03A	Perform LV field switching operation to a given	UTTNTD3	Minor resemblance to previous	UETTDRCJ03A or UETTDRCJ07A or	3	80	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalence - Full, part or not
	schedule	09A	unit. Unit has been updated, realigned and reformatted.	UETTDRIS02A or UETTDRIS14A or UETTDRTP09A			
UETTDRIS04A	Perform HV field switching operations to a given schedule	UTTNTD310A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ03A or UETTDRCJ07A or UETTDRIS02A or UETTDRIS14A or UETTDRTP09A	3	80	Part
UETTDRIS05A	Perform substation switching operation to a given schedule	New Unit	New Unit	UETTDRCJ03A or UETTDRCJ07A or UETTDRIS02A or UETTDRIS14A or UETTDRTP09A	3	80	Not
UETTDRIS	Install and		New Unit	UETTDREL	4	110	Not

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UET06 Version 1 CSU Code	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)**	**AQF Align.**	**Weighting Points**	**Equivalence - Full, part or not**
06A	maintain network infrastructure electrical equipment	New Unit		01A & UETTDREL02A & UETTDREL04A & UETTDRIS22A & UETTDRIS23A & UEENEEG005A			
UETTDRIS07A	Sample, test, filter, and reinstate insulating oil	UTTNTD204A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UEENEEG005A	3	80	Part
UETTDRIS08A	Develop HV switching schedule	New Unit	New Unit	UETTDRIS03A or UETTDRIS04A or UETTDRIS05A or UETTDRRT10A	4	110	Not

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UET06 Version 1 CSU Code	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)**	**AQF Align.**	**Weighting Points**	**Equivalence - Full, part or not**
UETTDRIS09A	Develop LV switching schedule	New Unit	New Unit	UETTDRIS03A or UETTDRIS04A or UETTDRIS05A or UETTDRRT10A	4	110	Not
UETTDRIS10A	Coordinate permit procedures	New Unit	New Unit	UETTDRIS03A or UETTDRIS04A or UETTDRIS05A or UETTDRRT10A	4	120	Not
UETTDRIS11A	Coordinate and direct switching schedules	New Unit	New Unit	UETTDRIS03A or UETTDRIS04A or UETTDRIS05A or UETTDRRT10A	4	110	Not
UETTDRIS12A	Install and maintain poles/structures and associated	UTTNTD301A	Minor resemblance to previous	UETTDREL01A & UETTDREL02A & UETTDREL	3	90	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalence - Full, part or not
	hardware		unit. Unit has been updated, realigned and reformatted.	04A & UEENEEE001A & UEENEEE002A & UEENEEG002A & UEENEEE008A			
UETTDRIS13A	Install and maintain public lighting systems	UTTNTD304A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ03A or UETTDRCJ07A or UETTDRIS02A or UETTDRIS14A or UETTDRTP09A	3	80	Part
UETTDRIS14A	Install & maintain overhead conductors and cables (Poles and Structures)	UTTNTD305A	Minor resemblance to previous unit. Unit has been updated, realigned and	UETTDRIS12A	3	100	Part

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UET06 Version 1 CSU Code	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)**	**AQF Align.**	**Weighting Points**	**Equivalence - Full, part or not**
			reformatted.				
UETTDRIS15A	Install and maintain low voltage services (Underground)	New Unit	New Unit	UETTDRCJ03A or UETTDRCJ07A or UETTDRIS02A or UETTDRIS14A or UETTDRTP09A	3	80	Not
UETTDRIS16A	Install and maintain low voltage services (overhead)	New Unit	New Unit	UETTDRCJ03A or UETTDRCJ07A or UETTDRIS02A or UETTDRIS14A or UETTDRTP09A	3	80	Not
UETTDRIS17A	Conduct visual checking and treatment of poles and structures	UTTNTD206A	Minor resemblance to previous unit. Unit has been updated,	UETTDRIS12A	2	40	Part

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UET06 Version 1 CSU Code	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)**	**AQF Align.**	**Weighting Points**	**Equivalence - Full, part or not**
			realigned and reformatted.				
UETTDRIS18A	Locate faults in underground power cables	UTTNTD322A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ03A or UETTDRCJ07A or UETTDRIS02A or UETTDRIS14A or UETTDRTP09A	4	110	Part
UETTDRIS19A	Conduct high potential testing of underground power cables	New Unit	New Unit	UETTDRCJ03A or UETTDRCJ07A or UETTDRIS02A or UETTDRIS14A or UETTDRTP09A	3	90	Not
UETTDRIS20A	Install and replace energy meters and associated	UTTNTD311A	Minor resemblance to previous unit.	UETTDRCJ03A or UETTDRCJ07A or UETTDRIS0	3	90	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalence - Full, part or not
	equipment		Unit has been updated, realigned and reformatted.	2A or UETTDRIS14A or UETTDRTP09A			
UETTDRIS21A	Install mobile generation set for synchronised Genset LV	New Unit	New Unit	UETTDRCJ03A or UETTDRCJ07A or UETTDRIS02A or UETTDRIS14A or UETTDRTP09A	3	90	Not
UETTDRIS22A	Implement and monitor the organisational OHS policies, procedures and programs	UTTNTD413A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UEENEEE001A & UETTDREL04A	4	Core	Part
UETTDRIS23A	Implement and monitor environmen	UTTNTD4	Minor resemblance to	UETTDREL01A	4	Core	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalence - Full, part or not
	tal and sustainable energy management policies and procedures	14A	previous unit. Unit has been updated, realigned and reformatted.				
UETTDRIS24A	Install mobile generation set for synchronised genset HV	New Unit	New Unit	UETTDRIS03A or UETTDRIS04A or UETTDRIS05A or UETTDRRT10A & UETTDRIS21A	3	90	Not
UETTDRIS25A	Contribute to coordinated HV live line work	New Unit	New Unit	Nil	3	100	Not
UETTDRIS26A	Manage an electricity supply industry OHS management system	New Unit	New Unit	Nil	5	Core	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalence - Full, part or not
UETTDRIS27A	Install and maintain network infrastructure electrical equipment	New Unit	New Unit	UETTDREL01A & UETTDREL02A & UETTDREL04A & UETTDRIS22A & UETTDRIS23A & UEENEEG005A	4	120	Not

Discipline – Rail Traction

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRRT01A	Install overhead traction wiring systems	UTTNTD323A	Minor resemblance to previous unit. Unit has	UETTDRIS14A	3	90	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
			been updated, realigned and reformatted.				
UETTDRRT02A	Maintain overhead traction wiring systems	UTTNTD323A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRRT01A	3	100	Part
UETTDRRT03A	Install traction bonds	UTTNTD324A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS14A	3	80	Part
UETTDRRT04A	Maintain traction bonds	UTTNTD3	Minor resemblance to	UETTDRRT03A	3	90	Part

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UET06 Version 1 CSU Code	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)**	**AQF Align.**	**Weighting Points**	**Equivalent - Full, part or not**
		24A	previous unit. Unit has been updated, realigned and reformatted.				
UETTDRRT05A	Install overhead traction configurations	UTTNTD325A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRRT02A & UETTDRRT08A	3	90	Part
UETTDRRT06A	Maintain overhead traction configurations	UTTNTD325A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRRT05A	3	100	Part

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UET06 Version 1 CSU Code	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)**	**AQF Align.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRRT07A	Install overhead traction equipment and components	UTTNTD326A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS14A	3	90	Part
UETTDRRT08A	Maintain overhead traction equipment and components	UTTNTD326A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRRT07A	3	100	Part
UETTDRRT09A	Operate road rail traction height access equipment	UTTNTD327A	Minor resemblance to previous unit. Unit has been updated, realigned	UETTDRRT02A & UETTDRRT08A	2	40	Part

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UET06 Version 1 CSU Code	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)**	**AQF Align.**	**Weighting Points**	**Equivalent - Full, part or not**
			and reformatted.				
UETTDRRT10A	Perform rail traction switching operation to a given schedule	New Unit	New Unit	UETTDRRT02A & UETTDRRT08A	3	80	Not
UETTDRRT11A	Maintain energised DC traction overhead wiring system	New Unit	New Unit	BSBFLM412A & UETTDRIS25A & UETTDRRT06A & UETTDRRT09A	4	120	Not
UETTDRRT12A	Maintain energised traction overhead electrical apparatus (Stick)	New Unit	New Unit	UETTDRRT11A	4	130	Not
UETTDRRT13A	Maintain energised traction overhead electrical apparatus	New Unit	New Unit	UETTDRRT11A	4	130	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
	(Glove)						
UETTDRRT14A	Install and maintain traction network wiring systems	New Unit	New Unit	UETTDRIS27A	4	110	Not
UETTDRRT15A	Install and maintain traction network equipment & components	New Unit	New Unit	UETTDRRT14A	4	130	Not

Discipline – Substation

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRSB01A	Diagnose and rectify faults in power	New Unit	New Unit	UEENEEG005A	4	Core	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
	systems substation environment						
UETTDRSB02A	Carry out substation inspections	New Unit	New Unit	UEENEEG005A	4	Core	Not
UETTDRSB03A	Install and maintain substation DC systems	New Unit	New Unit	UEENEEG005A	4	Core	Not
UETTDRSB04A	Maintain HV power system circuit breakers	New Unit	New Unit	UEENEEG005A	4	Core	Not
UETTDRSB05A	Maintain HV power system – transformers & instrument transformers	New Unit	New Unit	UEENEEG005A	4	Core	Not
UETTDRSB06A	Install high current DC switchgear & equipment	New Unit	New Unit	UEENEEG005A	4	110	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRSB07A	Maintain high current DC switchgear & equipment	New Unit	New Unit	UEENEEG005A	4	110	Not
UETTDRSB08A	RESERVED						
UETTDRSB09A	Maintain HV regulating equipment – capacitor banks	New Unit	New Unit	UEENEEG005A	4	110	Not
UETTDRSB10A	Maintain HV power system static VAR compensators	New Unit	New Unit	UEENEEG005A	4	110	Not
UETTDRSB11A	Maintain HV power system synchronous condensers	New Unit	New Unit	UEENEEG005A	4	110	Not
UETTDRSB12A	Maintain voltage regulating equipment – on load Tapchange	New Unit	New Unit	UEENEEG005A	4	110	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
	rs						
UETTDRSB13A	Install HV plant and equipment	New Unit	New Unit	UEENEEG005A	4	110	Not
UETTDRSB14A	Carry out thermovision surveys	New Unit	New Unit	UEENEEG005A	3	90	Not
UETTDRSB15A	Maintain discrete protection and control systems	New Unit	New Unit	UEENEEG005A	4	110	Not
UETTDRSB16A	Commission discrete protection and control systems	New Unit	New Unit	UEENEEG005A	4	110	Not
UETTDRSB17A	Maintain distribution field devices	New Unit	New Unit	UEENEEG005A	4	110	Not
UETTDRSB18A	Commission distribution field devices	New Unit	New Unit	UEENEEG005A	4	110	Not

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Discipline – Systems Operations

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRSO02A	Manage network faults	New Unit	New Unit	UETTDRSO05A or UETTDRSO12A or UETTDRSO13A	6	220	Not
UETTDRSO03A	Manage critical events	New Unit	New Unit	UETTDRSO02A	6	220	Not
UETTDRSO04A	Control generating plant	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG0	6	180	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				49A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRSO05A	Manage HV distribution and subtransmission network demand	New Unit	New Unit	UETTDRSO10A	6	220	Not
UETTDRSO06A	Develop LV distribution switching programs	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE00	5	150	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				7A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRSO07A	Develop HV distribution and subtransmission switching programs	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH0	5	150	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				11A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRSO08A	Develop and evaluate transmission switching programs	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH0	5	150	Not

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UET06 Version 1 CSU Code	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)**	**AQF Align.**	**Weighting Points**	**Equivalent - Full, part or not**
				39A & UEENEEH070A & UETTDRIS26A			
UETTDRSO09A	Coordinate LV distribution networks	New Unit	New Unit	UETTDRSO06A	5	150	Not
UETTDRSO10A	Coordinate HV distribution and subtransmission networks	New Unit	New Unit	UETTDRSO07A	5	150	Not
UETTDRSO11A	Manage transmission networks	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A &	6	200	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRSO08A			
UETTDRSO12A	Manage transmission network demand	New Unit	New Unit	UETTDRSO11A	6	200	Not
UETTDRSO13A	Coordinate LV distribution network demand	New Unit	New Unit	UETTDRSO09A	5	150	Not
UETTDRSO14A	Develop crisis management plans	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED0	6	180	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				04A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			

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Discipline – Transmission

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRTP02A	Establish and reinstate a transmission tower work site	New Unit	New Unit	UETTDREL03A & UEENEEE001A	2	35	Not
UETTDRTP03A	Erect transmission towers	UTTNTD208A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDREL03A & UEENEEE001A	2	Core	Part
UETTDRTP04A	Erect transmission tower hardware	UTTNTD208A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRTP03A	2	30	Part

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UET06 Version 1 CSU Code	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)**	**AQF Align.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRTP05A	Pre-tension stringing transmission overhead conductors and cables	UTTNTD211A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRTP04A	2	35	Part
UETTDRTP06A	Erect transmission towers and associated hardware	UTTNTD208A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDREL01A & UETTDREL02A & UETTDREL04A & UEENEEE001A & UEENEEE002A & UEENEEG002A & UEENEEE008A	3	100	Part
UETTDRTP07A	Maintain transmission towers and associated	UTTNTD302A	Minor resemblance to previous unit.	UETTDRTP06A	3	100	Part

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UET06 Version 1 CSU Code	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)**	**AQF Align.**	**Weighting Points**	**Equivalent - Full, part or not**
	hardware		Unit has been updated, realigned and reformatted.				
UETTDRTP08A	Transmission tower stub setting	New Unit	New Unit	Nil	3	90	Not
UETTDRTP09A	Install and maintain overhead conductors and cables (Towers).	UTTNTD305A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRTP07A	3	100	Part
UETTDRTP10A	Inspect overhead structures and electrical apparatus (Towers)	UTTNTD303A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatte	UETTDRTP07A	3	100	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
			d.				
UETTDRTP11A	Maintain energised lines (Transmission) using live line stick technique	UTTNTD444A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	BSBFLM412A & UETTDRIS25A & UETTDRTP09A	4	130	Part
UETTDRTP12A	Maintain energised lines (Transmission) using Barehand Technique	UTTNTD444A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRTP11A	4	130	Part
UETTDRTP13A	Maintain energised lines (Transmission) using Barehand Technique on a	UTTNTD444A	Minor resemblance to previous unit. Unit has been updated,	UETTDRTP12A	4	130	Part

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UET06 Version 1 CSU Code	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)**	**AQF Align.**	**Weighting Points**	**Equivalent - Full, part or not**
	helicopter platform		realigned and reformatted.				
UETTDRTP14A	Install and maintain overhead transmission network infrastructure	New Unit	New Unit	UETTDREL01A & UETTDREL02A & UETTDREL04A & UETTDRIS22A & UETTDRIS23A & UEENEEG005A	4	120	Not
UETTDRTP15A	Install and maintain transmission network infrastructure electrical equipment	New Unit	New Unit	UETTDRTP14A	4	130	Not

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Discipline – Testing

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRTS01A	Maintain network protection and control systems (Interdependent)	New Unit	New Unit	UETTDRTS09A	5	150	Not
UETTDRTS02A	Commission network protection and control systems (Interdependent)	New Unit	New Unit	UETTDRTS01A	5	150	Not
UETTDRTS03A	Conduct evaluation of power system faults within a substation	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE0	6	180	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				02A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRTS04A	Design testing and commissioning procedures for substation and field devices	New Unit	New Unit	UETTDRTS06A & UETTDRTS08A & UETTDRTS12A & UETTDRTS15A	6	180	Not
UETTDRTS05A	Test and maintain metering schemes	New Unit	New Unit	UETTDRTS09A	5	140	Not
UETTDRTS06A	Commission metering	New Unit	New Unit	UETTDRTS05A	5	150	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
	schemes						
UETTDRTS07A	Perform accuracy checks on instrument transformers	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A	5	150	Not
UETTDRTS08A	Test, repair and calibrate protection relays and	New Unit	New Unit	BSBMGT507A &	5	150	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
	meters			UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRTS09A	Develop secondary isolation instructional documents	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED0	5	150	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				27A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRTS10A	Design secondary isolation instructional documents	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED0	6	200	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				28A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRTS11A	Maintain, test and commission voltage regulating equipment	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE0	4	120	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				07A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRTS12A	Conduct evaluation of primary plant	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG0	6	200	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				49A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRTS13A	Undertake project management of substation augmentation and maintenance	New Unit	New Unit	UETTDRTS06A & UETTDRTS08A & UETTDRTS12A & UETTDRTS15A	6	220	Not
UETTDRTS14A	Install and maintain power system communication equipment	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE0	5	150	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				02A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRTS15A	Maintain network protection and control systems (Complex)	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE0	6	220	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				07A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRTS01A			
UETTDRTS16A	Commission network protection and control systems (complex)	New Unit	New Unit	UETTDRTS02A & UETTDRTS15A	6	220	Not

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Discipline – Vegetation

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRVC01A	Cut vegetation above ground outside live work zone near live electrical apparatus (Climbing)	New Unit	New Unit	UETTDRVC07A	2	35	Not
UETTDRVC02A	Operate vegetation control plant, machinery and equipment near live electrical apparatus	New Unit	New Unit	UETTDRVC03A	2	Core	Not
UETTDRVC03A	Plan for the removal of vegetation up to vegetatio	New Unit	New Unit	UETTDREL03A & UETTDREL04A & UEENEEE001A	2	Core	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
	n exclusion zone near live electrical apparatus						
UETTDRVC04A	Assess vegetation and recommend control measures for work near live electrical apparatus	New Unit	New Unit	UETTDRVC01A or UETTDRVC05A or UETTDRVC06A or UETTDRVC08A	2	35	Not
UETTDRVC05A	Cut vegetation above ground outside live work zone near live electrical apparatus (Platform)	New Unit	New Unit	UETTDRVC07A	2	30	Not
UETTDRVC06A	Cut vegetation at	New Unit	New Unit	UETTDRVC07A	2	30	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
	ground level outside vegetation exclusion zone near live electrical apparatus						
UETTDRVC07A	Monitor safety compliance for vegetation work near live electrical apparatus	New Unit	New Unit	UETTDRVC02A	2	Core	Not
UETTDRVC08A	Safe use of elevating work platform (EWP) near live electrical apparatus	New Unit	New Unit	UETTDRVC07A	2	35	Not
UETTDRVC09A	Control vegetation (Linewor	UTTNTD318A	Minor resemblance to previous	UETTDRIS14A	3	80	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
	k)		unit. Unit has been updated, realigned and reformatted.				
UETTDRVC10A	Coordinate vegetation control work	UTTNTD406A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS22A & UETTDRIS23A	4	120	Part

Discipline – Universal Electrotechnology Units

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
UEUNEED0	Assemble, set-up and	New Unit	New Unit	UEUNEEE002A &	2	Core	Not

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UET06 Version 1 CSU Code	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)**	**AQF Align.**	**Weighting Points**	**Equivalent - Full, part or not**
02A	test personal computers			UEUNEEE007A			
UEUNEED004A	Use engineering applications software	New Unit	New Unit	Nil	3/4	Core	Not
UEUNEED017A	Install and configure internetworking systems	New Unit	New Unit	Nil	4	Core	Not
UEUNEED027A	Develop structured programs for control sub systems to access external devices	New Unit	New Unit	Nil	3/4	Core	Not
UEUNEED028A	Develop and test basic specification for microcontroller equipped devices	New Unit	New Unit	Nil	5/6	Core	Not
UEUNEEE001A	Apply OHS practices in the work place	New Unit	New Unit	Nil	1/2	Core	Not
UEUNEEE002A	Dismantle, assemble and	New Unit	New Unit	Nil	1/2	Core	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
	fabricate electrotechnology components						
UEUNEEE003A	Solve problems in extra-low voltage single path circuits	New Unit	New Unit	Nil	1/2	Core	Not
UEUNEEE004A	Solve problems in multiple path d.c. circuits	New Unit	New Unit	UEUNEEE003A	1/2	Core	Not
UEUNEEE005A	Fix and secure equipment	New Unit	New Unit	Nil	1/2/3	Core	Not
UEUNEEE007A	Use drawings, diagrams, schedules and manuals	New Unit	New Unit	Nil	2	Core	Not
UEUNEEE008A	Lay wiring/cabling and terminate accessories for extra-low voltage circuits	New Unit	New Unit	UEUNEEE002A & UEUNEEE005A & UEUNEEE007A	2	Core	Not
UEUNEEG0	Solve	New Unit	New Unit	UEUNEEE0	3	Core	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
01A	problems in electromagnetic circuits			04A			
UEUNEEG002A	Solve problems in single and three phase low voltage circuits	New Unit	New Unit	UEUNEEG001A	3	Core	Not
UEUNEEG047A	Provide computational solutions to power engineering problems	New Unit	New Unit	UEUNEEG002A	4/5	Core	Not
UEUNEEG048A	Solve problems in complex multiple path power circuits	New Unit	New Unit	UEUNEEG047A	4/5	Core	Not
UEUNEEG049A	Solve problems in complex polyphase power circuits	New Unit	New Unit	UEUNEEG048A	5/6	Core	Not
UEUNEEH011A	Solve problems in d.c. power supplies with single phase	New Unit	New Unit	UEUNEEH002A & UEUNEEH0	3	Core	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
	input.			14A			
UEUNEEH012A	Solve problems in digital components of electronic apparatus	New Unit	New Unit	UEUNEEH002A or UEUNEEE070A	3	Core	Not
UEUNEEH039A	Solve problems in basic amplifier circuits	New Unit	New Unit	UEUNEEH002A or UEUNEEH070A & UEUNEEH014A or UEENEEG002A	3	Core	Not
UEUNEEH070A	Terminate and connect components, conductors, wiring and cables for electronic circuits	New Unit	New Unit	UEUNEEE002A & UEUNEEE007A & UEUNEEG012A or UEUNEEG0	6	Core	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF Align.	Weighting Points	Equivalent - Full, part or not
				49A			

Table 3 Relationship between UET09 Version 1 Units and UET06 Version 1 Units

Table 3 Relationship between UET09 Version 1 Units and UET06 Version 1 Units

Discipline – Cable Jointing

UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
UETTDRCJ01B	Lay electrical cables	UETTDRCJ01A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDREL01B & UETTDREL02B & UETTDREL04B & UEENEEE001B & UEENEEE002B & UEENEEE004B & UEENEEE00	3	30	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
				5B & UEENEEE007B & UEENEEG001B & UEENEEG002B *UEENEEE003B*			
UETTDRCJ02B	Install and maintain de-energised LV underground paper insulated cables	UETTDRCJ02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ01B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG0*	3	100	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
				01B *UEENEEG002B*			
UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables.	UETTDRCJ03A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ01B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*	3	100	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
UETTDRCJ04B	Joint and maintain energised LV underground paper insulated cables	UETTDRCJ04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ02B *UETTDRCJ01B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*	3	100	Full
UETTDRCJ05B	Perform straight through	UETTDRCJ05A	Revised Unit includes	UETTDRCJ07B	3	90	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
	HV paper insulated to polymeric transition joint		editorial changes, reformatted unit layout and updated pre-requisites	*UETTDRCJ01B* *UETTDRCJ06B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRCJ06B	Install and maintain de-energised LV	UETTDRCJ06A	Revised Unit includes editorial	UETTDRCJ01B	3	90	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
	underground polymeric cables		changes, reformatted unit layout and updated pre-requisites	*UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRCJ07B	Install and maintain de-energised HV underground polymeric cables	UETTDRCJ07A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ06B *UETTDRCJ01B* *UETTDREL01B* *UETTDREL02B*	3	90	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
				UETTDREL04B *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRCJ08B	Joint and maintain energised LV underground polymeric cables	UETTDRCJ08A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ06B *UETTDRCJ01B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B*	3	90	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
				UEENEEE001B *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRCJ09B	Install oil and gas filled specialised underground cables	UETTDRCJ09A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B & UETTDRCJ07B *UETTDRCJ01B* *UETTDRCJ06B* *UETTDREL01B* *UETTDREL02B*	4	120	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
				UETTDREL04B *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRCJ10B	Maintain oil and gas filled specialised underground cables	UETTDRCJ10A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ09B *UETTDRCJ01B* *UETTDRCJ03B* *UETTDRCJ06B* *UETTDRCJ07B*	4	120	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
				UETTDREL01B *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRCJ11B	Install and maintain polymeric specialised underground cables	UETTDRCJ11A	Revised Unit includes editorial changes, reformatted unit layout and updated	UETTDRCJ03B & UETTDRCJ07B *UETTDRCJ01B*	4	130	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
			pre-requisites	*UETTDRCJ06B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRCJ12B	Install and maintain oil & gas pressure systems for specialise	UETTDRCJ12A	Revised Unit includes editorial changes, reformatted unit	UETTDRCJ03B & UETTDRCJ07B	4	130	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
	d underground cables		layout and updated pre-requisites	*UETTDRCJ01B* *UETTDRCJ06B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
UETTDRCJ13B	Install and maintain network infrastructure LV underground cables	UETTDRCJ13A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS06B *A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.* *&* *UETTDREL02B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE001B* *UETTDREL01B* *UETTDREL04B*	4	120	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
UETTDRCJ14B	Install and maintain network infrastructure HV underground cables	UETTDRCJ14A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ13B *A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.* *&* *UETTDRIS06B* *UETTDREL02B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE001B* *UETTDREL01B* *UETTDREL0*	4	130	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
				4B			

Discipline - Distribution

UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
UETTDRDP01B	Inspect overhead structures and electrical apparatus (poles /structures)	UETTDRDP01A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS12B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE00*	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				4B *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRDP02B	Maintain overhead energised LV conductors and cables	UETTDRDP02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS14B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE00*	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				7B *UEENEEG001B*			
UETTDRDP03B	Maintain energised high voltage distribution overhead electrical apparatus (stick)	UETTDRDP03A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	BSBWOR402A & UETTDRDP02B & UETTDRIS02B & UETTDRIS25B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS01B* *UETTDRIS12B* *UETTDRIS14B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B*	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEENEEE004B *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRDP04B	Maintain energised high voltage distribution overhead electrical apparatus (glove)	UETTDRDP04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	BSBWOR402A & UETTDRDP02B & UETTDRIS02B & UETTDRIS25B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS01B* *UETTDRIS12B* *UETTDRIS1*	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				4B *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRDP05B	Inspect, maintain and restore energised LV overhead distribution network infrastructure	UETTDRDP05A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS06B UETTDRIS27B *A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or*	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence. *&* *UETTDREL02B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE001B* *UETTDREL01B* *UETTDREL04B*			

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Discipline - Design

UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
UETTDRDS01B	Draft and layout an overhead distribution extension	UETTDRDS01A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS22B & UETTDRIS23B & UEENEEE002B & UEENEEE007B & UEENEEG002B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B*	4	110	Full
UETTDRDS02B	Draft and layout an underground distribution extension	UETTDRDS02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS22B & UETTDRIS23B & UEENEEE002B & UEENEEE007B & UEENEEG002B *UETTDREL*	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				01B *UETTDREL04B* *UEENEEE001B*			
UETTDRDS03B	Draft and layout a street lighting system	UETTDRDS03A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS22B & UETTDRIS23B & UEENEEE002B & UEENEEE007B & UEENEEG002B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B*	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRDS04B	Draft and layout a distribution substation minor upgrade	UETTDRDS04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS22B & UETTDRIS23B & UEENEEE002B & UEENEEE007B & UEENEEG002B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B*	4	120	Full
UETTDRDS05B	Design overhead distribution systems	UETTDRDS05A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS13B & UETTDRDS15B *UETTDRDS09B* *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS2*	5	140	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				3B *UEENEEE001B* *UEENEEE007B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRDS06B	Design underground distribution systems	UETTDRDS06A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS13B & UETTDRDS15B *UETTDRDS09B* *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE0*	5	140	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				01B *UEENEEE007B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRDS07B	Design distribution substations	UETTDRDS07A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS13B & UETTDRDS15B *UETTDRDS09B* *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE001B* *UEENEEE0*	5	140	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				07B *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRDS08B	Design public lighting systems	UETTDRDS08A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS13B & UETTDRDS15B *UETTDRDS09B* *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE001B* *UEENEEE007B* *UEENEEG0*	5	140	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRDS09B	Prepare and manage detailed construction plans for electrical system infrastructure	UETTDRDS09A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEEG002B & UETTDRIS23B *UETTDREL01B*	5	140	Full
UETTDRDS10B	Prepare and appraise financial impact statements	UETTDRDS10A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS09B OR UETTDRTS16B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS2*	6	200	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				3B *UETTDRTS01B* *UETTDRTS02B* *UETTDRTS09B* *UETTDRTS15B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEED004B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRDS11B	Manage electrical infrastructure projects	UETTDRDS11A	Revised Unit includes editorial changes,	UETTDRDS10B *UETTDREL*	6	200	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			reformatted unit layout and updated pre-requisites	*01B* *UETTDREL04B* *UETTDRDS09B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRTS01B* *UETTDRTS02B* *UETTDRTS09B* *UETTDRTS15B* *UETTDRTS16B* *UEENEEE001B* *UEENEED004B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				47B *UEENEEG048B* *UEENEEG049B*			
UETTDRDS12B	Investigate quality of supply issues	UETTDRDS12A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS05B & UETTDRDS06B *UETTDRDS09B* *UETTDRDS13B* *UETTDRDS15B* *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE001B* *UEENEEE007B* *UEENEEG0*	5	140	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRDS13B	Develop HV and LV distribution protection systems	UETTDRDS13A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEEG049B & UEENEEE007B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEE001B*	5	150	Full
UETTDRDS	Design zone	UETTDRDS	Revised	UEENEEE0	5	160	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
14B	substations modifications	14A	Unit includes editorial changes, reformatted unit layout and updated pre-requisites	02B & UEENEEE007B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B*			
UETTDRDS15B	Organise and implement line and easement surveys	UETTDRDS15A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS09B *UEENEEG002B* *UETTDRIS23B* *UETTDREL01B*	5	140	Full
UETTDRDS16B	Develop planned outage strategies	UETTDRDS16A	Revised Unit includes editorial changes, reformatte	UEENEED004B OR UETTDRIS22B	5	140	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			d unit layout and updated pre-requisites	*UETTDREL04B* *UEENEEE001B*			
UETTDRDS17B	Review asset management strategies	UETTDRDS17A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS09B OR UETTDRTS16B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEED004B* *UEENEEE001B* *UEENEEG002B*	6	180	Full
UETTDRDS18B	Analyse and appraise fault and outage data	UETTDRDS18A	Revised Unit includes editorial changes,	UETTDRDS09B *UEENEEG0*	6	180	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			reformatted unit layout and updated pre-requisites	*02B UETTDRIS23B* *UETTDREL01B*			
UETTDRDS19B	Establish and manage geographical information systems data	UETTDRDS19A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UETTDRIS22B *UETTDREL04B* *UEENEEE001B*	5	140	Full
UETTDRDS20B	Design customer substations	UETTDRDS20A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS07B *UETTDRDS09B* *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS2*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				3B *UEENEEE001B* *UEENEEE007B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRDS21B	Manage transmission and sub-transmission design process	UETTDRDS21A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS09B *UEENEEG002B* *UETTDRIS23B* *UETTDREL01B*	6	180	Full
UETTDRDS22B	Design transmission, sub-transmission and zone	UETTDRDS22A	Revised Unit includes editorial changes, reformatte	UETTDRDS09B & UETTDRDS14B	6	200	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	substation buildings		d unit layout and updated pre-requisites	*UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEG002B* *UEENEEE001B* *UEENEEE002B* *UEENEEE007B*			
UETTDRDS23B	Design transmission and sub-transmission substation primary plant	UETTDRDS23A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS09B & UETTDRDS14B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEG0*	6	220	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B *UEENEEE001B* *UEENEEE002B* *UEENEEE007B*			
UETTDRDS24B	Design transmission and sub-transmission protection and control	UETTDRDS24A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS09B & UETTDRDS14B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEG002B* *UEENEEE001B* *UEENEEE002B* *UEENEEE007B*	6	220	Full
UETTDRDS	Design	UETTDRDS	Revised	UETTDRDS	6	200	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
25B	transmission and sub-transmission substation earthing	25A	Unit includes editorial changes, reformatted unit layout and updated pre-requisites	09B & UETTDRDS 14B *UETTDREL 01B* *UETTDREL 04B* *UETTDRIS2 2B* *UETTDRIS2 3B* *UEENEEG0 02B* *UEENEEE0 01B* *UEENEEE0 02B* *UEENEEE0 07B*			
UETTDRDS 26B	Design transmission, sub-transmission and zone substation – civil and structural components	UETTDRDS 26A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS 09B & UETTDRDS 14B *UETTDREL 01B* *UETTDREL 04B* *UETTDRIS2*	6	200	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				2B *UETTDRIS23B* *UEENEEG002B* *UEENEEE001B* *UEENEEE002B* *UEENEEE007B*			
UETTDRDS27B	Design overhead transmission systems	UETTDRDS27A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS15B *UETTDRDS09B* *UEENEEG002B* *UETTDRIS23B* *UETTDREL01B*	6	200	Full
UETTDRDS28B	Design underground transmission systems	UETTDRDS28A	Revised Unit includes editorial changes, reformatted unit layout	UETTDRDS15B *UETTDRDS09B* *UEENEEG0*	6	200	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
			and updated pre-requisites	*02B UETTDRIS23B* *UETTDREL01B*			

Discipline – Entry Level Cross Discipline

UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
UETTDREL01B	Apply environmental and sustainable energy procedures	UETTDREL01A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	Nil	3	Core	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDREL02B	Operate plant and equipment near live electrical conductors/apparatus	UETTDREL02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	Nil	3	Core	Full
UETTDREL03B	Comply with environmental and incidental response procedures	UETTDREL03A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	Nil	2	Core TLA and Possible Skill Sets Unit	Full
UETTDREL04B	Working safely near live electrical apparatus as non electrical worker	UETTDREL04A	Revised Unit includes editorial changes, reformatted unit layout and	Nil	2	Core TLA and Possible Skill Sets Unit	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			updated pre-requisites				
UETTDREL05B	Respond to technical enquiries and requests	UETTDREL05A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	Nil	3	Possible Skill Sets Unit 90	Full

Discipline – Industry Specific

UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRIS01B	Install electrical equipment (network infrastructure)	UETTDRIS01A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDREL01B & UETTDREL02B & UETTDREL04B & UEENEEE001B & UEENEEE002B & UEENEEE004B & UEENEEE005B & UEENEEE007B & UEENEEG001B & UEENEEG002B *UEENEEE003B*	3	100	Full
UETTDRIS02B	Maintain electrical equipment (network infrastructure)	UETTDRIS02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS01B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B*	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEENEEE001B *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS03B	Perform LV field switching operation to a given schedule	UETTDRIS03A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS02B or UETTDRIS14B or UETTDRTP09B *UETTDREL01B* *UETTDREL02B*	3	80	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDREL04B *UETTDRCJ01B* *UETTDRCJ06B* *UETTDRIS01B* *UETTDRIS12B* *UETTDRTP06B* *UETTDRTP07B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRIS04B	Perform high voltage field switching operation to a given schedule	UETTDRIS04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS02B or UETTDRIS14B or UETTDRTP09B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRCJ01B* *UETTDRCJ06B* *UETTDRIS01B* *UETTDRIS12B* *UETTDRTP06B* *UETTDRTP07B* *UEENEEE001B* *UEENEEE0*	3	80	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS05B	Perform substation switching operation to a given schedule	UETTDRIS05A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS02B or UETTDRIS14B or UETTDRTP09B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRCJ01B*	3	80	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDRCJ06B *UETTDRIS01B* *UETTDRIS12B* *UETTDRTP06B* *UETTDRTP07B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRIS06B	Install and maintain network infrastructure electrical equipment	UETTDRIS06A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDREL02B & UETTDRIS22B & UETTDRIS23B & A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence. *UEENEEE001B* *UETTDREL01B* *UETTDREL04B*	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRIS07B	Sample, test, filter and reinstate insulating oil	UETTDRIS07A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	3	80	Full
UETTDRIS08B	Develop HV switching schedule	UETTDRIS08A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS03B or UETTDRIS04B or UETTDRIS05B or UETTDRRT10B *UETTDRCJ01B* *UETTDRCJ03B* *UETTDRCJ06B* *UETTDRCJ0*	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				7B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS01B* *UETTDRIS02B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRTP06B* *UETTDRTP07B* *UETTDRTP09B* *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT08B* *UEENEEE001B* *UEENEEE0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS09B	Develop LV switching schedule	UETTDRIS09A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS03B or UETTDRIS04B or UETTDRIS05B or UETTDRRT10B *UETTDRCJ01B* *UETTDRCJ03B* *UETTDRCJ06B* *UETTDRCJ07B* *UETTDREL*	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				01B *UETTDREL02B* *UETTDREL04B* *UETTDRIS01B* *UETTDRIS02B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRTP06B* *UETTDRTP07B* *UETTDRTP09B* *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT08B* *UEENEEE001B* *UEENEEE002B* *UEENEEE0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				03B *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS10B	Coordinate permit procedures	UETTDRIS10A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS03B or UETTDRIS04B or UETTDRIS05B or UETTDRRT10B *UETTDRCJ01B* *UETTDRCJ03B* *UETTDRCJ06B* *UETTDRCJ07B* *UETTDREL01B*	4	120	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDREL02B *UETTDREL04B* *UETTDRIS01B* *UETTDRIS02B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRTP06B* *UETTDRTP07B* *UETTDRTP09B* *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT08B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				04B *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS11B	Coordinate and direct switching schedules	UETTDRIS11A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS03B or UETTDRIS04B or UETTDRIS05B or UETTDRRT10B *UETTDRCJ01B* *UETTDRCJ03B* *UETTDRCJ06B* *UETTDRCJ07B* *UETTDREL01B* *UETTDREL02B*	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDREL04B *UETTDRIS01B* *UETTDRIS02B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRTP06B* *UETTDRTP07B* *UETTDRTP09B* *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT08B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				05B *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS12B	Install and maintain poles/structures and associated hardware	UETTDRIS12A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDREL01B & UETTDREL02B & UETTDREL04B & UEENEEE001B & UEENEEE002B & UEENEEE004B & UEENEEE005B & UEENEEE007B & UEENEEG001B *UEENEEE003B*	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRIS13B	Install and maintain public lighting systems	UETTDRIS13A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS02B or UETTDRIS14B or UETTDRTP09B	3	80	Full
UETTDRIS14B	Install and maintain overhead conductors and cables (poles and structures)	UETTDRIS14A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS12B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE0*	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				07B *UEENEEG001B*			
UETTDRIS15B	Install and maintain low voltage services (underground)	UETTDRIS15A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS02B or UETTDRIS14B or UETTDRTP09B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRCJ01B* *UETTDRCJ06B* *UETTDRIS01B* *UETTDRIS12B* *UETTDRTP06B*	3	80	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDRTP07B *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS16B	Install and maintain low voltage services (overhead)	UETTDRIS16A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS02B or UETTDRIS14B or UETTDRTP09B *UETTDREL01B*	3	80	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDREL02B *UETTDREL04B* *UETTDRCJ01B* *UETTDRCJ06B* *UETTDRIS01B* *UETTDRIS12B* *UETTDRTP06B* *UETTDRTP07B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B			
UETTDRIS17B	Conduct visual checking and treatment of poles and structures	UETTDRIS17A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS12B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*	2	40	Full
UETTDRIS18B	Locate faults in underground power	UETTDRIS18A	Revised Unit includes editorial changes,	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS0	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	cables		reformatted unit layout and updated pre-requisites	2B or UETTDRIS14B or UETTDRTP09B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRCJ01B* *UETTDRCJ06B* *UETTDRIS01B* *UETTDRIS12B* *UETTDRTP06B* *UETTDRTP07B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				04B *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS19B	Conduct high potential testing of underground power cables	UETTDRIS19A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS02B or UETTDRIS14B or UETTDRTP09B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRCJ01B* *UETTDRCJ06B* *UETTDRIS0*	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				1B *UETTDRIS12B* *UETTDRTP06B* *UETTDRTP07B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS20B	Install and replace energy meters and associated equipment	UETTDRIS20A	Revised Unit includes editorial changes, reformatted unit layout and	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS02B or UETTDRIS14B or	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			updated pre-requisites	UETTDRTP09B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRCJ01B* *UETTDRCJ06B* *UETTDRIS01B* *UETTDRIS12B* *UETTDRTP06B* *UETTDRTP07B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				05B *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS21B	Install mobile generation set for synchronised Genset LV	UETTDRIS21A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS02B or UETTDRIS14B or UETTDRTP09B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRCJ01B* *UETTDRCJ06B* *UETTDRIS01B* *UETTDRIS1*	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				2B *UETTDRTP06B* *UETTDRTP07B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS22B	Implement and monitor the organisational OHS policies, procedures and programs	UETTDRIS22A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requis	UEENEEE001B & UETTDREL04B	4	Core	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			ites				
UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures	UETTDRIS23A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDREL01B	4	Core	Full
UETTDRIS24B	Install mobile generation set for synchronised genset HV	UETTDRIS24A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS03B or UETTDRIS04B or UETTDRIS05B or UETTDRRT10B & UETTDRIS21B *UETTDRCJ01B* *UETTDRCJ03B* *UETTDRCJ0*	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				6B *UETTDRCJ07B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS01B* *UETTDRIS02B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT07B* *UETTDRRT08B* *UETTDRTP06B* *UETTDRTP07B* *UETTDRTP*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				09B *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS25B	Contribute to coordinated high voltage live line work	UETTDRIS25A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	Nil	3	100	Full
UETTDRIS26B	Manage an electricity	UETTDRIS26A	Revised Unit	Nil	5	Core	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	supply industry OHS management system		includes editorial changes, reformatted unit layout and updated pre-requisites				
UETTDRIS27B	Install and maintain overhead distribution network infrastructure	UETTDRIS27A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDREL02B & UETTDRIS22B & UETTDRIS23B & A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	120	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDREL01B *UETTDREL04B* *UEENEEE001B*			
UETTDRIS28A	Analyse and develop solutions for problems in extra-low voltage, single path circuits	New Unit – UET09 Version 1	New Unit	Nil	6	Core	
UETTDRIS29A	Analyse and develop solutions for problems in multiple path d.c. circuits	New Unit – UET09 Version 1	New Unit	UETTDRIS28A	6	Core	
UETTDRIS30A	Analyse and develop solutions for problems in electromagnetic circuits	New Unit – UET09 Version 1	New Unit	Nil	6	Core	

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRIS31A	Analyse and develop solutions for problems in single and three phase low voltage circuits	New Unit – UET09 Version 1	New Unit	Nil	6	Core	

Discipline – Rail Traction

UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRRT01B	Install overhead traction wiring systems	UETTDRRT01A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS14B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS1*	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				2B *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRRT02B	Maintain overhead traction wiring systems	UETTDRRT02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRRT01B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B* *UEUNEEE0*	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				01B *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRRT03B	Install traction bonds	UETTDRRT03A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS14B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE0*	3	80	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				03B *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRRT04B	Maintain traction bonds	UETTDRRT04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRRT03B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE0*	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				04B *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRRT05B	Install overhead traction configurations	UETTDRRT05A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRRT02B & UETTDRRT08B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRRT01B* *UETTDRRT07B* *UEUNEEE001B* *UEUNEEE0*	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRRT06B	Maintain overhead traction configurations	UETTDRRT06A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRRT05B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT*	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				07B *UETTDRRT 08B* *UEUNEEE0 01B* *UEUNEEE0 02B* *UEENEEE0 03B* *UEENEEE0 04B* *UEENEEE0 05B* *UEENEEE0 07B* *UEENEEG0 01B*			
UETTDRRT 07B	Install overhead traction equipment and components	UETTDRRT 07A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS14B *UETTDREL 01B* *UETTDREL 02B* *UETTDREL 04B* *UETTDRIS12B* *UEUNEEE0*	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				01B *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRRT08B	Maintain overhead traction equipment and components	UETTDRRT08A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRRT07B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B* *UEUNEEE001B* *UEUNEEE0*	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRRT09B	Operate road rail traction height access equipment	UETTDRRT09A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRRT02B & UETTDRRT08B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRRT01B* *UETTDRRT*	2	40	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				07B *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRRT10B	Perform rail traction switching operations to a given schedule	UETTDRRT10A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRRT02B & UETTDRRT08B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B*	3	80	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDRRT01B *UETTDRRT07B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRRT11B	Maintain energised direct current traction overhead wiring system	UETTDRRT11A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	BSBWOR402A & UETTDRIS25B & UETTDRRT06B & UETTDRRT09B *UETTDREL01B* *UETTDREL*	4	120	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT05B* *UETTDRRT07B* *UETTDRRT08B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				01B			
UETTDRRT12B	Maintain energised traction overhead electrical apparatus (stick)	UETTDRRT12A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRRT11B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRIS25B* *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT05B* *UETTDRRT06B* *UETTDRRT*	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				07B *UETTDRRT08B* *UETTDRRT09B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *BSBWOR402A*			
UETTDRRT13B	Maintain energised traction overhead electrical apparatus (glove)	UETTDRRT13A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requis	UETTDRRT11B *UETTDREL01B* *UETTDREL02B* *UETTDREL*	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			ites	*04B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRIS25B* *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT05B* *UETTDRRT06B* *UETTDRRT07B* *UETTDRRT08B* *UETTDRRT09B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				05B *UEENEEE007B* *UEENEEG001B* *BSBWOR402A*			
UETTDRRT14B	Install and maintain traction network wiring systems	UETTDRRT14A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS27B & A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence. *UETTDREL02B* *UETTDRIS22B*	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDRIS23B *UEENEEE001B* *UETTDREL01B* *UETTDREL04B*			
UETTDRRT15B	Install and maintain traction network equipment and components	UETTDRRT15A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRRT14B & A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence. *UETTDRRT11B* *UETTDREL01B*	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDREL02B *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRIS25B* *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT05B* *UETTDRRT06B* *UETTDRRT07B* *UETTDRRT08B* *UETTDRRT09B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				04B *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *BSBWOR402A*			

Discipline – Substation

UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRSB01B	Diagnose and rectify faults in power system substation environment	UETTDRSB01A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requis	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction	4	Core	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			ites	of the ERAC requirements for the issue of an unrestricted electrician's licence.			
UETTDRSB02B	Carry out substation inspection	UETTDRSB02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	Core	Full
UETTDRSB03B	Install and maintain substation DC system	UETTDRSB03A	Revised Unit includes editorial changes, reformatted unit layout and	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or	4	Core	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			updated pre-requisites	Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.			
UETTDRSB04B	Maintain HV power system breakers	UETTDRSB04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	Core	Full
UETTDRSB05B	Maintain HV power system – transformers and instrument transforme	UETTDRSB05A	Revised Unit includes editorial changes, reformatted unit layout and	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or	4	Core	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	rs		updated pre-requisites	Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.			
UETTDRSB06B	Install high current DC switchgear and equipment	UETTDRSB06A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	110	Full
UETTDRSB07B	Maintain high current DC switchgear and	UETTDRSB07A	Revised Unit includes editorial changes, reformatte	A current 'Unrestricted Electrician's Licence' or equivalent issued in an	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	equipment		d unit layout and updated pre-requisites	Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.			
UETTDRSB08A	RESERVED						
UETTDRSB09B	Maintain voltage regulating equipment – capacitor banks	UETTDRSB09A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRSB10B	Maintain HV power system static VAR compensators	UETTDRSB10A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	110	Full
UETTDRSB11B	Maintain HV power system synchronous condensers	UETTDRSB11A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				licence.			
UETTDRSB 12B	Maintain voltage regulating equipment – on load tapchangers	UETTDRSB 12A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	110	Full
UETTDRSB 13B	Install HV plant and equipment	UETTDRSB 13A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				for the issue of an unrestricted electrician's licence.			
UETTDRSB 14B	Carry out thermovision surveys	UETTDRSB 14A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	3	90	Full
UETTDRSB 15B	Maintain discrete protection and control systems	UETTDRSB 15A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				for the issue of an unrestricted electrician's licence.			
UETTDRSB16B	Commission discrete protection and control systems	UETTDRSB16A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRSB15B & A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	110	Full
UETTDRSB17B	Maintain distribution field devices	UETTDRSB17A	Revised Unit includes editorial changes, reformatted unit layout and	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			updated pre-requisites	Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.			
UETTDRSB18B	Commission distribution field devices	UETTDRSB18A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	110	Full

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Discipline – System Operations

UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
UETTDRSO02B	Manage network faults	UETTDRSO02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRSO20A *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO04B* *UETTDRSO05B* *UETTDRSO07B* *UETTDRSO08B* *UETTDRSO10B* *UETTDRSO11B* *UETTDRSO12B* *UETTDRSO17A* *UETTDRSO*	6	220	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				18A *UETTDRSO19A* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO03B	Manage critical events	UETTDRSO03A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRSO02B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS2*	6	220	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				3B *UETTDRSO04B* *UETTDRSO05B* *UETTDRSO07B* *UETTDRSO08B* *UETTDRSO10B* *UETTDRSO11B* *UETTDRSO12B* *UETTDRSO17A* *UETTDRSO18A* *UETTDRSO19A* *UETTDRSO20A* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				24B *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO04B	Control generating plant	UETTDRSO04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRSO18A & UETTDRSO19A *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO07B* *UETTDRSO08B* *UETTDRSO10B* *UETTDRSO*	6	180	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				17A *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO05B	Manage HV distribution and subtransmission network demand	UETTDRSO05A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRSO18A & UETTDRSO19A *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS2*	6	220	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				3B *UETTDRSO07B* *UETTDRSO08B* *UETTDRSO10B* *UETTDRSO17A* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRSO06B	Develop LV distribution switching programs	UETTDRSO06A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG049B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B*	5	150	Full
UETTDRSO07B	Develop HV distribution and subtransmission switching	UETTDRSO07A	Revised Unit includes editorial changes, reformatted unit	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG0	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	programs		layout and updated pre-requisites	49B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B*			
UETTDRSO08B	Develop and evaluate transmission switching programs	UETTDRSO08A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG049B & UETTDRIS22B & UETTDRIS23B	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDREL01B *UETTDREL04B* *UEENEEE001B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B*			
UETTDRSO09B	Coordinate LV distribution networks	UETTDRSO09A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRSO06B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEENEEE024B *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO10B	Coordinate HV distribution and subtransmission networks	UETTDRSO10A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRSO07B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEENEEG002B *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO11B	Manage transmission networks	UETTDRSO11A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRSO18A & UETTDRSO19A *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO07B* *UETTDRSO08B* *UETTDRSO10B* *UETTDRSO17A* *UEENEED0*	6	200	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				04B *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO12B	Manage transmission network demand	UETTDRSO12A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRSO11B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO07B* *UETTDRSO*	6	200	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				08B *UETTDRSO 10B* *UETTDRSO 17A* *UETTDRSO 18A* *UETTDRSO 19A* *UEENEED0 04B* *UEENEEE0 01B* *UEENEEE0 07B* *UEENEEE0 24B* *UEENEEG0 02B* *UEENEEG0 47B* *UEENEEG0 48B* *UEENEEG0 49B*			
UETTDRSO 13B	Coordinate LV distribution network demand	UETTDRSO 13A	Revised Unit includes editorial changes,	UETTDRSO 09B *UETTDREL*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			reformatted unit layout and updated pre-requisites	*01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO06B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO14B	Develop crisis management plans	UETTDRSO14A	Revised Unit includes editorial changes,	UETTDRSO03B *UETTDREL*	6	180	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			reformatted unit layout and updated pre-requisites	*01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO02B* *UETTDRSO04B* *UETTDRSO05B* *UETTDRSO07B* *UETTDRSO08B* *UETTDRSO10B* *UETTDRSO11B* *UETTDRSO12B* *UETTDRSO17A* *UETTDRSO18A* *UETTDRSO19A* *UETTDRSO*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				20A *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO15A	Operate and monitor system equipment (SCADA)	New Unit – UET09 Version 1	New Unit	UETTDREL05B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO*	5	150	

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				07B *UETTDRSO 08B* *UETTDRSO 10B* *UETTDRSO 17A* *UETTDRSO 18A* *UETTDRSO 19A* *UEENEED0 04B* *UEENEEE0 01B* *UEENEEE0 07B* *UEENEEE0 24B* *UEENEEG0 02B* *UEENEEG0 47B* *UEENEEG0 48B* *UEENEEG0 49B*			
UETTDRSO 16A	Monitor and control the	New Unit – UET09	New Unit	Nil	5	150	

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	activities of field staff	Version 1					
UETTDRSO17A	Coordinate HV transmission network	New Unit – UET09 Version 1	New Unit	UETTDRSO08B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*	5	150	

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRSO18A	Respond to discrete/ interdependent protection operations	New Unit – UET09 Version 1	New Unit	UETTDRSO10B OR UETTDRSO17A *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO07B* *UETTDRSO08B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG*	5	150	

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				48B *UEENEEG049B*			
UETTDRSO19A	Coordinate system operations in a regulated energy market	New Unit – UET09 Version 1	New Unit	UETTDRSO10B OR UETTDRSO17A *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO07B* *UETTDRSO08B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG0*	5	150	

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO20A	Respond to complex protection operations	New Unit – UET09 Version 1	New Unit	UETTDRSO04B Or UETTDRSO05B Or UETTDRSO12B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO07B* *UETTDRSO08B* *UETTDRSO10B* *UETTDRSO11B*	6	220	

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDRSO17A *UETTDRSO18A* *UETTDRSO19A* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO21A	Manage network power flows	New Unit – UET09 Version 1	New Unit	UETTDRSO02B *UETTDREL01B* *UETTDREL04B*	6	220	

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDRIS22B *UETTDRIS23B* *UETTDRSO04B* *UETTDRSO05B* *UETTDRSO07B* *UETTDRSO08B* *UETTDRSO10B* *UETTDRSO11B* *UETTDRSO12B* *UETTDRSO17A* *UETTDRSO18A* *UETTDRSO19A*			

Discipline – Transmission

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRTP02B	Establish and reinstate a transmission tower work site	UETTDRTP02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEEE001B & UETTDREL03B	2	35	Full
UETTDRTP03B	Erect transmission towers	UETTDRTP03A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEEE001B & UETTDREL03B	2	Core	Full
UETTDRTP04B	Erect transmission tower hardware	UETTDRTP04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTP03B *UETTDREL03B* *UEENEEE001B*	2	30	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRTP05B	Pre-tension stringing transmission overhead conductors and cables	UETTDRTP05A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTP04B *UETTDREL03B* *UETTDRTP03B* *UEENEEE001B*	2	35	Full
UETTDRTP06B	Erect transmission towers and associated hardware	UETTDRTP06A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDREL01B & UETTDREL02B & UETTDREL04B & UEENEEE001B & UEENEEE002B & UEENEEE004B & UEENEEE005B & UEENEEE007B & UEENEEG001B & UEENEEG002B *UEENEEE0*	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				03B			
UETTDRTP07B	Maintain transmission towers and associated hardware	UETTDRTP07A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTP06B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE0*	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRTP08B	Transmission tower stub setting	UETTDRTP08A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	Nil	3	90	Full
UETTDRTP09B	Install and maintain overhead conductors and cables (towers).	UETTDRTP09A	Revised Unit includes editorial changes, reformatted unit	UETTDRTP07B *UETTDREL01B* *UETTDREL*	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			layout and updated pre-requisites	*02B* *UETTDREL04B* *UETTDRTP06B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRTP10B	Inspect overhead structures and electrical apparatus (towers)	UETTDRTP10A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requis	UETTDRTP07B *UETTDREL01B* *UETTDREL02B* *UETTDREL*	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			ites	*04B* *UETTDRTP06B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRTP11B	Maintain energised lines (transmission) using live line stick technique	UETTDRTP11A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	BSBWOR402A & UETTDRIS25B & UETTDRTP09B *UETTDREL01B* *UETTDREL02B*	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDREL04B *UETTDRTP06B* *UETTDRTP07B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRTP12B	Maintain energised lines (transmission) using Barehand Technique	UETTDRTP12A	Revised Unit includes editorial changes, reformatted unit layout and updated	UETTDRTP11B *UETTDREL01B* *UETTDREL02B*	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			pre-requisites	*UETTDREL04B* *UETTDRIS25B* *UETTDRTP06B* *UETTDRTP07B* *UETTDRTP09B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B* *BSBWOR402A*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRTP13B	Maintain energised lines (transmission) using Barehand Technique on a helicopter platform	UETTDRTP13A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTP12B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS25B* *UETTDRTP06B* *UETTDRTP07B* *UETTDRTP09B* *UETTDRTP11B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE0*	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				07B *UEENEEG001B* *UEENEEG002B* *BSBWOR402A*			
UETTDRTP14B	Install and maintain overhead transmission network infrastructure	UETTDRTP14A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDREL02B & UETTDRIS22B & UETTDRIS23B & A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence. *UETTDREL*	4	120	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				01B *UETTDREL04B* *UEENEEE001B*			
UETTDRTP15B	Install and maintain transmission network infrastructure electrical equipment	UETTDRTP15A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTP14B & A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence. *UETTDREL01B* *UETTDREL*	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE001B*			

Discipline – Protection/Testing

UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRTS01B	Maintain network protection and control systems (interdependent)	UETTDRTS01A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requis	UETTDRTS09B *UETTDREL01B* *UETTDREL04B* *UETTDRIS2*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			ites	*2B* *UETTDRIS23B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRTS02B	Commission network protection and control systems (Interdependent)	UETTDRTS02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTS01B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS2*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				3B *UETTDRTS09B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRTS03B	Conduct evaluation of power system faults within a substation	UETTDRTS03A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG049B & UETTDRIS22B & UETTDRIS23B	6	180	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDREL01B *UETTDREL04B* *UEENEEE001B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B*			
UETTDRTS04B	Design testing and commissioning procedures for substation and field devices	UETTDRTS04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTS06B or UETTDRTS08B or UETTDRTS12B or UETTDRTS15B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B*	6	180	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDRTS01B *UETTDRTS05B* *UETTDRTS09B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRTS05B	Test and maintain metering schemes	UETTDRTS05A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requis	UETTDRTS09B *UETTDREL01B* *UETTDREL04B* *UETTDRIS2*	5	140	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			ites	*2B* *UETTDRIS23B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRTS06B	Commission metering schemes	UETTDRTS06A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTS05B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS2*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				3B *UETTDRTS09B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRTS07B	Perform accuracy checks on instrument transformers	UETTDRTS07A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG049B & UETTDRIS22B & UETTDRIS23B	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDREL01B *UETTDREL04B* *UEENEEE001B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B*			
UETTDRTS08B	Test, repair and calibrate protection relays and meters	UETTDRTS08A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG049B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE0*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				01B *UEENEEG002B* *UEENEEG047B* *UEENEEG048B*			
UETTDRTS09B	Develop secondary isolation instructional documents	UETTDRTS09A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG049B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B* *UEENEEG002B* *UEENEEG047B* *UEENEEG0*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				48B			
UETTDRTS10B	Design secondary isolation instructional documents	UETTDRTS10A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG049B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B*	6	200	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRTS11B	Maintain, test and commission voltage regulating equipment	UETTDRTS11A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG049B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B*	4	150	Full
UETTDRTS12B	Conduct evaluation of primary plant	UETTDRTS12A	Revised Unit includes editorial changes, reformatted unit	UETTDRTS09B *UETTDREL01B* *UETTDREL*	6	200	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			layout and updated pre-requisites	*04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRTS13B	Undertake project management of substation augmentation and maintenance	UETTDRTS13A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requis	UETTDRTS06B or UETTDRTS08B or UETTDRTS12B or UETTDRTS15B	6	220	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			ites	*UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRTS01B* *UETTDRTS05B* *UETTDRTS09B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRTS14B	Install and maintain power system communication equipment	UETTDRTS14A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG049B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B*	5	150	Full
UETTDRTS15B	Maintain network protection and control systems (Complex)	UETTDRTS15A	Revised Unit includes editorial changes, reformatted unit	UETTDRTS01B *UETTDREL01B* *UETTDREL*	6	220	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			layout and updated pre-requisites	*04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRTS09B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRTS16B	Commission network protection and control systems (complex)	UETTDRTS16A	Revised Unit includes editorial changes, reformatted unit layout and	UETTDRTS02B & UETTDRTS15B *UETTDREL*	6	220	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			updated pre-requisites	*01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRTS01B* *UETTDRTS09B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			

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Discipline – Vegetation

UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRVC01B	Cut vegetation above ground outside live work zone near live electrical apparatus (climbing)	UETTDRVC01A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRVC07B *UETTDREL03B* *UETTDREL04B* *UETTDRVC02B* *UETTDRVC03B* *UEENEEE001B*	2	35	Full
UETTDRVC02B	Operate vegetation control plant, machinery and equipment near live electrical apparatus	UETTDRVC02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRVC03B *UETTDREL03B* *UETTDREL04B* *UEENEEE001B*	2	Core	Full
UETTDRVC03B	Plan for the removal	UETTDRVC03A	Revised Unit includes	UEENEEE001B & UETTDREL	2	Core	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	of vegetation up to vegetation exclusion zone near live electrical apparatus		editorial changes, reformatted unit layout and updated pre-requisites	03B & UETTDREL04B			
UETTDRVC04B	Assess vegetation and recommend control measures for work near live electrical apparatus	UETTDRVC04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRVC01B OR UETTDRVC05B OR UETTDRVC06B OR UETTDRVC08B *UETTDREL03B* *UETTDREL04B* *UETTDRVC02B* *UETTDRVC03B* *UETTDRVC07B* *UEENEEE001B*	2	35	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRVC05B	Cut vegetation above ground outside live work zone near live electrical apparatus (platform)	UETTDRVC05A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRVC07B *UETTDREL03B* *UETTDREL04B* *UETTDRVC02B* *UETTDRVC03B* *UEENEEE001B*	2	30	Full
UETTDRVC06B	Cut vegetation at ground level outside ‘vegetation exclusion zone’ near live electrical apparatus	UETTDRVC06A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRVC07B *UETTDREL03B* *UETTDREL04B* *UETTDRVC02B* *UETTDRVC03B* *UEENEEE001B*	2	30	Full
UETTDRVC07B	Monitor safety	UETTDRVC07A	Revised Unit	UETTDRVC02B	2	Core	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	compliance for vegetation work near live electrical apparatus		includes editorial changes, reformatted unit layout and updated pre-requisites	*UETTDREL03B* *UETTDREL04B* *UETTDRVC03B* *UEENEEE001B*			
UETTDRVC08B	Safe use of Elevating Work Platform (EWP) near live electrical apparatus	UETTDRVC08A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRVC07B *UETTDREL03B* *UETTDREL04B* *UETTDRVC02B* *UETTDRVC03B* *UEENEEE001B*	2	35	Full
UETTDRVC09B	Control vegetation (linework)	UETTDRVC09A	Revised Unit includes editorial changes, reformatted unit	UETTDRIS14B *UETTDREL01B* *UETTDREL0*	3	80	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			layout and updated pre-requisites	*2B* *UETTDREL04B* *UETTDRIS12B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRVC10B	Coordinate vegetation control work	UETTDRVC10A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE00*	4	120	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				1B			

Table 4 - Replacement of Universal Electrotechnology Units with Imported Units

Table 4 — Replacement of Universal Electrotechnology Units with Imported Units

The Universal Electrotechnology Units (UEU) have been replaced with units imported from UEE07 Electrotechnology Training Package. This table indicates relevant equivalences and points weightings for the imported units.

Unit Imported to Replace **UEU Unit in UET09 Version 1**	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship to units in the former Training Package**	**Prerequisite requirements of Imported Unit**	**AQF**	**Weighting Points**	**Equivalent - Full, part or not**
		UEUNEED002A	Unit Deleted from UET09 V1				
UEENEED004B	Use engineering applications software	UEUNEED004A	Unit Deleted from UET09 V1 and	Nil	3/4	Core	Full

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Unit Imported to Replace **UEU Unit in UET09 Version 1**	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship to units in the former Training Package**	**Prerequisite requirements of Imported Unit**	**AQF**	**Weighting Points**	**Equivalent - Full, part or not**
			replaced by imported unit				
UEENEED017B	Install and configure internetworking systems	UEUNEED017A	Unit Deleted from UET09 V1 and replaced by imported unit	Nil	4	160	Full
UEENEED027B	Develop structured programs to control external devices	UEUNEED027A	Unit Deleted from UET09 V1 and replaced by imported unit	Nil	3/4	80	Full
UEENEED028B	Develop and test code for microcontroller devices	UEUNEED028A	Unit Deleted from UET09 V1 and replaced by imported unit	Nil	5/6	100	Full
UEENEEE001B	Apply OHS practices in the work place	UEUNEEE001A	Unit Deleted from UET09 V1 and	Nil	1/2	Core	Full

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Unit Imported to Replace **UEU Unit in UET09 Version 1**	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship to units in the former Training Package**	**Prerequisite requirements of Imported Unit**	**AQF**	**Weighting Points**	**Equivalent - Full, part or not**
			replaced by imported unit				
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components	UEUNEEE002A	Unit Deleted from UET09 V1 and replaced by imported unit	Nil	1/2	Core	Full
UEENEEE003B	Solve problems in extra-low voltage single path circuits	UEUNEEE003A	Unit Deleted from UET09 V1 and replaced by imported unit	Nil	1/2	Core	Full
UEENEEE004B	Solve problems in multiple path d.c. circuits	UEUNEEE004A	Unit Deleted from UET09 V1 and replaced by imported unit	UEENEEE003B	1/2	Core	Full
UEENEEE005B	Fix and secure equipment	UEUNEEE005A	Unit Deleted from UET09 V1 and replaced	Nil	1/2/3	Core	Full

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Unit Imported to Replace **UEU Unit in UET09 Version 1**	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship to units in the former Training Package**	**Prerequisite requirements of Imported Unit**	**AQF**	**Weighting Points**	**Equivalent - Full, part or not**
			by imported unit				
UEENEEE007B	Use drawings, diagrams, schedules and manuals	UEUNEEE007A	Unit Deleted from UET09 V1 and replaced by imported unit	Nil	2	Core	Full
UEENEEE008B	Lay wiring/cabling and terminate accessories for extra-low voltage circuits	UEUNEEE008A	Unit Deleted from UET09 V1 and replaced by imported unit	UEENEEE005B & UEENEEE007B	2	80	Full
UEENEEG001B	Solve problems in electromagnetic circuits	UEUNEEG001A	Unit Deleted from UET09 V1 and replaced by imported unit	Nil	3	Core	Full
UEENEEG002B	Solve problems in single and three phase low voltage circuits	UEUNEEG002A	Unit Deleted from UET09 V1 and replaced by	Nil	3	Core	Full

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Unit Imported to Replace **UEU Unit in UET09 Version 1**	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship to units in the former Training Package**	**Prerequisite requirements of Imported Unit**	**AQF**	**Weighting Points**	**Equivalent - Full, part or not**
			imported unit				
UEENEEG047B	Provide computational solutions to power engineering problems	UEUNEEG047A	Unit Deleted from UET09 V1 and replaced by imported unit	UEENEEG002B	4/5	Core	Full
UEENEEG048B	Solve problems in complex multiple path power circuits	UEUNEEG048A	Unit Deleted from UET09 V1 and replaced by imported unit	UEENEEG047B	4/5	Core	Full
UEENEEG049B	Solve problems in complex polyphase power circuits	UEUNEEG049A	Unit Deleted from UET09 V1 and replaced by imported unit	UEENEEG048B	5/6	Core	Full
UEENEEH002B	Carry out basic repairs to electronic apparatus by replacement of components	UEUNEEH002A	Unit Deleted from UET09 V1 and replaced by imported	UEENEEE002B	2/3	80	Full

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Unit Imported to Replace **UEU Unit in UET09 Version 1**	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship to units in the former Training Package**	**Prerequisite requirements of Imported Unit**	**AQF**	**Weighting Points**	**Equivalent - Full, part or not**
			unit				
		UEUNEEH011A	Unit Deleted from UET09 V1				
UEENEEH012B	Troubleshoot digital subsystems	UEUNEEH012A	Unit Deleted from UET09 V1 and replaced by imported unit	UEENEEH002B	3	120	Full
UEENEEH039B	Troubleshoot basic amplifiers	UEUNEEH039A	Unit Deleted from UET09 V1 and replaced by imported unit	UEENEEH002B & UEENEEH014B or UEENEEG002B	3	80	Full
		UEUNEEH070A	Unit Deleted from UET09 V1				

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Table 5 Relationship between UET09 Version 2 Units and UET09 Version 1 Units

Table 5 Relationship between UET09 Version 2 Units and UET09 Version 1 Units

Full prerequisite chains for unit prerequisites are listed where applicable in italicised text.

All Other Disciplines in the UET09 Training Package

UET09 Version 2.0 CSU Code	Unit Title	UET09 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
		All existing Units in all disciplines	No change in existing units. Please refer to the mapping for UET09 version 1 see Table 4 above.	No change in existing units. Please refer to the mapping for UET09 version 1 see table 4 above.			

Discipline - Refresher Training

UET09 Version 2.0 CSU Code	Unit Title	UET09 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not

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UET09 Version 2.0 CSU Code	Unit Title	UET09 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
UETTDRRF01A	Apply ESI safety rules, codes of practice and procedures for work on or near electrical apparatus	New Unit	New Unit	Nil		No weighting points for this unit as it is only to be used for refresher training.	New Unit
UETTDRRF02A	Perform pole top rescue	New Unit	New Unit	Nil		No weighting points for this unit as it is only to be used for refresher training.	New Unit
UETTDRRF03A	Perform EWP rescue	New Unit	New Unit	HLTCPR201A		No weighting points for this unit as it is only to be used for	New Unit

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UET09 Version 2.0 CSU Code	Unit Title	UET09 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
						refresher training.	
UETTDRRF04A	Perform tower rescue	New Unit	New Unit	Nil		No weighting points for this unit as it is only to be used for refresher training.	New Unit
UETTDRRF05A	Perform rescue from switchyard structures at heights	New Unit	New Unit	Nil		No weighting points for this unit as it is only to be used for refresher training.	New Unit
UETTDRRF06A	Perform rescue from a live LV panel	New Unit	New Unit	HLTCPR201A		No weighting points for this	New Unit

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UET09 Version 2.0 CSU Code	Unit Title	UET09 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
						unit as it is only to be used for refresher training.	
UETTDRRF07A	Perform cable pit/trench/excavation rescue	New Unit	New Unit	HLTCPR201A		No weighting points for this unit as it is only to be used for refresher training.	New Unit
UETTDRRF08A	Perform EWP controlled descent escape	New Unit	New Unit	Nil		No weighting points for this unit as it is only to be used for refresher training.	New Unit

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UET09 Version 2.0 CSU Code	Unit Title	UET09 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
UETTDRRF09A	Apply access procedures to work on or near electrical network infrastructure	New Unit	New Unit	Nil		No weighting points for this unit as it is only to be used for refresher training.	New Unit
UETTDRRF10A	Provide first aid in an ESI environment	New Unit	New Unit	Nil		No weighting points for this unit as it is only to be used for refresher training.	New Unit

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Table 6 Relationship between UET09 Version 2.1 Units and UET09 Version 2.0 Units

Table 6 Relationship between UET09 Version 2.1 Units and UET09 Version 2.0 Units

Full prerequisite chains for unit prerequisites are listed where applicable in italicised text.

UET09 Version 2.1 CSU Code	**Unit Title**	**UET09 Version 2.0 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
		All existing Units in all disciplines	No change in existing units. Please refer to the mapping Tables 4 and 5 above.	No change in existing units. Please refer to the mapping Tables 4 and 5 above..			

Table 7 Relationship between UET09 Version 3 Units and UET09 Version 2.1 Units

Table 7 Relationship between UET09 Version 3 Units and UET09 Version 2.1 Units

Full prerequisite chains for unit prerequisites are listed where applicable in italicised text.

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UET09 Version 3 CSU Code	**Unit Title**	**UET09 Version 2.1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRIS81A	Install and maintain telecommunications infrastructure on electricity supply industry assets	New Unit	New Unit	UETTDREL04B; UEENEEE001B; UEENEEE002B; UEENEEE005B	2	80	New Unit

Table 8 - Imported Competency Standard Units in this Training Package

Table 8 - Imported Competency Standard Units in this Training Package

Imported Competency Standard Units in the Electricity Supply Industry — Transmission, Distribution and Rail sector Training Package

Code	**Title**	**Origin**
BSBCUS501B	Manage quality customer service	Innovation and Business Services. ISC — IBSA
BSBFIM501A	Manage budgets and financial plans	Innovation and Business Services. ISC — IBSA
BSBFLM303C	Contribute to effective workplace relationships	Innovation and Business Services. ISC — IBSA
BSBFLM305C	Support operational plan	Innovation and Business Services. ISC — IBSA

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Code	Title	Origin
BSBFLM306C	Provide workplace information and resourcing plans	Innovation and Business Services. ISC — IBSA
BSBFLM309C	Support continuous improvement systems and processes	Innovation and Business Services. ISC — IBSA
BSBFLM311C	Support a workplace learning environment	Innovation and Business Services. ISC — IBSA
BSBFLM312B	Contribute to team effectiveness	Innovation and Business Services. ISC — IBSA
BSBINM401A	Implement workplace information system	Innovation and Business Services. ISC — IBSA
BSBINM501A	Manage an information or knowledge management system	Innovation and Business Services. ISC — IBSA
BSBINN502A	Build and sustain an innovative work environment	Innovation and Business Services. ISC — IBSA
BSBLED501A	Develop a workplace learning environment	Innovation and Business Services. ISC — IBSA
BSBMGT402A	Implement operational plan	Innovation and Business Services. ISC — IBSA
BSBMGT403A	Implement continuous improvement	Innovation and Business Services. ISC — IBSA
BSBMGT502B	Manage people performance	Innovation and Business Services. ISC — IBSA
BSBMGT515A	Manage operational plan	Innovation and Business Services. ISC — IBSA
BSBMGT516B	Facilitate continuous improvement	Innovation and Business Services. ISC — IBSA
BSBSUS501A	Develop workplace policy and procedures for sustainability	Innovation and Business Services. ISC — IBSA

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Code	Title	Origin
BSBWOR401A	Establish effective workplace relationships	Innovation and Business Services. ISC — IBSA
BSBWOR402A	Promote team effectiveness	Innovation and Business Services. ISC — IBSA
BSBWOR501B	Manage personal work priorities and professional development	Innovation and Business Services. ISC — IBSA
BSBWOR502B	Ensure team effectiveness	Innovation and Business Services. ISC — IBSA
HLTCPR201A	Perform CPR	Community Services and Health ISC
ICTCBL3013A	Perform cable and system test on customer premises	Innovation and Business Services. ISC — IBSA
ICTCBL2064A	Haul underground cable	Innovation and Business Services. ISC — IBSA
ICTCBL2065A	Splice and terminate optical fibre cable for carriers and service providers	Innovation and Business Services. ISC — IBSA
ICTCBL2066A	Joint and terminate coaxial cable	Innovation and Business Services. ISC — IBSA
ICTCBL2068A	Install a telecommunications service to a building	Innovation and Business Services. ISC — IBSA
ICTCBL3069A	Install network cable equipment	Innovation and Business Services. ISC — IBSA
ICTTEN3104A	Maintain an electronic system	Innovation and Business Services. ISC — IBSA
ICTWOR3127A	Supervise worksite activities	Innovation and Business Services. ISC — IBSA

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Code	Title	Origin
ICTCBL2131A	Install an above ground equipment enclosure	Innovation and Business Services. ISC — IBSA
ICTCBL2133A	Construct underground telecommunications infrastructure	Innovation and Business Services. ISC — IBSA
ICTCBL2134A	Fix aerial cable	Innovation and Business Services. ISC — IBSA
ICTCBL2135A	Joint metallic conductor cable in access network	Innovation and Business Services. ISC — IBSA
UEENEED004B	Use engineering application software	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEC001B	Maintain documentation	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEC008B	Receive and store materials and equipment for electrotechnology work	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEC010B	Deliver a service to customers	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEED017B	Install and configure internetworking systems	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEED027B	Develop structured programs to control external devices	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEED028B	Develop and test code for microcontroller devices	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEE001B	Apply OHS practices in the workplace	EE-Oz Training Standards ISC – Electrotechnology

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Code	Title	Origin
		Training Package UEE07
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEE003B	Solve problems in extra-low voltage, single path circuits	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEE004B	Solve problems in multiple path DC circuits	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEE005B	Fix and secure equipment	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEE007B	Use drawings, diagrams, schedules and manuals	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEE008B	Lay wiring and terminate accessories for extra-low voltage circuits	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEE024B	Compile and produce an electrotechnology report	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEE037B	Document occupational hazards and risks in electrotechnology	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEE051B	Transport apparatus and materials	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEF006B	Solve problems in data and voice communications circuits	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEF007B	Set up the wireless capabilities of communications and data	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07

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Code	Title	Origin
	storage devices	
UEENEEG001B	Solve problems in electromagnetic circuits	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEG002B	Solve problems in single and three phase low voltage circuits	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEG047B	Provide computational solutions to power engineering problems	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEG048B	Solve problems in complex multiple path power circuits	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEG049B	Solve problems in complex polyphase power circuits	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEH002B	Carry out basic repairs to electronic apparatus by replacement of components	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEH012B	Troubleshoot digital subsystems	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEH039B	Troubleshoot basic amplifiers	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
UEENEEK042A	Participate in environmentally sustainable work practices	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07
CPCCCM2007A	Use explosive power tools	Construction and Property Sevices ISC - Construction, Plumbing and Services Integrated Framework CPC08

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Code	Title	Origin
CPCCOHS1001A	Work safely in the construction industry	Construction and Property Sevices ISC - Construction, Plumbing and Services Integrated Framework CPC08
RIIOHS202A	Enter and work in confined spaces	Skills DMC ISC - Resources and Infrastructure Industry Training Package RII09
RIIOHS204A	Work safely at heights	Skills DMC ISC - Resources and Infrastructure Industry Training Package RII09
RIIOHS205A	Control traffic with stop-slow bat	Skills DMC ISC - Resources and Infrastructure Industry Training Package RII09
TLID3507C	Operate a boom type elevating work platform	Transport and Logistics ISC - Transport and Logistics Training Package (TLI07)
TLILIC508A	Licence to operate a boom-type elevating work platform (boom length 11 metres or more)	Transport and Logistics ISC - Transport and Logistics Training Package (TLI07)

Explanation of the review date

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 in the light of changes such as changing technologies and 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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Transition to NQC Training Package packaging rules for flexibility

Transition to NQC Training Package packaging rules for flexibility

The following qualifications have been modified to meet the requirements of the National Quality Council's Training Package packaging rules for flexibility.

UET20110 Certificate II in ESI – Vegetation Control

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 a qualification is permitted from either 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.

Minimum points 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 must be sought from the relevant EE-Oz Technical Advisory Committee

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1.0.00 Qualification Framework

Volume 1 Part 1

Qualification Framework

1.1.00 The ESI Transmission, Distribution and Rail Qualifications

1.0 The ESI Transmission, Distribution and Rail Qualifications

The qualifications listed in this Training Package adhere to the advice provided in the *AQF Implementation Handbook 3rd Edition 2002*. They have been developed by the many and respective sectors of the ESI-Transmission, Distribution and Rail Sector in accord with the following principles:

- qualifications are to be competency based
- qualifications are to be made up by clustering or grouping individual Competency Standard Units
- qualifications are to be relevant, in terms of both level and scope, reflecting the realistic vocational needs of the industry
- qualifications are to facilitate real career pathways
- qualification structures are not to be designed or intended to be misrepresented for other purposes
- qualifications are to reflect industry work requirements and not be influenced by the variety of existing qualifications which may have been used in the past for career progression
- qualifications are to be constructed so as to enhance the prospects for consistency, equity of effort, transferability and portability within and across industries.

Additionally, a list of Competency Standard Units that meet regulatory or specialist requirements recognised by Statements of Attainment have been included to support possible skill cluster outcomes. These outcomes generally support requirements associated with regulatory, safety, or specialised/hazardous functions of work.

Research into the review of the ESI – Transmission Distribution and Rail Sector Training Package found that many qualified people in the industry seek further skill sets training in only one or two units at any onetime post, their primary qualification - not an additional qualification. The previous policy limitation prohibited the declaration of stand-alone orphan Competency Standard Units in their own right.

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The ESI – Transmission Distribution and Rail Sector Training Package Review undertaken by EE-Oz Training Standards to develop this revised Training Package established that there are occasions when stand-alone orphan specialist Competency Standard Units are need by the industry for special circumstances and environments. These Competency Standard Units do not form a qualification in their own right and often, are not able to be regarded as an elective or a replacement Competency Standard Unit within mainstream qualifications. For instance, the field of Gas and Electrical Safety on and around equipment is a unique environment and often a full qualification is not required. RTOs in this environment are often specialist in discrete areas and do not wish to offer full qualifications.

The previous Training Package Development policy limited opportunities for individuals and employers to meet their specialised needs. However, as a result of the High Level Review completed in 2004, recognition was accorded to the inclusion of a separate section in Training Packages, and in relation to this Training Package such as has been included under the section of Possible Skill Sets Competency Standard Units. The High Level Review findings stated:

"Statements of Attainment

A set of related competencies below the level of a full qualification can be highly portable and valuable for individuals. The tool for recognising this achievement - the Statement of Attainment - is an important recognition of personal achievement, and is a legitimate credential in its own right, but it has no wider community standing or recognition.

We see a need to enhance the market standing of Statements of Attainment by re-positioning and promoting them as an important tool for nationally recognising related skill sets below full qualification level and which will be valued by individuals and by industry. We also see a need to

- review the current systems for reporting the enrolment in and achievement of individual Competency Standard Units to achieve greater clarity for the issuers, recipients and end users of Statements of Attainment, and to
- clarify and harmonise advice on Statements of Attainment within AQTF documents and the AQF Implementation Handbook."

Moving on .... Report of the High Level Review of Training Packages, April 2004."

1.1.01 List of Qualifications

1.1 List of Qualifications

The full range and completion requirements of the qualifications in the Electricity Supply Industry (ESI) – Transmission, Distribution and Rail Sector Training Package are detailed in the section Qualifications Structure and are summarised below:

AQF	Qualification Title	Qualification code
1	Nil	
2	Certificate II in ESI — Vegetation Control	UET20110

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AQF	Qualification Title	Qualification code
	Certificate II in ESI — Transmission Line Assembly Certificate II in National Broadband Network Cabling (Electricity Supply Industry Assets)	UET20209 UET20511
3	Certificate III in ESI — Transmission Certificate III in ESI — Distribution Certificate III in ESI — Rail Traction Certificate III in ESI — Cable Jointing	UET30109 UET30209 UET30309 UET30409
4	Certificate IV in ESI — Power Systems Certificate IV in ESI — Substation Certificate IV in ESI — Network Infrastructure	UET40109 UET40209 UET40309
5	Diploma of ESI — Power Systems *Diploma of ESI — Network Infrastructure**	UET50109
6	Advanced Diploma of ESI — Power Systems	UET60109

** To be developed as part of continuous improvement.*

Table 1 — Mapping Qualifications

This Table maps the former Electricity Supply Industry — Transmission and Distribution Sector Training Package (UTT98) to the new Electricity Supply Industry — Transmission, Distribution and Rail Sector Training Package (UET06).

Qual Code	Relates to	Nature of Relationship	Equivalent — full, part or no
UET20106	Certificate II in ESI — Vegetation Control.	Previously resided in the National Electrotechnology Training Package UTE99 Completely new structure and units.	No equivalent
UET20206	Certificate II in ESI — Transmission Line Assembly.	New Qualification	No equivalent
UET30106	Certificate III in ESI	Updated on the previous	No

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Qual Code	Relates to	Nature of Relationship	Equivalent — full, part or no
	— Transmission	Certificate III in ESI — Transmission (Powerline) UTT30201— Completely new structure and units.	equivalent
UET30206	Certificate III in ESI — Distribution	Updated on the previous Certificate III in ESI — Distribution (Powerline) UTT30101— Completely new structure and units.	No equivalent
UET30306	Certificate III in ESI — Rail Traction.	Updated on the previous Certificate III in ESI — Rail Traction (Powerline) UTT30401— Completely new structure and units.	No equivalent
UET30406	Certificate III in ESI — Cable Jointing.	Updated on the previous Certificate III in ESI — Cable Jointing (Powerline) UTT30301— Completely new structure and units.	No equivalent
UET40106	Certificate IV in ESI — Power Systems.	Updated on the previous qualifications with completely new structures and units. Certificate IV in ESI — Transmission (Powerline) UTT40101 Certificate IV in ESI — Distribution (Powerline) UTT40201	No equivalent
UET40206	Certificate IV in ESI — Substation.	Certificate IV in ESI — Transmission and Distribution (Substations) UTT40301	No equivalent
UET40306	Certificate IV in ESI – Network Infrastructure	New Qualification	No equivalent
UET50106	Diploma of ESI — Power Systems.	New Qualification– Version 1	No equivalent

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Qual Code	Relates to	Nature of Relationship	Equivalent — full, part or no
UET60106	Advanced Diploma of ESI — Power Systems.	New Qualification – Version 1	No equivalent

Table 2 — Mapping Qualifications UET06 Version 1 to UET09 Version 1

This Table maps the Electricity Supply Industry — Transmission and Distribution Sector Training Package (UET06) Version 1 to the revised Electricity Supply Industry — Transmission, Distribution and Rail Sector Training Package (UET09) Version 1.

Qual Code	Relates to	Nature of Relationship	Equivalent — full, part or no
UET20109	Certificate II in ESI — Vegetation Control.	Revised version of UET20106 – 1 imported unit replaced	Full
UET20209	Certificate II in ESI — Transmission Line Assembly.	Revised version of UET20206 – 1 imported unit replaced	Full
UET30109	CIII in ESI – Transmission	Revised version of UET30106 – 1 Unit removed from Core	Full
UET30209	Certificate III in ESI – Distribution	Revised version of UET30206 – 1 Unit removed from Core	Full
UET30309	Certificate III in ESI – Rail Traction	Revised version of UET30306 – 1 Unit removed from Core	Full
UET30409	Certificate III in ESI – Cable Jointing	Revised version of UET30406 – 1 Unit removed from Core	Full
UET40109	Certificate IV in ESI - Power Systems	Recoded as part of review	Full
UET40209	Certificate IV in ESI - Substation	Recoded as part of review	Full
UET40309	Certificate IV in ESI - Network	Recoded as part of review	Full

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Qual Code	Relates to	Nature of Relationship	Equivalent — full, part or no
	Infrastructure		
UET50109	Diploma of ESI — Power Systems	Restructured version of UET50106	Full
UET60109	Advanced Diploma of ESI — Power Systems	Restructured version of UET60106	Full

Table 3 — Mapping Qualifications UET09 Version 2.0 to UET09 Version 1

This Table maps the Electricity Supply Industry — Transmission and Distribution Sector Training Package (UET09) Version 1 to the revised Electricity Supply Industry — Transmission, Distribution and Rail Sector Training Package (UET09) Version 2.0.

Qual Code	Relates to	Nature of Relationship	Equivalent — full, part or no
		No qualifications were amended or added in UET09 Version 2	

Table 3 — Mapping Qualifications UET09 Version 2.1 to UET09 Version 2.0

This Table maps the Electricity Supply Industry — Transmission and Distribution Sector Training Package (UET09) Version 2.0 to the revised Electricity Supply Industry — Transmission, Distribution and Rail Sector Training Package (UET09) Version 2.1.

Qual Code	Relates to	Nature of Relationship	E= Equivalent N – Not equivalent
UET20110	Certificate II in ESI — Vegetation Control.	Revised version of UET20109 to comply with NQC Packaging rules	E

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Table 4 — Mapping Qualifications UET09 Version 3 to UET09 Version 2.1

This Table maps the Electricity Supply Industry — Transmission and Distribution Sector Training Package (UET09) Version 2.0 to the revised Electricity Supply Industry — Transmission, Distribution and Rail Sector Training Package (UET09) Version 2.1.

Qual Code	Relates to	Nature of Relationship	E= Equivalent N – Not equivalent
UET20511	Certificate II in National Broadband Network (Electricity Supply Industry Assets)	New Qualification	

Allied Qualifications

This table shows the Allied Qualifications relevant to the ESI — Transmission, Distribution and Rail sectors that reside in other nationally endorsed Training Packages

AQF	Qualification Title	Training Package	Qualification code
1	Certificate I in Utilities Industry Operations	Gas	UEG10106
1	Certificate I in ElectroComms Skills	Electrotechnology	UEE10110
2	Certificate II in Electrotechnology (Career Start)	Electrotechnology	UEE22010
2	Certificate II in Sustainable Energy (Career Start)	Electrotechnology	UEE22107
2	Certificate II in Utilities Industries Operations	Gas	UEG20106
3	Certificate III in Electrotechnology Electrician.	Electrotechnology	UEE30807
4	Certificate IV in Electrotechnology – Systems Electrician	Electrotechnology	UEE40610

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1.1.02 List of Skill Sets

1.2 List of Skill Sets

This section provides information on skill sets within this Training Package, with the following important disclaimer. Readers should ensure that they have also read the part of the Training Package that outlines licensing and regulatory requirements.

The following Competency Standard Units may appear within a qualification in this Training Package. However, they may be independent or 'orphaned' from any qualification in this Training Package in which case they can be delivered and assessed independently for a Statement of Attainment.

Typically, the CSUs relate to work functions that are associated with regulatory or specialised functions. They may augment or be incidental to existing competencies held by individuals, or be required for workplace entry associated with OHS issues.

All of any pre-requisite requirements must be met for each Competency Standard Unit.

Schedule of Possible Skill Sets Competency Standard Units

The Competency Standard Units in this schedule may be achieved independently of a qualification. In so doing all pre-requisites and conditions are to be met for each Competency Standard Unit.

The Competency Standard Units listed below may appear within a qualification in this Training Package. However they may be independent from any qualification in which case they can be delivered and assessed independently for a Statement of Attainment.

UNIT CODE	UNIT TITLE
UETTDREL03B	Comply with environmental and incidental response procedures
UETTDREL04B	Working safely near live electrical apparatus as non electrical worker
UETTDREL05B	Respond to technical enquiries and requests

Identified Skill Sets

Note: Refresher Training Skill Sets

The following Skill Sets have been developed to meet the requirements for refresher training of skills essential for gaining and maintaining access to electricity supply industry networks.

The Refresher Training units in these Skill Sets are not included in any qualifications or elective schedules and are only to be accessed via the identified Skill Sets included below.

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Skill Set – Apply Access Procedures to Work On or Near Electrical Network Infrastructure

Skill Set – Apply ESI Safety Rules, Codes of Practice and Procedures for Work On or Near Electrical Apparatus

Skill Set – Perform Pole Top Rescue

Skill Set – Perform Tower Rescue

Skill Set – Perform Rescue from Switchyard Structures at Heights

Skill Set – Perform EWP Controlled Descent Escape

Skill Set – Provide First Aid in an ESI Environment

Skill Set – Perform CPR

Skill Set – Perform Pole Top Rescue and CPR

Skill Set – Perform EWP Rescue and CPR

Skill Set – Perform Tower Rescue and Provide First Aid

Skill Set – Perform Switchyard Rescue at Heights and Provide First Aid

Skill Set – Perform Rescue from a Live LV Panel and CPR

Skill Set – Perform Cable Pit/Trench/Excavation Rescue and CPR

Skill Set – Perform Cable Pit/Trench/Excavation Rescue

Skill Set – Perform Rescue from a Live LV Panel

Skill Set – Perform EWP Rescue

1.1.03 Key Features and Design Needs

1.3 Key Features and Design Needs

These refer to the Qualifications Structures and to the Possible Skill Sets CSUs

Qualification structures have been developed to satisfy flexibility, quality of outcomes, equity and consistency within this Training Package whilst achieving valid alignment with the Australian Qualifications Framework (AQF). The approach has been to provide a range of purpose built qualifications at the various AQF levels that align to specific and well recognised workplace outcomes. It also identifies a range of emerging new areas within the ESI – Transmission, Distribution and Rail Sector. Qualification titles have been chosen after much consultation with a host of stakeholders and practitioners to ensure that they meet the needs of the market now and into the future.

Consideration has been given to the relationship of this Training Package with the full suite of EE-Oz Training Standards Electrotechnology and EnergyUtilities and other allied Training Packages in ESI – Generation Sector; Electrotechnology Industry; and Gas Industry; as well as Metals and Engineering; Telecommunications; and others.

To achieve this, the design processes have:

- facilitated flexibility by maximising the range of options available within the qualifications structures

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- satisfied quality requirements by ensuring the integrity of the AQF in terms of relative equity and flexibility between and across competency levels
- been cognisant of any prevailing Regulatory requirements
- achieved consistency of outcomes across the range of qualifications on offer at respective AQF levels.

To achieve the above outcome requirements, research was undertaken with stakeholders. Recommendations followed. It resulted in the need to consider how best to structure and advise on the completion requirements of a qualification. The outcome was an agreement to utilise a core and elective approach, and the need to introduce a system for the valuing elective Competency Standard Units to realise the completion of the qualification. It was proposed that the system would value each of the elective Competency Standard Units. It would assign a total weighting value required for the completion of the respective qualification. The weighting system and process would aim to assure that the AQF characteristics and distinguishing features were met for each qualification outcome. In addition, it would ensure that it related to realistic work organisation and outcomes. Thus the qualification outcome would reflect actual worth, breadth, depth and complexity of outcomes required for performance in and across the EnergyUtilities Industry.

These design features and needs assisted in producing the packaging, alignment, completion rules and definitions for each qualification. The structuring, composition and required completion rules for the respective qualifications were determined with these tenets in mind.

1.1.04 Structuring of Qualifications

1.4 Structuring of Qualifications

The qualifications for this Training Package have been constructed with flexibility and quality of vocational outcomes. That is, Competency Standard Units are clustered and packaged to include a Core and an Elective group. For the elective group, a valuation weighting system has been developed and adopted to facilitate choice, whilst assuring equity across the respective range of qualifications on offer. The structures of the qualifications are typically constructed as follows:

Core *Core Units are compulsory units required for the industry.* They represent a substantive part of the overall group of Competency Standard Units that make up the structure of the qualification. The core units to do not attract any weighting value for the purpose of the qualification completion requirements.

Electives *Elective Units are those units that provide the flexibility required specifically for enterprise work organisation and outcomes.* They are included specifically*to meet particular work organisation and skill requirements of enterprises and the completion requirements of the qualification. Elective units are treated as complementary and as key building blocks to enhancing the contextualisation and relevance of outcomes of the Core Units within the qualification. They are weighted*

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to facilitate flexibility.

Note: Certain Core Units in one qualification may appear as Elective Units in another and thus a weighting value is assigned to them for that qualification(s).

It should be noted that each Qualification stands alone from other related qualifications. Each is treated independently when determining the group of units required for completion, relative to the chosen qualification.

Flexibility

The Qualifications Framework aims to provide the maximum flexibility permissible within the regulated context of the Industry and, for all parties using the qualifications.

The qualifications have been structured to meet the needs of the industry. Particular regard has been given to allowing sufficient access for all employers and their employees. The qualifications contain a core requirement supplemented by a broad range of electives, sufficiently broad enough to reflect and respond to diverse approaches to work requirements and organisation needs. Of the considerable array of elective Competency Standard Units on offer within the qualifications, all are distributed across a selection of discipline areas. It includes a large number of imported units.

Contextualisation

While the opportunity for contextualisation is acknowledged, this is to occur in the context of the following:

- no individual Competency Standard Units shall be varied or contextualised in any way without regard to prevailing legislation in any jurisdiction, regulatory codes of practice, guidelines and advisory standard requirements mandated by a relevant State/Territory electricity or regulatory authority; and
- all prerequisites are included
- industry or enterprise developed Competency Standard Units may be added to the elective group of units within the qualification framework, provided the additional unit(s);
  - is an allied skills set which is complementary to the core Competency Standard Units; and
  - does not change the intended vocational outcome or equity of the overall qualification; and
  - is submitted to the ElectroComms and EnergyUtilities Industry Skills Council Ltd trading as EE-Oz Training Standards for approval and inclusion into this Training Package in accordance with the importation rules and continuous improvement arrangements defined by the National Quality Council (NQC).

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Regulatory Arrangements

Licensing and regulatory authorities will use a range of Qualifications contained within this Training Package for their respective purposes. In construction of such qualifications EE-Oz Training Standards and respective Regulators have given consideration to the link between the issuance of the qualification and a respective licence. It is expected that the assessment and preferred training regime, which meets the competency outcomes of the qualification, will therefore meet the regulatory requirements. For instance, the Electrical Regulatory Authorities Council (ERAC) promulgated and released a policy in March 2001 as important advice to both Registered Training Organisations (RTOs) as well as apprentice electricians to ensure that persons being trained and assessed under Training Packages, as electricians, have met national licensing requirements.

The ERAC policy required that where a Training Program is recommended by the industry, Registered Training Organisations (RTOs) shall deliver such. The policy stated that, "*Failure by an RTO to provide evidence (to the satisfaction of the relevant licensing authority) that the training (including assessment) delivered to a licence applicant satisfies the stated requirements and forms an integral part of an* [1]*approved Training Package qualification, which means the applicant has successfully passed a "*electrical safety assessment*" in accordance with specified requirements, will result in the applicant being required to undertake further assessments at the discretion of the licensing authority."*

[1]Approved Training Package means an ANTA National Quality Council (NQC) endorsed Training Package qualification, that includes the "electrical safety assessment" as approved by ERAC/NUELAC, within the respective industry's Training Program where recommended (ERAC Policy released[1st July 2001).]

In recognising the interrelationship that exists between qualification outcomes and licensing/registration, development of qualifications in this Training Package has encompassed respective requirements. Every effort has been made to ensure currency in regulatory requirements is included and thus, RTOs must ensure they are observed. This includes utilising any recommended industry training program designed to meet the Competency Standard Units and qualification outcome related to licensing/registration applications.

It must be remembered that an RTO registered under the Australian Quality Training Framework (AQTF) requirements is given full responsibility for deeming a leaner/apprentice competent for the respective Competency standard units making up a Training Package qualification. Where the learner/apprentice is deemed competent by the RTO and is to be issued the qualification and statement for the Competency standard units, the RTO is to also provide all the necessary documentation required by the regulatory authority to support an application of eligibility. That is, where regulatory endorsed training strategies/learning specifications and support materials are advised, such as modules/subjects, learning specifications, programs or other, and these are aligned and used to provide the underpinning essential knowledge and associated skills specified in the competency standard units, then, because of licensing and/or industrial requirements, the relevant titles of the aligned subjects/topics or learning specifications within the specified training programs including their results (preferably percentile based) shall be issued. It shall form part of a statement of results attached to the qualification or statement of attainment.

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It should be noted that regulatory authorities have advised that the quality of RTOs 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 issuance of the qualification to satisfy the eligibility requirements for issuance of the licence.

1.1.05 Valuation of Competency Standard Units

1.5 Valuation of Competency Standard Units

Flexibility and consistency of outcomes between qualifications at the same AQF level and across qualifications of different AQF*levels has been achieved by developing and adopting completion guidelines (valuation weighting system) that effectively balances flexibility with consistency. This applies to this Training Package which contains the vocational standards for industry and also all other EnergyUtilities and allied Training Packages which contains the vocational standards for industry. These guidelines are based on an industry developed Competency Standard Units weighting system. It takes into account the electives required to "trigger" the completion of a qualification. It utilises the key features stated above. Each Elective Unit is assigned a weighting value that reflects its level of content, breadth, complexity, autonomy, context, and comparative effort of application related to work performance, relative to the Core Units of the qualification level sought within the Electricity Supply Industry, as well as ElectroComms and EnergyUtilities industry.*

The elective units selected for completion of the qualification will require, where applicable, relevant prerequisites to also be attained and these too may require weighting relative to the core of the qualification.

Valuation Processes and Procedures

1. Weighting system – An overview

To assist with the structuring and completion requirements of the qualifications, all elective units contained in the ESI — Transmission, Distribution and Rail Sector Training Package have been valued. The method adopted complements the *Training Package Developer's Handbook* Part 2 Section 1, "*The "size" of a Competency Standard Unit is a reflection of the complexity of skills and knowledge incorporated, or the range of activities undertaken, which may vary*".

The ESI — Transmission, Distribution and Rail reviewed this document and statement and subsequently developed a simple and notionally relative valuation weighting system. The system identified three typical types of Competency Standard Units that existed within the industry relative to work organisation and aligned or requisite skill sets. This contrasted slightly from the four types identified in the Handbook referred to above. The Industry resolved that only three types of Competency Standard Units applied that were relevant and that each should be assigned a value relative to the type and the AQF level.

The following AQF/Unit Value Table therefore represents the weighting system and allocated points assigned to each unit type and AQF level by the Industry. The system applies to the full suite of elective units contained within this Training Package. The result is the optimal choice/variance of Competency Standard Units elective group packaging.

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AQF/Unit Value Table

		Type 1 (less complex)	Type 2	Type 3 (more complex)
AQF	6	180	200	220
	5	140	150	160
	4	110	120	130
	3	80	90	100
	2	30	35	40
	1	10	15	20

2. Unit Type Definitions

The *AQF/Unit Value Table* above specifies the weighting points assigned to three levels of Competency Standard Units complexity (i.e. Type 1, 2 and 3) applying across the six AQF levels.

Type 1 — Type 1 Competency Standard Units are considered generally to require less effort/complexity relative to work performance than a Type 2.

Type 2 — Type 2 Competency Standard Units are considered generally to require a moderate level of effort/complexity relative to work performance than a Type 1.

Type 3 — Type 3 Competency Standard Units are considered generally to require more effort/complexity relative to work performance than a Type 2.

The same principle applies at each AQF level. As mentioned, the Competency Standard Unit size/type has been adapted from ANTA/DEST's (Chapter 4, Page 9) Training Package Developer's Handbook Part 2 Section 1. The weighting points are notional and relative to each other for the specific AQF level as applied within this Training Package which contains the vocational standards for industry. They should not be used or applied for any other use but to assist in meeting the completion requirements of the relevant qualification within this Training Package which contains the vocational standards for industry.

3. Applying the Unit Values

It should be noted that the unit valuation process will never provide an absolute solution for all situations, nor does it attempt to do so. However, in relation to the ESI – Transmission, Distribution and Rail Sector Training Package which contains the vocational standards for industry, the relative weighting assigned to Elective units has been determined by the industry and coordinated by EE-Oz Training Standards.

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To ensure optimisation of flexibility and equity of the AQF vocational outcomes across qualifications in the EnergyUtilities Industry and to maintain the integrity of the Core AQF alignment within the Qualification, values for each of the Elective unit(s) have been attributed dependent on their breadth and complexity relative to the Core. As previously mentioned, the greater the breadth and complexity the higher the relative weighting.

Importing Units and Valuing Imported Units

1. Importation of Units

To further enhance flexibility the ESI – Transmission, Distribution and Rail Sector Training Package has imported a number of other nationally endorsed Training Package Competency Standard Units. Many of these units have been identified for use in the Elective range of the qualifications on offer. These too have been valued in accordance with the Competency Standard Units valuation weighting rules. These weightings are applied for this Training Package only and are utilised for the triggering of the qualifications within it.

It is acknowledged that at the time of developing this Training Package it was not possible to identify the full range of Competency Standard Units that the Industry may have wished to include into the future. To assure continued flexibility, relevancy and currency, a process has been established for users to request the inclusion of Competency Standard Units in the Training Package in accordance with this section of the ESI – Transmission, Distribution and Rail Sector Training Package. RTOs and enterprises may identify and wish to submit Competency Standard Units for inclusion in the Training Package, to assist in its continuous improvement. In doing so, Competency Standard Units will need to be submitted, processed and valued in accordance with the Training Package requirements. It is anticipated that this option is not likely to occur frequently given the high degree of imported units already included.

Where enterprises or RTOs wish to have Competency Standard Units included into the elective group of units, or the core of a particular Qualification(s) they can do so in accordance with the *Process for importation and valuation* section (below) of this Part of the ESI – Transmission, Distribution and Rail Sector Training Package.

2. Units for Importation

When importing Competency Standard Units, regulators and users of this Training Package are informed of the need to consider new technology, shared/converging technology, specialist needs or other needs.

Imported units may be:

- those from other industries, which have been nationally endorsed by the National Quality Council (NQC), **and/or**
- those that may have been developed at an enterprise or local level and they wish to have them submitted for inclusion in range of ESI — Transmission, Distribution and Rail Competency Standards.

As previously stated, for the purposes of this Training Package all imported units are to be valued against the same criteria as applied to the ESI — Transmission, Distribution and Rail Competency Standards.

3. Process for Importation and Valuation

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The process for inclusion and valuation of imported units is co-ordinated by the EE-Oz Training Standards, the DEST-declared Industry Skill Council for ElectroComms and EnergyUtilities Industry. Importation valuation and inclusion arrangements are facilitated by EE-Oz Training Standards in concert with the relevant Industry advisory committee. Where assistance is required, contact EE-Oz Training Standards.

Exporting 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 sections of the Volume. This includes, matters related to language, literacy and numeracy, access, equity, cultural diversity and any regulatory arrangements for which the Competency Standard Units may apply. Each Competency Standard Unit must not be used in isolation or exported without these interrelated components.

1.1.06 Qualifications - Completion requirements framework

1.6 Qualifications – Completion requirements framework

Qualifications have been structured to provide an appropriate mix of Competency Standard Units to enhance flexibility whilst assuring equity and quality of outcomes.

The requirements for individuals to complete each qualification are outlined in the Qualification Structure that follows. Each qualification describes the minimum requirement for the issuance of the qualification. Individuals may undertake additional Elective Units, concurrent with or after the completion of the qualification.

Typically the trigger for a qualification contained in the National Transmission, Distribution and Rail Industry Qualifications Structure requires selection and completion of Elective Units in addition to the Core Units. RTOs are to confirm in accordance with the approved training plan that all the critical aspects of evidence are present on completion of the respective Competency Standard Units making up the qualification.

It should be noted that Units taken in addition to the minimum requirements of the qualification are not to be included within the qualification completion requirements but is to be appended thereto.

Endorsements

In some instances there may be a requirement for a formal statement of ‘endorsement’ to be issued to individuals for a particular range of outcomes within a Competency standard unit. Individuals are required to confirm this for compliance with Regulatory or Industry duty-of-care purposes.

The requisite information that is to be reported on is detailed in the respective competency standard unit, and confirms the context the individual was deemed competent in, relative to the endorsement in the Competency standard unit. This occurs in some Training Package Competency standard units.

In the event that such units are included in this Training Package, further information will be provided. Examples of this are:

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UEENEEP001B is the unit *Disconnect and reconnect fixed wire electrical equipment connected to supplies up to 1000 Volts a.c. or 1500 Volts d,c*. which has several endorsed categories of work – Pre-assembled types 1 and 2 cold cathode neon signs (N); Composite equipment incorporating one or more current-using devices and/or controls (P); Control devices (Q);

Electrical water heaters (R); Motors (S) The alpha letter following each category of work is for references purposes and does not need to be reported. However, this competency standard unit does require the respective endorsed category of work to be reported. For example in the case of Motors, the endorsement is (motors).

The transcript of record(s) and report(s) is to appear as:

UEENEEP001B Disconnect and reconnect fixed wired electrical equipment connected to supplies up to 1000 Volts a.c. or 1500 Volts d.c. *(motors)*

Qualification Completion Values

The following pages detail the full range of qualifications and include their respective structure, composition and requirements.

AQF	Qualification Title	**Core Units**	**Total Elective Unit Points Required**	**Section of Elective Units**
2	Certificate II in ESI — Vegetation Control	All to be completed	60	Only from this qualification
2	Certificate II in ESI —Transmission Line Assembly	All to be completed	60	Only from this qualification
2	Certificate II in ESI - National Broadband Network Cabling Installation and Maintenance	All to be completed	120	Only from this qualification

AQF	**Qualification Title**	**Core Units**	**Total Elective Unit Points Required**	**Section of Elective Units**
3	Certificate III in ESI — Transmission	All to be completed	360	
3	Certificate III in ESI —	All to be	360	From a group of

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	Distribution	completed		Elective Units covering Transmission, Distribution, Rail Traction and Cable Jointing.
3	Certificate III in ESI — Rail Traction	All to be completed	360	
3	Certificate III in ESI — Cable Jointing	All to be completed	450	
4	Certificate IV in ESI — Power Systems	All to be completed	360	Only from this qualification.
4	Certificate IV in ESI — Substation	All to be completed	360	Only from this qualification
4	Certificate IV in ESI — Network Infrastructure	All to be completed	360	Only from this qualification
5	Diploma of ESI — Power Systems	All to be completed	900	790 from this qualification and 110 from any level.
6	Advanced Diploma of ESI — Power Systems.	All to be completed	1800	600 from this qualification, 790 from level 5 and 410 from any level.

1.1.07 Qualifications and Competency Recognition Issuance Requirements

1.7 Qualifications and Competency Recognition Issuance Requirements

Formal recognition of competency achievement may be in the form of:

- A full qualification in accordance with the criteria established under the ESI - Transmission, Distribution and Rail Qualifications Framework and Structure and be in accord with AQTF 10. Where the title of the qualification within the framework and structure requires further clarity to satisfy State/Territory, enterprise and/or regulatory requirements, then an additional occupational identifier to the title in the National Transmission, Distribution and Rail Qualifications Framework and Structure shall be provided.

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- A Statement of Attainment, and where appropriate, an authorised entry in an individual's Statement of Competency or Industry Skills Passport or approved instrument, which recognises the attainment of a subset group of individual Competency Standard Units within a full qualification. Where the Statement of Attainment within the qualification structure requires further clarity to satisfy State/Territory, enterprise and regulated requirements, then an additional identifier, Record of Achievement/Statement of results, or other such statement is to be provided.

Formal recognition of respective types is to be issued by an RTO. The recognition is to be recorded on formats established by these requirements and/or relevant State Training Authorities and include additional items, which have been agreed by industry and/or regulators in concert with the Industry Skill Council for the ElectroComms and EnergyUtilities Industry or its nominated representatives. Industry and Regulators would expect at least the formal recognition to include:

- the name of the recipient
- the title of the qualification or Statement of Attainment
- the title and logo of the RTO
- the logos of the relevant State/Territory Training and Recognition Authorities, the Nationally Recognised Training logo and, preferably, the logo of Industry Skill Council
- an attached transcript of information that is meaningful for maximum recognition and skills transfer. Generally this would be the individual Competency Standard Unit titles and any endorsement or subset thereof, as well as detailed formal advice about the achieved results of the interrelated essential knowledge and associated skills. It should be noted that in this Training Package the successful attainment of the specified essential knowledge and associated skills for each Competency Standard Unit, forms a critical part of the unit outcome and therefore, reporting is to include its achievement and be in accord with the industry preferred approach. Where regulated requirements advise the use of training support material(s) and it is used to provide the essential knowledge and skills specified in the Competency Standard Unit, then, details of the support material(s) and their achievement should form part of the statement of results attached to the qualification or statement of attainment.
- any endorsements for regulatory outcomes/recognition.

1.1.08 Pathways into Individual Qualifications

1.8 Pathways into Individual Qualifications

Within the ESI – Transmission, Distribution and Rail Sector three learning pathways have been identified and listed in Part 2 Assessment Guidelines. Within that, six qualifications pathways have been found to be available for individuals. These are as follows:

- entry-level contracted employment as a New Apprenticeship
- employee whose occupation is Line Work, Cable Jointing or Substations and needs to upgrade to a new ESI – Transmission, Distribution and or Rail Qualification (including individuals who are trained outside Australia)

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- electricians wishing to multi-skill by seeking to obtain an ESI – Transmission, Distribution, Rail or Substation Qualification (including individuals who are trained outside Australia)
- employees of a telecommunication company who have limited line-work skills seeking to obtain an ESI – Transmission, Distribution or Rail Qualification (including individuals who are trained outside Australia)
- a pathway utilising an institutional only delivery model that produces quality outcomes to the standard of performance specified in the Competency Standard Units of the Training Package
- others with related and allied skill sets.

In general these pathways will include equivalent outcomes to a combination of on-and off-the-job training strategies supported by the industry and regulators leading to the achievement and demonstration of competence. That is, the pathways identify how competence is developed and how evidence is gathered for the assessment of competence.

Whilst there are historically established norms in apprentice duration of learning and particularly for new entry-level contracted employment entrants, it may be the case that some reduction in this time could be achieved through comprehensive structured arrangements set in a workplace or an institution. This can be achieved by reducing any peripheral activity that naturally occurs in an actual workplace, however the burden is on an institute/skill centre, or assisted by an employer where appropriate, to assure the required outcomes are met. To ensure the replication of the world of work is achieved, it is likely in relation to costs that this would be considerable and possibly prohibitive, and a matter for respective parties. Accordingly, the Industry's preferred arrangement is a combination of off-and on-the-job pathway for new entrants. It is clearly recognised as the more cost effective medium to that of an institutional pathway or all on-the-job approach where developing competency is underpinned by a rich knowledge base. However, it is acknowledged that all pathways are recognised as possible and are only limited by costs. The decision as to where the training and assessment is provided, and work performance evidence gathered, is a matter for the RTO, provided that it is in consultation and in accord with, the Industry and employer/learner.

It does however not limit in any way opportunities for entry into respective qualifications for those considered under-represented or from identified disadvantaged groups. These groups include persons from non-English speaking backgrounds, women, indigenous persons or persons with a disability. Appropriate measures should be utilised to accommodate reasonable adjustments for entry into, and completion of the respective qualifications.

The RTO would be expected to carry out such activity in accordance with the criteria established by the relevant State or Territory Training Authority, the AQTF Standards for RTOs to effect a realistic assessment outcome and as outlined in the respective Volumes and related parts of this Training Package which contains the vocational standards for industry, including any prevailing regulatory requirements.

The Industry also acknowledges that the institutional pathway would clearly be much more expensive than a structured learning/training model that assures a combination of all on-the-job approach to developing competence.

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The industry is of the view that it is critical that all evidence with respect to the Competency Standard Units performance requirements and critical aspects of evidence must be present for competence to be attributed. Assessment processes and methodologies must ensure that best practice in assessment and the process of making judgement about attributing competence remains valid and reliable.

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 new apprentices as entry-level contracted employees.

All qualifications are open entry and open exit and are available for use as new apprenticeship entry-level contracted employment. New 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.

New 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. Where the entry requirements are not met industry would expect a requisite entry-bridging program would be developed by an RTO. RTOs would submit these programs in consultation with EE-Oz Training Standards for information and distribution. 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. The Industry Skills Council does not have any control over such declarations.

At this time industry has not recommended qualifications from this Training Package as suitable for School based Australian Apprenticeships.

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Access, Equity and Cultural Diversity

The skills required of employees in the Transmission, Distribution and Rail sector of the Electricity Supply Industry are comprehensive and therefore many employment opportunities are available. 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 new and 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 entry-level advice on the relevant language, literacy and numeracy requirements to maximise the possibility of successful completion of the Competency Standard Units and subsequently the qualification. The language, literacy and numeracy requirements are described in more detail in Volume 1, Part 2 – Competency Standards of this Training Package, and in Volume 2, Part 3 – Language, Literacy and Numeracy Skills.

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 New 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 Volume 1 Part 3 – Assessment Guidelines.

Prerequisite Competency Standard Units Flowcharts

A range of qualification and Competency Standard Units advisory flowcharts showing pre-requisite flows have been developed by industry under the following criteria:

- To assist RTOs in their planning processes
- To obtain a worthwhile outcome from each unit
- To ensure that the units were deliverable
- To maintain the high standard of safety and skill development
- To ensure consistency and quality of outcomes
- To ensure a worthwhile career pathway without hindrance.

Notwithstanding, a pre-requisite requirement statement applies to each qualification structure. The completion requirements refer to the statement that **all of any prerequisite requirements must be acquired**.

Prerequisites are listed in each Competency Standard Unit under Section 3.1, as well as Table 2 *Summary of CSUs, Relationship to Former Training Package and Prerequisites* located in Vol 1 Part 2 Competency Standards. In should be noted that the authoritative point of reference for relevant prerequisites is in the Competency Standard Unit and not the flowcharts which are advisory.

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The flowcharts are provided as a guide only and should be read in conjunction with the respective qualification structure, elective schedules and Competency Standard Units. Elective Competency Standard Units shown are typical examples only. Other elective Competency Standard Units are possible and may be selected from the specified schedules.

The flowcharts depicted on the following pages enable a clearer visual and advisory display of the prerequisite requirements and provide for career planning pathways as they relate to key qualifications contained in this Training Package, namely:

Qualification Title	**Flowchart No**
Certificate II in ESI — Vegetation Control	Flowchart A
Certificate II in ESI — Transmission Line Assembly	Flowchart B
Certificate III in ESI — Transmission	Flowchart C
Certificate III in ESI — Distribution	Flowchart C
Certificate III in ESI — Rail Traction	Flowchart C
Certificate III in ESI — Cable Jointing	Flowchart C
Certificate IV in ESI — Power Systems	Flowchart D
Certificate IV in ESI — Substation	Flowchart E
Certificate IV in ESI — Network Infrastructure	Flowchart F
Core Units for the Diploma of ESI — Power Systems	Flowchart G
Core Units for the Advanced Diploma of ESI – Power Systems	Flowchart H
Diploma and Advanced Diploma of ESI — Power Systems (Design Elective Units)	Flowchart I
Diploma and Advanced Diploma of ESI — Power Systems (System Operations Elective Units)	Flowchart J
Diploma and Advanced Diploma of ESI — Power Systems (Protection/Testing Elective Units)	Flowchart K

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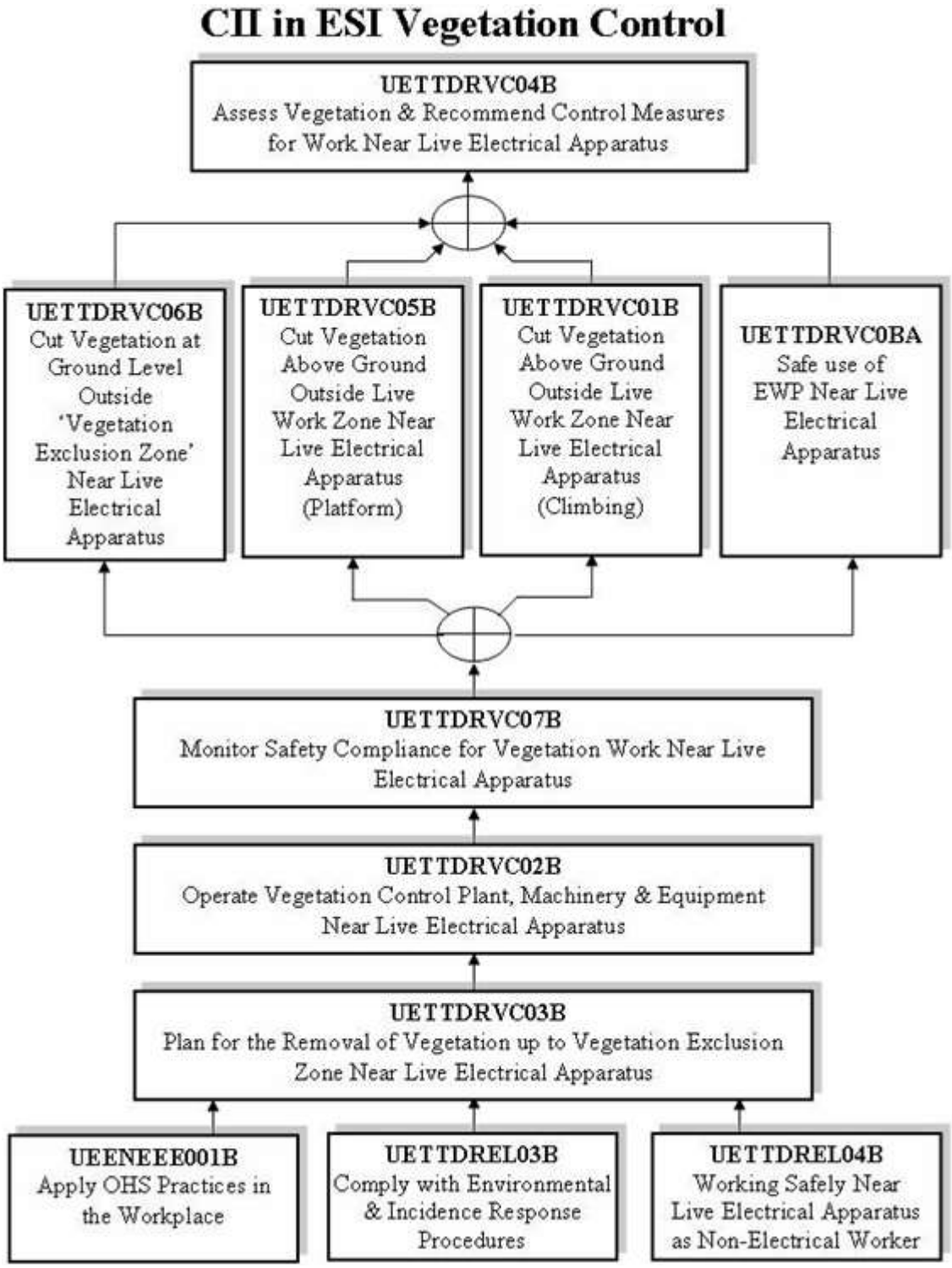
Flowchart A: CII in ESI — Vegetation Control



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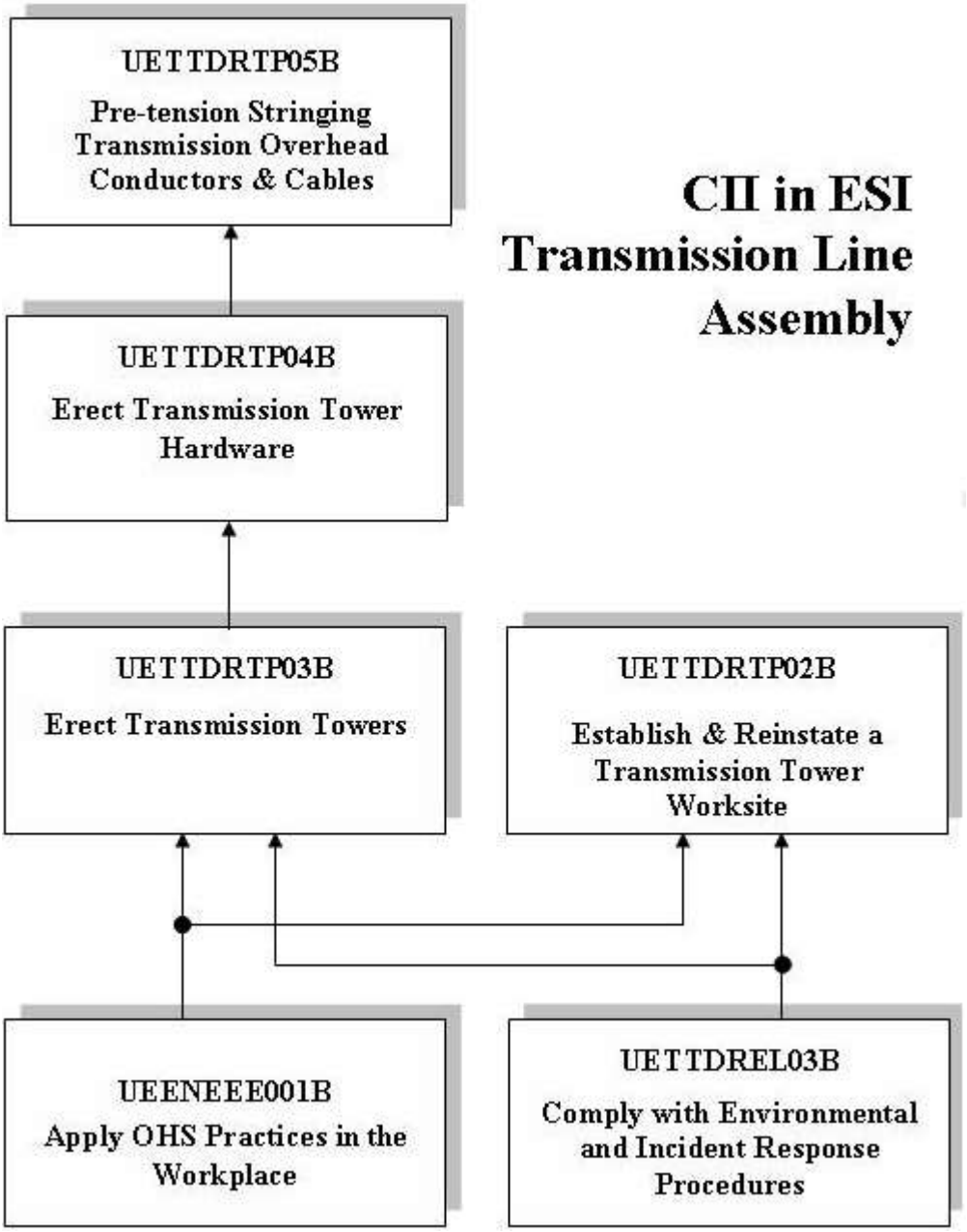
Flowchart B: CII in ESI — Transmission Line Assembly



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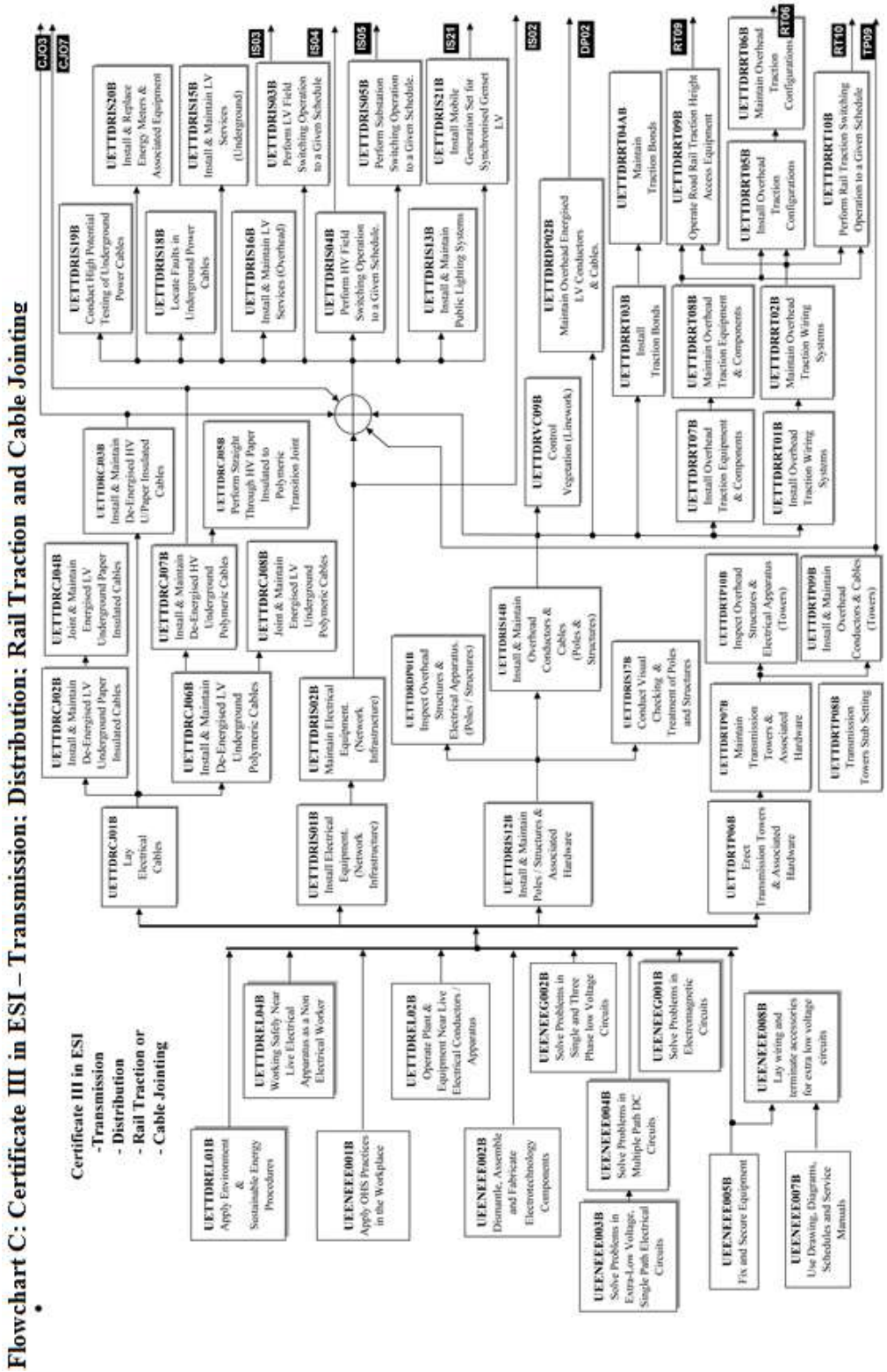
Flowchart C: Certificate III in ESI – Transmission; Distribution; Rail Traction and Cable Jointing



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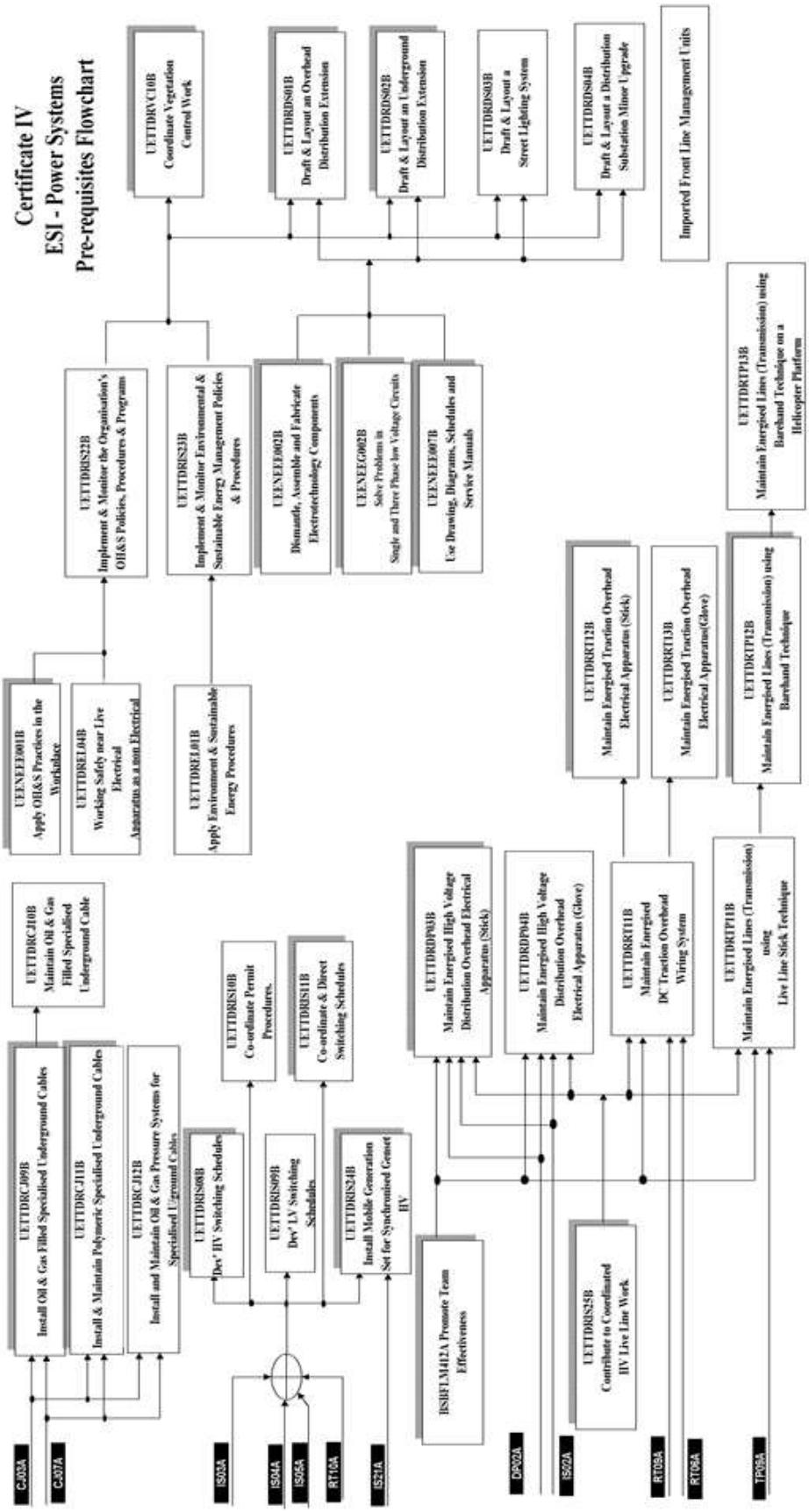
Flowchart D: Certificate IV in ESI — Power Systems



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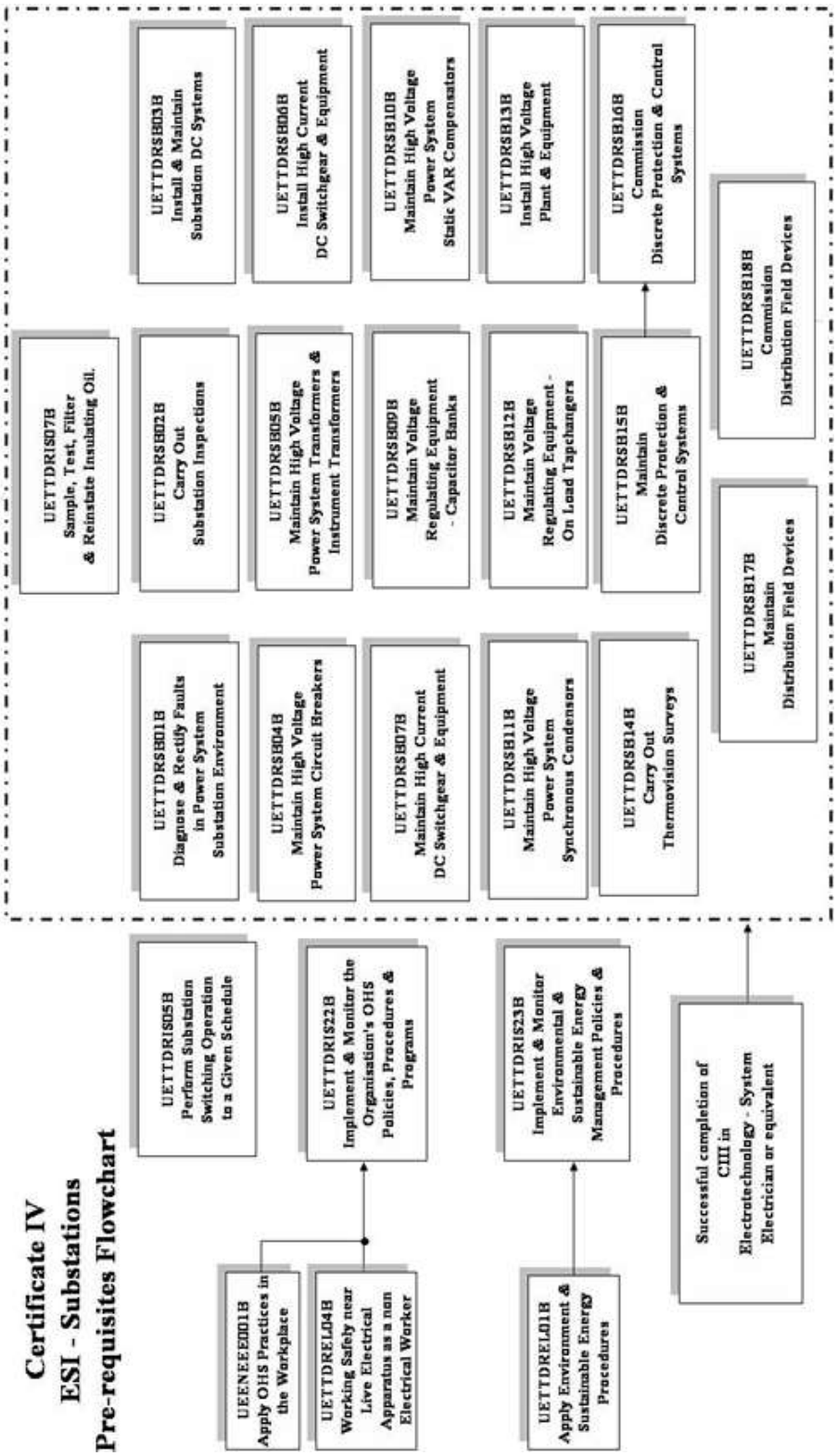
Flowchart E: Certificate IV in ESI – Substation



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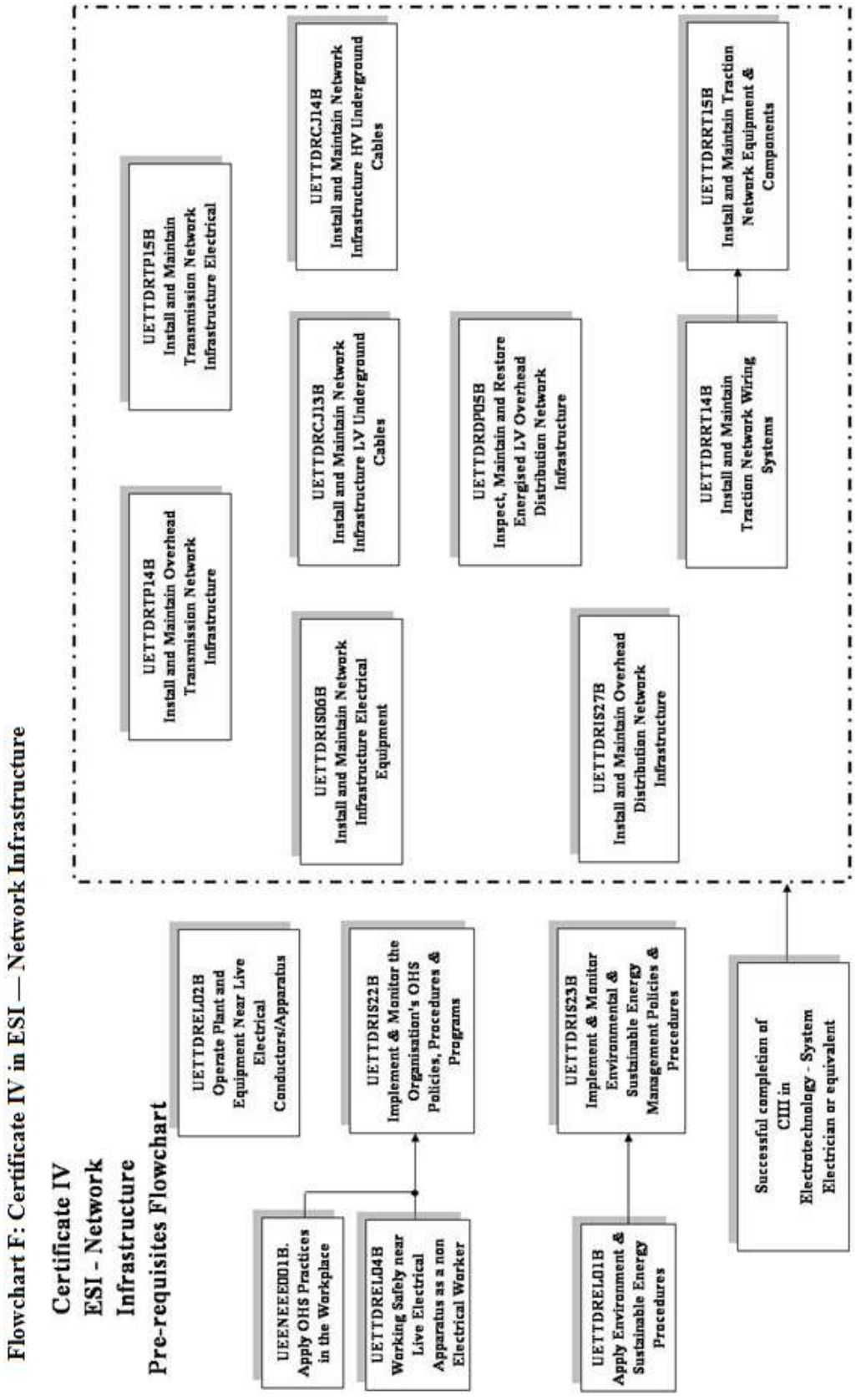
Flowchart F: Certificate IV in ESI — Network Infrastructure



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Flowchart G: Core Units for the Diploma of ESI — Power Systems

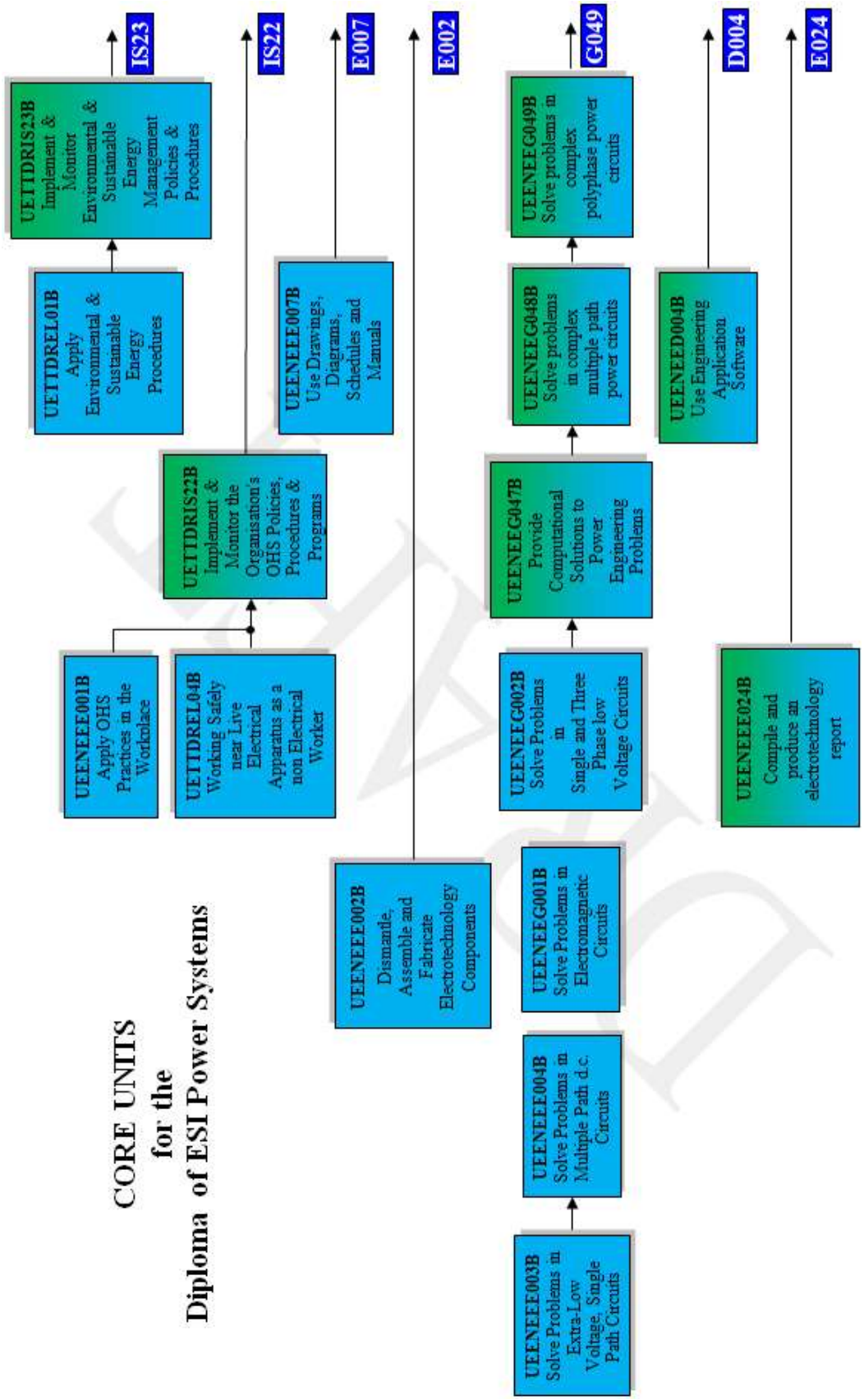

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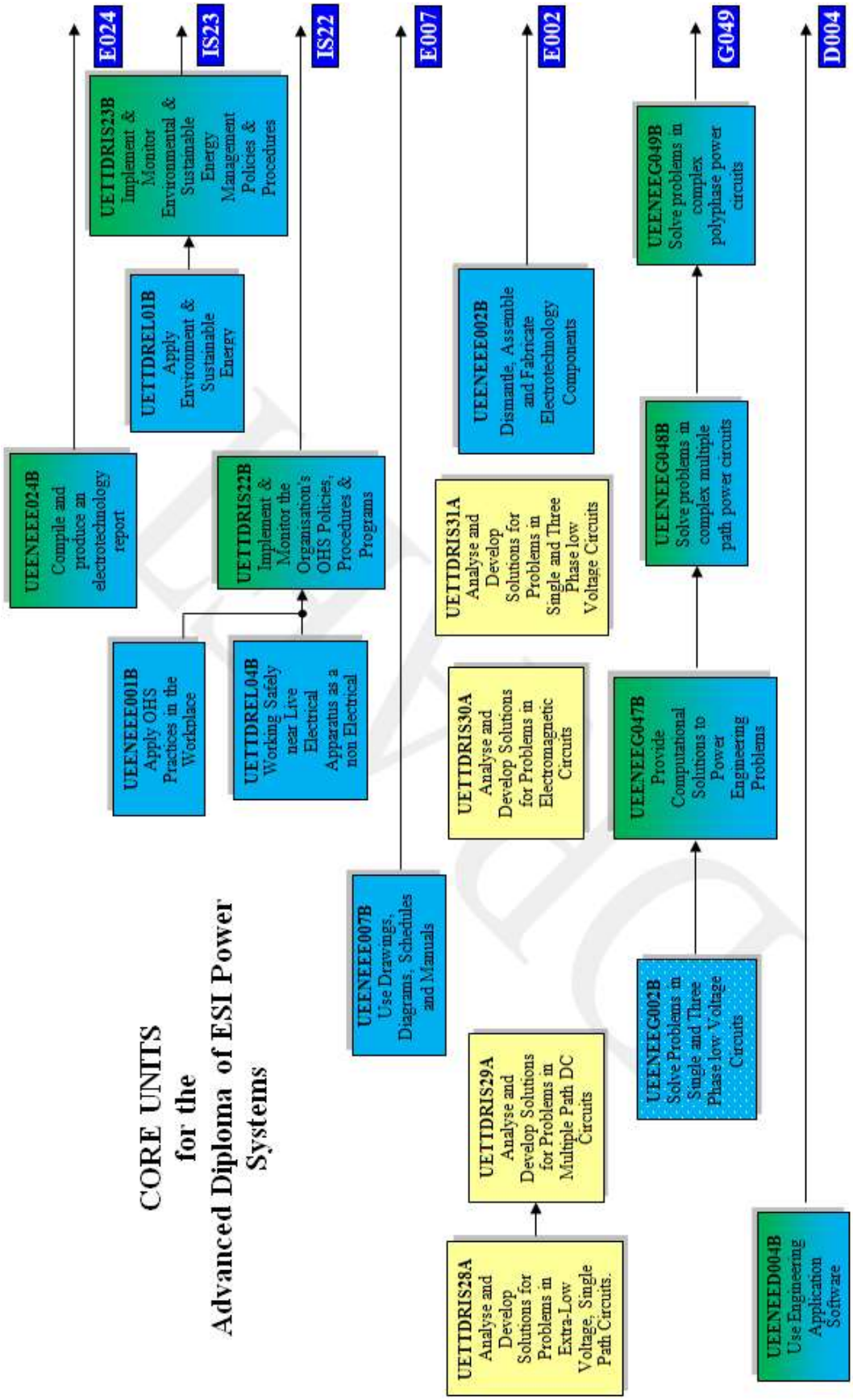
chart H: Core Units for the Advanced Diploma of ESI — Power Systems



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Flowchart I: Diploma of ESI — Power Systems (Design Elective Units)

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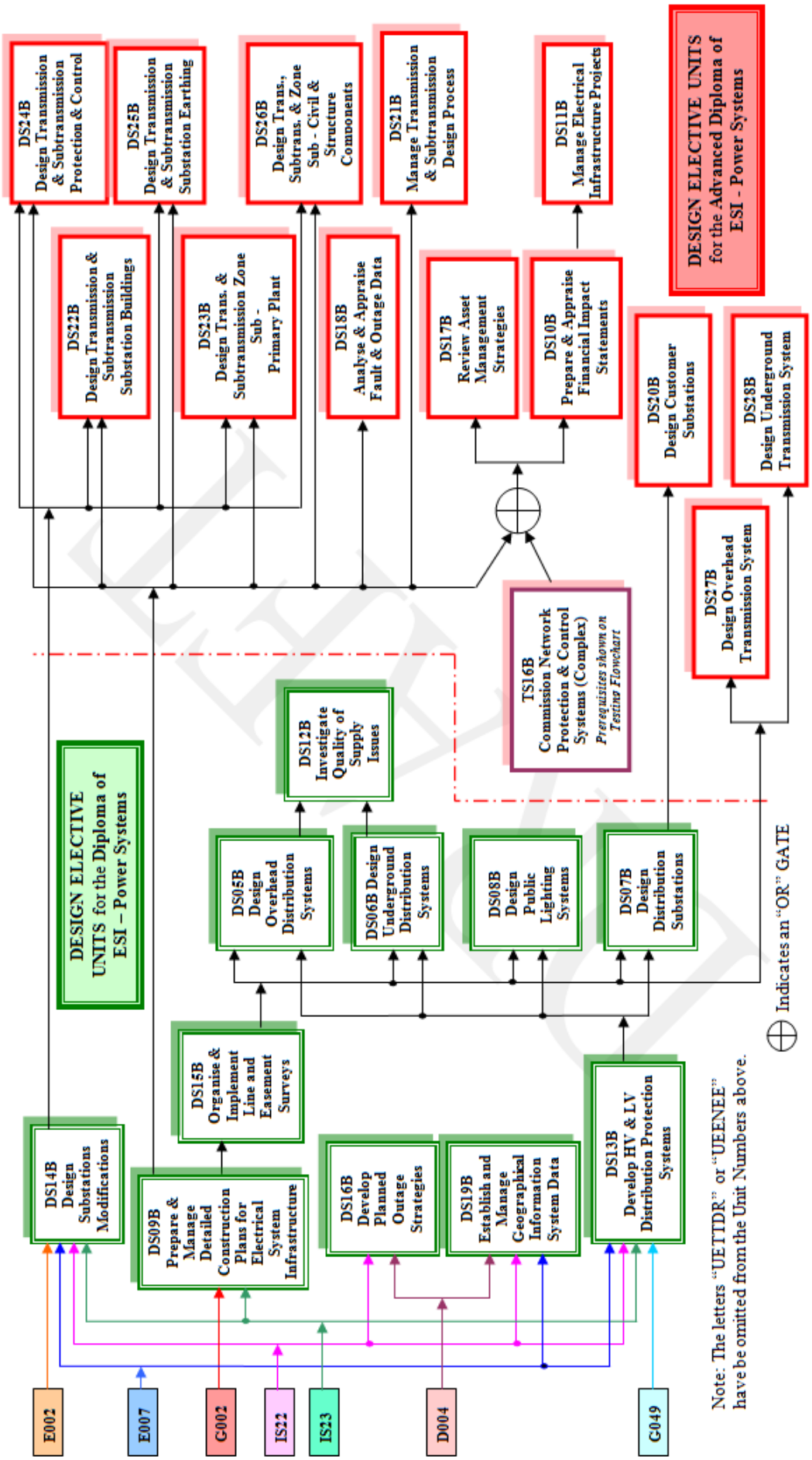

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Flowchart J: Diploma of ESI — Power Systems (System Operations Elective Units)

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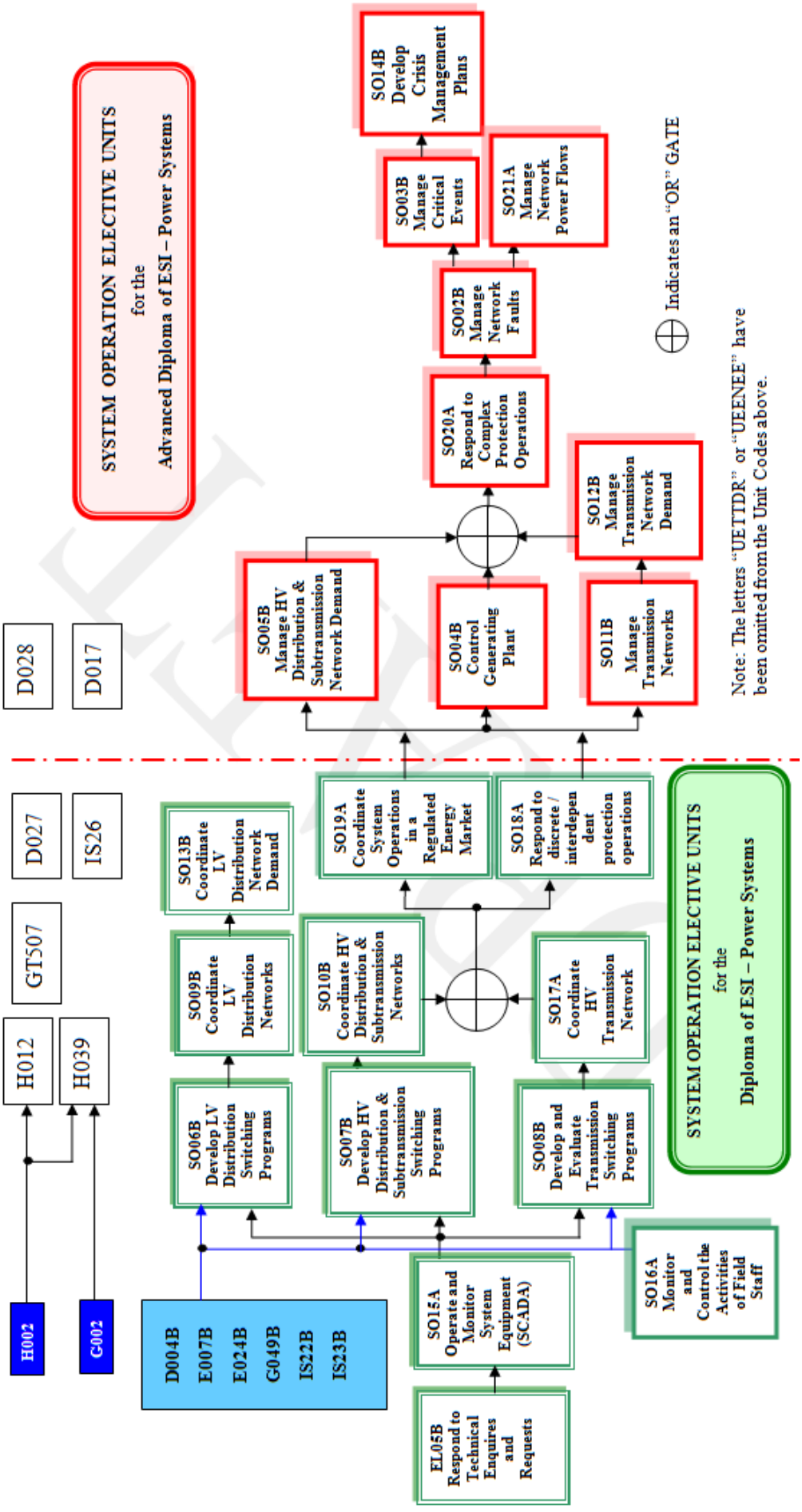

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Flowchart K: Diploma of ESI — Power Systems (Protection/Testing Elective Units)

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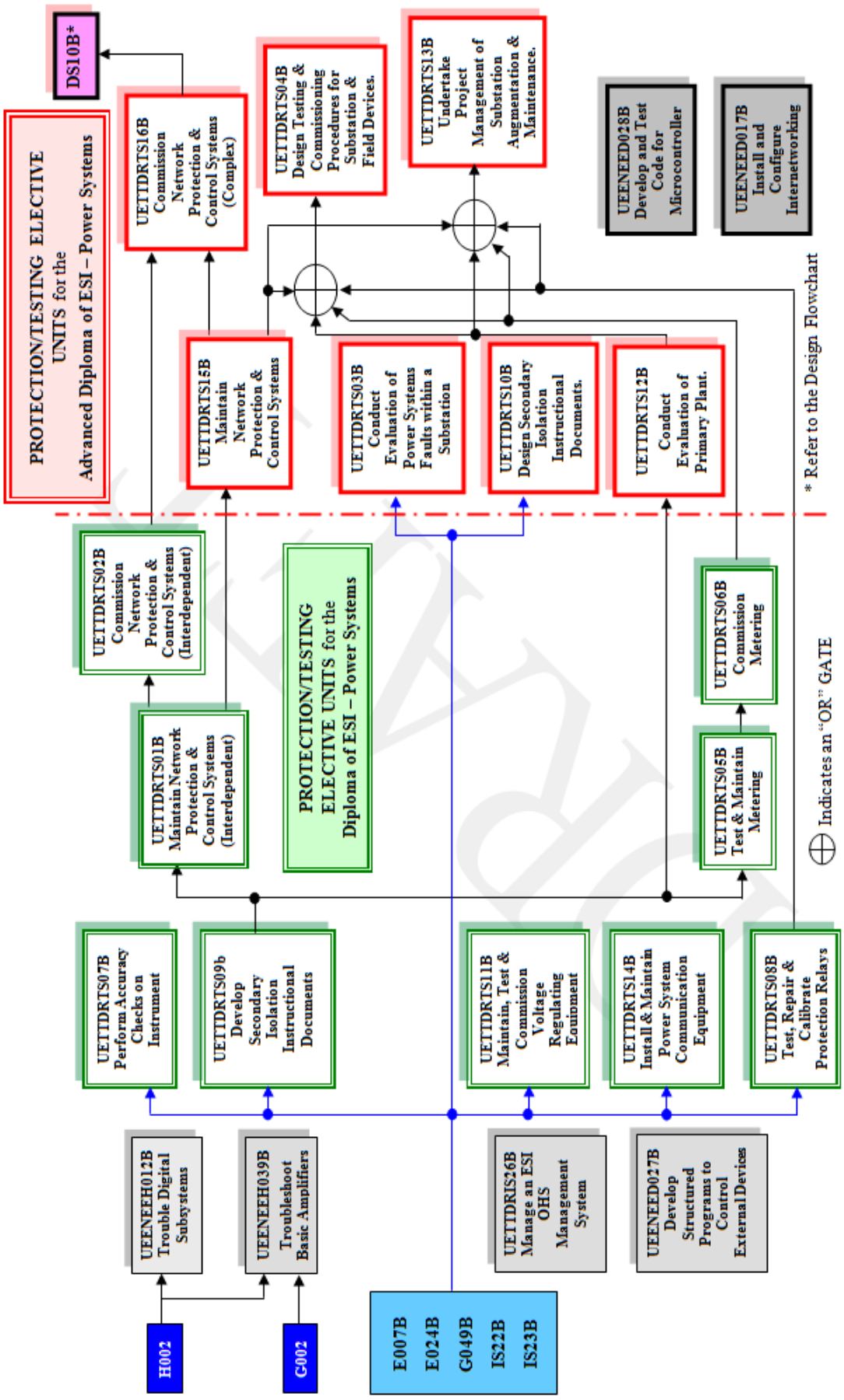

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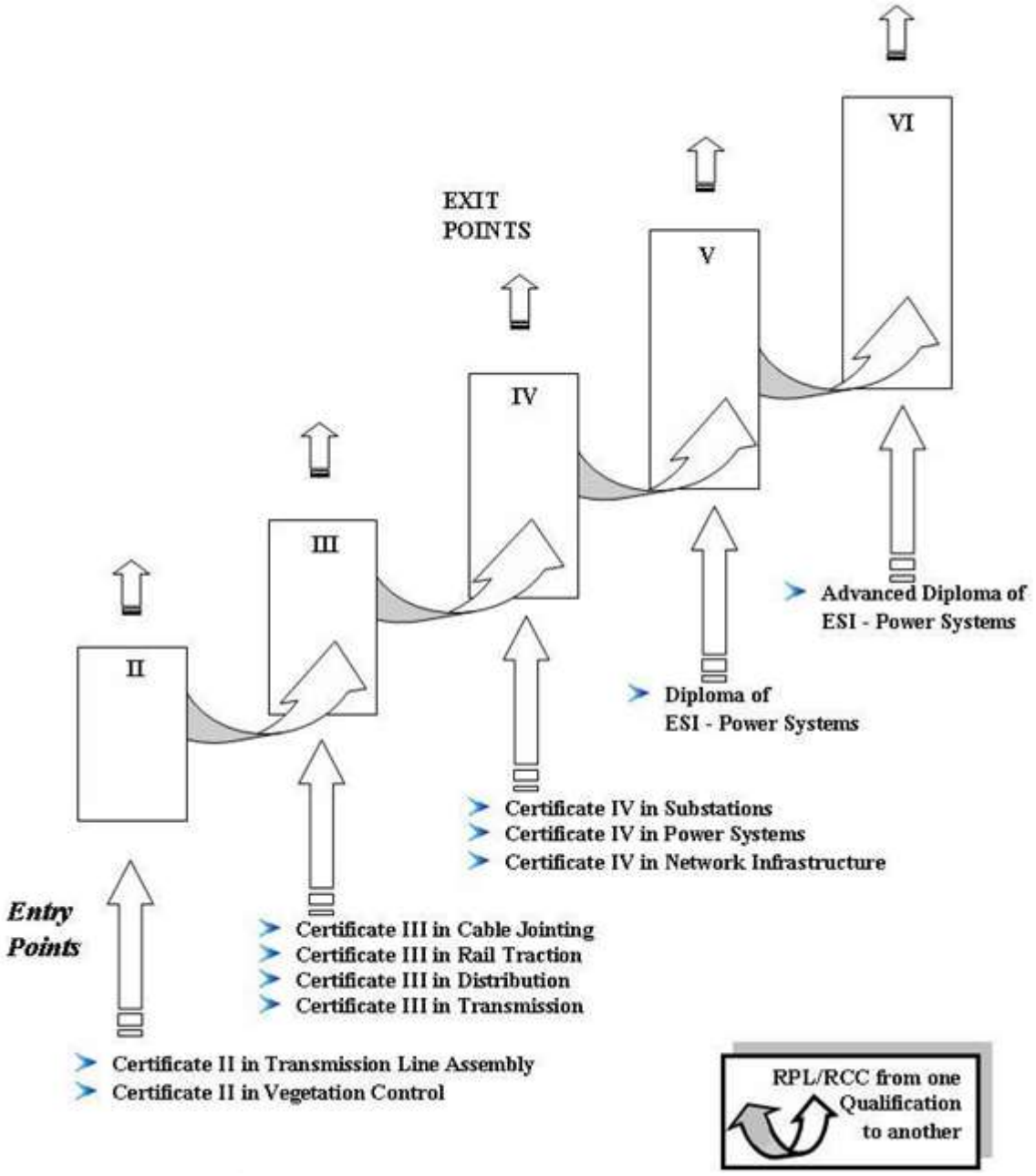
Qualification Pathways

This Training Package provides open entry at each of the AQF levels. More information is contained in the preceding sections.



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

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1.1.09 Maintenance of Qualifications

1.9 Maintenance of Qualifications

The ESI — Transmission, Distribution and Rail qualifications structure was developed by the ESI — Transmission, Distribution and Rail and it will contribute to its maintenance. The Qualifications structure 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.

Responsibility for maintaining of the qualifications structure is shared by the parties who constitute the sector:

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

1.1.10 The Australian Qualification Framework

1.10 The Australian Qualification Framework

What is the Australian Qualification Framework?

A brief overview of the Australian Qualifications Framework (AQF) follows. For a full explanation of the AQF see the AQF Implementation Handbook, 3rd Edition 2002 and any replacement thereof. You can download it from the Australian Qualifications Advisory Board (AQFAB) website (www.aqf.edu.au) or obtain a hard copy by contacting AQFAB on phone (03) 9639 1606 or by emailing AQFAB on aqfab@curriculum.edu.au.

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 Packages which contain the vocational standards for industry 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 and not be copied in other jurisdictions or varied in any way.

Qualifications

Training Packages can incorporate the following six AQF qualifications:

- Certificate I in …
- Certificate II in …
- Certificate III in …
- Certificate IV in …

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- Diploma of …
- Advanced Diploma of …

On completion of the requirements defined in the Training Package, a RTO may issue the respective nationally recognised AQF qualification. Issuance of AQF qualification(s) also must comply with the advice provided in the *AQF Implementation Handbook* and the *Australian Quality Training Framework Standards* (AQTF) for RTOs, particularly Standard 10.

Statement of Attainment

Where an AQF qualification is partially achieved through the achievement of one or more endorsed Competency Standard Units, an RTO may issue a Statement of Attainment. Issuance of Statements of Attainment must comply with the advice provided in the *AQF Implementation Handbook* and the *Australian Quality Training Framework Standards* (AQTF) for RTOs, particularly Standard 10.

Under the *Standards for Registered Training Organisations,* 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.

Additionally, to provide users with a broad depiction of Industry applications for each Qualification level outcome in this Training Package a description has been included against each AQF Guide outcome.

The information includes possible employment outcomes.

Certificate I

Characteristics of Learning Outcomes

Breadth, depth and complexity of knowledge and skills would prepare a person to perform a defined range of activities most of which may be routine and predictable.

Applications may include a variety of employment related skills including preparatory access and participation skills, broad-based induction skills and/or specific workplace skills. They may also include participation in a team or work group.

Distinguishing Features of Learning Outcomes

Do the competencies enable an individual with this qualification to:

- demonstrate knowledge by recall in a narrow range of areas
- demonstrate basic practical skills, such as the use of relevant tools
- perform a sequence of routine tasks given clear direction
- receive and pass on messages/information.

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Qualification title: Not applicable in this Training Package

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

Qualification title: Certificate II in ESI — Vegetation Control UET20110

Description of the qualification

Those gaining this qualification will be able to control the growth of vegetation near powerlines. Encompassed is compliance with 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.

Typical work function	Typical work environment
Preparation of risk assessment control measures that encompass job safety assessment. Identifications of broad environmental values of sites, potential hazards, consultation and notification processes associated with sites and categorisation of	Urban and rural worksites. Outside work at commercial and industrial premises, such as assets owners in the Electricity Supply Industry.

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Typical work function	Typical work environment
sites as per legislative and regulatory codes. Assessment of trees for defects and hazards prior to climbing, preparation of climbing equipment and understand aerial emergency rescue procedures. Options available: • Working from an elevated platform: determine trees natural lean, remove obstructions within the fall zone, determine felling methods, access trees to install restraints, remove trees in a safe manner and clear debris from felling site. • Working from the ground only: determine trees natural lean, remove obstructions within the fall zone, determine felling methods, access trees to install restraints, remove trees in a safe manner and clear debris from felling site. • Prepare and maintain equipment, operate equipment (e.g. EWP, woodchipper), remove stumps, control traffic.	

Qualification title: Certificate II in ESI — Transmission Line Assembly UET20209

Description of the qualification

Those gaining this qualification will be able to assembly transmission towers and structures and stringing transmission overhead conductors prior to them being tensioned.

Typical work function	Typical work environment
Erection of transmission towers and hardware used on towers and the pre-tension stringing of conductors. The establishment and reinstatement of the transmission tower worksite such as basic excavation work will require the use of support plant and equipment which may include back hoes, earth drilling rigs, trench excavators, heavy vehicles, wood-chippers, concrete cutters, rollers and compactor, trenching equipment and drills. Environmental concerns play a major part in this job function.	Outside work associated with transmission tower asset owners and the transmission tower construction industry.

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Qualification title: Certificate II in National Broadband Network Cabling Installation and Maintenance UET20511

Description of the qualification

This qualification provides competencies to install and maintain national broadband network communications cabling following prescribed routines.

Typical work function	Typical work environment
Erection and maintenance of NBN network cabling (backbone infrastructure) including hardware used for installation of cabling and cable supports in both underground and aerial (communications corridor) environments. The stringing of cable. The establishment and reinstatement of the worksite such as basic excavation work will require the use of support plant and equipment which may include elevating work platforms. The documentation of OHS hazards and risks and the application of OHS practices, particularly in relation to working near live electrical apparatus are essential to this role. Local traffic control, working at heights and/or in confined spaces, splicing and termination of optical fibre cable and installation a telecommunications service to a building and solving problems in d.c. and data and voice circuits may form part of this job role. Addressing environmental concerns play a major part in this job function.	Outside work associated with the construction and maintenance of National Broadband Network Cabling

Certificate III

Characteristics of Learning Outcomes

Breadth, depth and complexity of knowledge and competencies would cover selecting, adapting and transferring skills and knowledge to new 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

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including group or team co-ordination 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.

Qualification title: Certificate III in ESI — Transmission UET30109

Description of the qualification

Those gaining this qualification will be able to acquire the skills and knowledge needed for a career in power line transmission industry.

Typical work function	Typical work environment
Erection of towers, poles, structures and associated hardware including the installation and maintenance of conductors and cables. Inspection procedures for overhead structures and electrical apparatus are also included.	Outside work, assembling transmission towers and stringing and connecting transmission lines.

Qualification title: Certificate III in ESI — Distribution UET30209

Description of the qualification

Those gaining this qualification will be able to acquire the skills and knowledge needed for a career in power line distribution industry.

Typical work function	Typical work environment
Install, maintain and inspect poles, structures and associated hardware used on poles and structures. The work also encompasses the installation and maintenance of electrical equipment, conductors and cables used in the powerline industry. The use of support plant and equipment to undertake these tasks and environmental concerns also play a part in this job function.	Outside work, installing poles and structures and associated equipment, stringing overhead lines and cables.

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Qualification title: Certificate III in ESI — Rail Traction UET30309

Description of the qualification

Those gaining this qualification will be able to acquire the skills and knowledge needed for a career in the tram and train overhead powerline sector of the Rail Industry.

Typical work function	Typical work environment
Installation, maintenance and inspection of overhead poles/structures, conductors and cables and rail traction wiring systems including associated equipment used on these structures. The installation and maintenance of the overhead traction configuration and the installation and maintenance of bonds as well as the operation of the rail traction height access equipment is also included in this job function.	Outside work, installing rail structures and associated equipment, stringing overhead lines and cables associated with the trams and trains

Qualification title: Certificate III in ESI — Cable Jointing UET30409

Description of the qualification

Those gaining this qualification will be able to acquire the skills and knowledge needed for a career as a cable jointer in the Distribution and Rail sectors of the Electricity Supply Industry.

Typical work function	Typical work environment
Laying, installation and maintenance of de-energised LV and HV underground polymeric cables and the installation and maintenance of electrical equipment. Options are available for skills to be obtained for energised cables and or Low and High Voltage paper insulted cables.	Outside work, installing underground cables and associated equipment for the distribution and rail industry

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 new 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.

Qualification title: Certificate IV in ESI — Power Systems UET40109

Description of the qualification

Those gaining this qualification will be able to acquire additional skills and knowledge needed for a career in one of four specific fields, namely, Live Line Transmission, Live Line Distribution, Live Line Rail Traction and or installation and maintenance of Specialised Underground Cables.

Typical work function	Typical work environment
Live Line Transmission Maintenance of energised transmission overhead lines using the stick technique, barehand technique and using barehand technique on a helicopter platform. **Live Line Distribution** Maintenance of energised distribution overhead lines using the stick technique and the glove and barrier technique. **Live Line Rail Traction** Maintenance of energised rail traction overhead wiring system and lines using the stick technique and the glove and barrier technique. **Specialised Underground Cables** Installation and maintenance of oil and gas filled specialised underground cables, installation and maintenance of polymeric specialised underground cable and the installation and maintenance of oil and gas pressure systems for specialised underground	Work associated with the installation and maintenance of transmission, distribution, rail and or cable jointing overhead and or underground lines and cables which may be live.

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cables.	

Qualification title: Certificate IV in ESI — Substations UET40209

Description of the qualification

Those gaining this qualification will be able to acquire skills and knowledge needed for a career in installation and maintenance of substations.

Typical work function	Typical work environment
Substation work associated with the maintenance of HV power system, including circuit breakers and transformers. It encompasses the carrying out of substation, switching, inspection, and the diagnosing and rectification of faults. Options are available for skills to be obtained in High Current DC switchgear and equipment, installation of HV plant and equipment and or the maintenance and commissioning of discrete protection and control systems.	Working on Substations associated with Transmission, Distribution and Rail sectors of the Electricity Supply Industry.

Qualification title: Certificate IV in ESI — Network Infrastructure UET40309

Description of the qualification

Those gaining this qualification will be able to acquire skills and knowledge needed for a career in installation and maintenance of network infrastructure in one of four specific fields, namely, Transmission, Distribution, Rail Traction or Cable Jointer in the Distribution and Rail sectors of the Electricity Supply Industry.

Typical work function	Typical work environment
Installation and maintenance of apparatus and equipment belonging to electricity suppliers. **Transmission** Erection of towers, poles, structures and associated hardware including the installation and maintenance of conductors and cables. Inspection procedures for overhead structures and electrical apparatus are also included. **Distribution** Install, maintain and inspect poles, structures and associated hardware used on poles and structures. The work also encompasses the installation and maintenance of electrical equipment, conductors and cables used in the powerline industry. The use of	Outside work, associated with the installation and maintenance of network infrastructure for transmission, distribution, rail and or cable jointing overhead and or underground lines and cables which may be live. Industrial workshops, substations, switchyards and premises pertaining to the electricity supplier.

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Typical work function	Typical work environment
support plant and equipment to undertake these tasks and environmental concerns also play a part in this job function. **Rail Traction** Installation, maintenance and inspection of overhead poles/structures, conductors and cables and rail traction wiring systems including associated equipment used on these structures. The installation and maintenance of the overhead traction configuration and the installation and maintenance of bonds as well as the operation of the rail traction height access equipment is also included in this job function. **Cable Jointing** Laying, installation and maintenance of de-energised LV and HV underground polymeric cables and the installation and maintenance of electrical equipment. Options are available for skills to be obtained for energised cables and or Low and High Voltage paper insulted cables.	

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 co-ordination.

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 co-ordination 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:

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- 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 parameters
- take some responsibility for the achievement of group outcomes.

Qualification title: Diploma of ESI — Power Systems UET50109

Description of the qualification

Those gaining this qualification will be able to acquire skills and knowledge needed for a career in either, design, protection/testing and or system operation.

Typical work function	Typical work environment
OHS and EPA management systems and options in three specific streams: **Design** Preparation and management of detail construction plans for electrical system infrastructure, designing overhead, underground, substations and or public lighting systems. Development of planned outages strategies and or the investigation of quality supply issues. **Protection/Testing** Testing, maintaining and commissioning metering schemes and or distribution field devices, maintaining and commissioning network protection and control systems (interdependent) and, installing and maintaining power systems communication equipment. **SystemOperation** Development of LV and HV distribution switching programs and transmission switching programs. Coordinate LV distribution networks and HV distribution and subtransmission networks.	Designing new transmission, distribution and or rail overhead and underground lines for the Electricity Supply Industry. Typically inside work in design/drafting facilities Testing transmission, distribution and or rail overhead and underground lines and equipment for the Electricity Supply Industry. Typically outside and inside work. System Operations- Control rooms in an industrial complex with mimic panels, video displays, chart recorders, computers switching controls.

Qualification title: Diploma of ESI — Network Infrastructure Systems

(To be developed as part of continuous improvement)

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Description of the qualification

To be developed.

Typical work function	Typical work environment
To be developed as part of continuous improvement	

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 new criteria or applications or knowledge or procedures.

The application of a significant range of fundamental principles and complex techniques across a wise 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.

Qualification title: Advanced Diploma of ESI — Power Systems UET60109

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Description of the qualification

Those gaining this qualification will be able to acquire additional skills and knowledge needed for a career in either, design, testing and or system operation.

Typical work function	Typical work environment
OHS and EPA management systems and options in three specific streams: **Design** Preparation and management of detail construction plans for electrical system infrastructure and the designing of customer substations, Analysis and appraisal of fault and outage data, the designing of overhead and underground transmission systems and or the review of asset management strategies **Protection/Testing** Maintaining network protection control systems, conducting of evaluation of primary plant, conducting evaluations of power systems faults and or undertaking project management of substation augmentation and maintenance. **SystemOperation** Management of HV distribution and subtransmission and or transmission network demand. Development of crisis management plans, management of network faults, critical events and or control of generating plant.	Higher level, managerial design, protection/testing and system operation functions. Typically inside or outside environment of the Transmission, Distribution and Rail sectors of the Electricity Supply Industry.

1.1.11 Qualification Employability Skills Statements

1.11 Qualification Employability Skills Statements

Employability Skills Summary for all Qualifications at AQF Level 1.

Not applicable, there are no Qualificaitons at AQF Level 1 in this Training Package.

Employability Skills Summary for all Qualifications at AQF Level 2.

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The following table contains a summary of the Employability Skills required by the ESI-Transmission, Distribution and Rail Industry for all UET09-Version 1 ESI-Transmission, Distribution and Rail Training Package qualifications at AQF level 2, namely;

AQF	Qualification Title	Qualification code
2	Certificate II in ESI — Vegetation Control	UET20110
	Certificate II in ESI — Transmission Line Assembly	UET20209
	Certificate II in National Broadband Network Cabling Installation and Maintenance	UET20511

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 it's 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 and mental abilities
Contribute to a positive culture of compliance within an organisation
Develop and maintain networks for the implementation and maintenance of industry

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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-Transmission, Distribution and Rail 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

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Learning
Satisfy the competency requirements for the job
Maintain current knowledge of tools, devices, instruments, materials, work practices 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-Transmission, Distribution and Rail industry
Be willing to gain knowledge and skills relevant to new and emerging technologies

The Employability Skills described above are representative of the ESI-Transmission, Distribution and Rail 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, Volume 1, Part 3.

Employability Skills Summary for all Qualifications at AQF Level 3.

The following table contains a summary of the Employability Skills required by the ESI-Transmission, Distribution and Rail Industry for all UET09-Version 1 ESI-Transmission, Distribution and Rail Training Package qualifications at AQF level 3, namely;

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AQF	Qualification Title	Qualification code
3	Certificate III in ESI — Transmission	UET30109
	Certificate III in ESI — Distribution	UET30209
	Certificate III in ESI — Rail Traction	UET30309
	Certificate III in ESI — Cable Jointing	UET30409

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 it's 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
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 it's 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

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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
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

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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-Transmission, Distribution and Rail 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

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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
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

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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 standards
Attain and maintain IT skills relevant to the ESI-Transmission, Distribution and Rail 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-Transmission, Distribution and Rail 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, Volume 1, Part 3.

Employability Skills Summary for all Qualifications at AQF Level 4.

The following table contains a summary of the Employability Skills required by the ESI-Transmission, Distribution and Rail Industry for all UET09-Version 1 ESI-Transmission, Distribution and Rail Training Package qualifications at AQF level 4, namely;

AQF	**Qualification Title**	**Qualification code**
4	Certificate IV in ESI — Power Systems Certificate IV in ESI — Substation	UET40109 UET40209

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	Certificate IV in ESI — Network Infrastructure	UET40309

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 it's 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
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

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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-Transmission, Distribution and Rail industry

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Apply and enterprise best practice and quality systems
Apply and enterprise the best 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

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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
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

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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-Transmission, Distribution and Rail industry
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-Transmission, Distribution and Rail 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, Volume 1, Part 3.

Employability Skills Summary for all Qualifications at AQF Level 5.

The following table contains a summary of the Employability Skills required by the ESI-Transmission, Distribution and Rail Industry for all UET09-Version 1 ESI-Transmission, Distribution and Rail Training Package qualifications at AQF level 5, namely;

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AQF	Qualification Title	Qualification code
5	Diploma of ESI — Power Systems	UET50109

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 it's 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
Teamwork
Work with others by recognising dependencies and using co-operative approaches to

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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

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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-Transmission, Distribution and Rail industry
Apply and enterprise best practice and quality systems
Apply and enterprise the best 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

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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
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

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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-Transmission, Distribution and Rail industry
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-Transmission, Distribution and Rail 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, Volume 1, Part 3.

Employability Skills Summary for all Qualifications at AQF Level 6.

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The following table contains a summary of the Employability Skills required by the ESI-Transmission, Distribution and Rail Industry for all UET09-Version 1 ESI-Transmission, Distribution and Rail Training Package qualifications at AQF level 6, namely;

AQF	Qualification Title	Qualification code
6	Advanced Diploma of ESI — Power Systems	UET60109

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 it's 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
Share essential IT/Computing information
Document work quotations and tender support schedules
Process approvals/authorities for industry activities
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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Use aesthetic ideas to plan visual presentation material
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

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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-Transmission, Distribution and Rail industry
Apply and enterprise best practice and quality systems
Apply and enterprise the best 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

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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
Understand business systems and their relationships
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
Maintain current knowledge of computer systems programs and there relevant applications

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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-Transmission, Distribution and Rail industry
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-Transmission, Distribution and Rail 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, Volume 1, Part 3.

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1.1.12 Qualification Framework

1.12 Qualification Framework

The qualifications listed 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 facilitate worthwhile career pathways within the industry. The structure, composition and range of the qualifications and the requirements necessary for obtaining these, allows employers and employees to select the qualification and units as needed to meet their skill and work organisation requirements. The structure of each qualification has the flexibility to provide the necessary competencies (knowledge, skills and transferable abilities and capacities) related to the industry sector and the needs of the enterprise.

The benefits to industry, individuals and the community from individuals having attained a qualification from a Training Package are that they:

- can apply their knowledge and skills as they are more adaptable, productive and better utilised
- maintain pace with technological advancement
- control highly technical equipment
- can provide improved service delivery supported by new levels of technological competence
- critically assess and appraise situations and apply creative, diagnostic and problem solving techniques on a day-to-day basis
- communicate ideas by speech and in writing
- work safely.

For the Industry and the community the benefits are:

- improved productivity and efficiency and enhanced risk mitigation
- employee qualifications (based on competent performance) are portable across State/Territory borders – *can be used more effectively by enterprises for recruitment, skilling/re-skilling and retention*
- incorporating an external common national skills recognition framework within an Enterprise's culture and assures those deemed competent have met a minimum Industry standard of performance. (*Can be used for benchmarking and compliance purposes*)
- sends a message to employees, regulators, customers, the community and other stakeholders that an enterprise takes its responsibilities as a corporate citizen and compliance seriously
- portability of enterprises is enhanced when competing for interstate and/or national contracts.

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The qualification structures that follow must be read in conjunction with Volume 1 Part 2 – Competency Standards, Unit Construction. The structure of the qualifications listed herein includes the Competency Standard Units relevant to the outcome of the particular qualification.

Prerequisite requirements relationship to training

In the structure of the qualifications listed herein, prerequisite Competency Standard Units not included. Reference should be made to the section of Volume 1 of this Training Package – Important Note to Users, Table of Index of Units and Prerequisite requirements and Relationship and comments to units in the former Training Package included in this section of Volume 1 Part 1 – Qualifications Framework. It is important to note that any prerequisite Competency Standard Unit not listed in a qualification framework attracts no weighting value, but must be acquired.

Furthermore, it is important to note that in relation to delivery of prerequisites 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.

Qualifications Structures

The Electricity Supply Industry (ESI) – Transmission, Distribution and Rail Sector qualification structures are detailed in the following pages.

1.1.13 Schedule of Electives

Schedules forming an integral part of each qualification structure

The Schedule of Electives forms an integral part of the requisite qualification structure of this Training Package. There are seven Schedules that are included herein.

Schedule 2a — Vegetation Control

This Schedule forms an integral part of the respective qualification

Schedule 2a Vegetation Control Elective Group of Certificate II Units		Individual weighting values
UETTDRVC01B	Cut vegetation above ground outside live work zone near live electrical apparatus (climbing)	35
UETTDRVC04B	Assess vegetation and recommend control measures for work near live electrical apparatus	35
UETTDRVC05B	Cut vegetation above ground outside live work	30

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Schedule 2a Vegetation Control Elective Group of Certificate II Units		Individual weighting values
	zone near live electrical apparatus (platform)	
UETTDRVC06B	Cut vegetation at ground level outside ‘vegetation exclusion zone’ near live electrical apparatus	30
UETTDRVC08B	Safe use of Elevating Work Platform (EWP) near live electrical apparatus	35

Schedule 2b – Transmission Line Assembly

This Schedule forms an integral part of the respective qualification

Schedule 2b Transmission Line Assembly Elective Group of Certificate II Units		Individual weighting values
UETTDRTP02B	Establish and reinstate a transmission tower work site	35
UETTDRTP04B	Erect transmission tower hardware	30
UETTDRTP05B	Pre-tension stringing transmission overhead conductors and cables	35

Schedule 3 – Certificate III

This Schedule forms an integral part of the respective qualification

Schedule 3 Elective Group of Certificate III Units		Individual weighting values
UETTDRCJ01B	Lay electrical cables	30
UETTDRCJ02B	Install and maintain de-energised LV underground paper insulated cables	100
UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables	100
UETTDRCJ04B	Joint and maintain energised LV underground paper insulated cables	100

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Schedule 3 Elective Group of Certificate III Units		Individual weighting values
UETTDRCJ05B	Perform straight through HV paper insulated to polymeric transition joint	90
UETTDRCJ06B	Install and maintain de-energised LV underground polymeric cables	90
UETTDRCJ07B	Install and maintain de-energised HV underground polymeric cables	90
UETTDRCJ08B	Joint and maintain energised LV underground polymeric cables	90
UETTDRDP01B	Inspect overhead structures and electrical apparatus (poles /structures)	90
UETTDRDP02B	Maintain overhead energised LV conductors and cables	100
UETTDRIS01B	Install electrical equipment network infrastructure)	100
UETTDRIS02B	Maintain electrical equipment (network infrastructure)	100
UETTDRIS03B	Perform LV field switching operation to a given schedule	80
UETTDRIS04B	Perform high voltage field switching operation to a given schedule	80
UETTDRIS05B	Perform substation switching operation to a given schedule	80
UETTDRIS12B	Install and maintain poles/structures and associated hardware	90
UETTDRIS13B	Install and maintain public lighting systems	80
UETTDRIS14B	Install and maintain overhead conductors and cables (poles and structures)	100
UETTDRIS15B	Install and maintain low voltage services (underground)	80
UETTDRIS16B	Install and maintain low voltage services (overhead)	80

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Schedule 3 Elective Group of Certificate III Units		Individual weighting values
UETTDRIS17B	Conduct visual checking and treatment of poles and structures.	40
UETTDRIS18B	Locate faults in underground power cables	110
UETTDRIS19B	Conduct high potential testing of underground power cables	90
UETTDRIS20B	Install and replace energy meters and associated equipment	90
UETTDRIS21B	Install mobile generation set for synchronised Genset LV	90
UETTDRRT01B	Install overhead traction wiring systems	90
UETTDRRT02B	Maintain overhead traction wiring systems	100
UETTDRRT03B	Install traction bonds	80
UETTDRRT04B	Maintain traction bonds	90
UETTDRRT05B	Install overhead traction configurations	90
UETTDRRT06B	Maintain overhead traction configurations	100
UETTDRRT07B	Install overhead traction equipment and components	90
UETTDRRT08B	Maintain overhead traction equipment and components	100
UETTDRRT09B	Operate road rail traction height access equipment	40
UETTDRRT10B	Perform rail traction switching operations to a given schedule	80
UETTDRTP06B	Erect transmission towers and associated hardware	100
UETTDRTP07B	Maintain transmission towers and associated hardware	100
UETTDRTP08B	Transmission tower stub setting	90
UETTDRTP09B	Install and maintain overhead conductors and cables (towers)	100

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Schedule 3 Elective Group of Certificate III Units		Individual weighting values
UETTDRTP10B	Inspect overhead structures and electrical apparatus (towers)	100
UETTDRVC09B	Control vegetation (linework)	80
UEENEEE008B	Lay wiring and terminate accessories for extra-low voltage circuits	80

NOTE: Maximum points permitted from the following Imported group of units as part of the CIII qualification are 160 points.

BSBFLM303C	Contribute to effective workplace relationships	80
BSBFLM305C	Support operational plan	80
BSBFLM306C	Provide workplace information and resourcing plans	80
BSBFLM309C	Support continuous improvement systems and processes	80
BSBFLM311C	Support a workplace learning environment	80
BSBFLM312B	Contribute to team effectiveness	80
ITCBL3013A	Perform accurate customer premises cable and system test	80
ICTCBL2064A	Haul underground cable	80
ICTCBL2065A	Splice carrier/service provider optic fibre cable	80
ICTCBL2066A	Joint and terminate coaxial cable	80
ICTCBL2068A	Install telecommunications service to a building	80
ICTCBL3069A	Install network cable equipment	80
ICTTEN3104A	Maintain an electronic system	80
ICTWOR3127A	Supervise worksite activities	80
ICTCBL2131A	Install an above ground equipment enclosure	80
ICTCBL2133A	Construct underground telecommunications infrastructure	80

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Schedule 3 Elective Group of Certificate III Units		Individual weighting values
ICTCBL2134A	Fix aerial cable	80
ICTCBL2135A	Joint metallic conductor cable Access Network	80

Schedule 4a – Power Systems

This Schedule forms an integral part of the respective qualification

Schedule 4a Power Systems — Elective Group of Certificate IV Units		Individual weighting values
UETTDRCJ09B	Install oil and gas filled specialised underground cables	120
UETTDRCJ10B	Maintain oil and gas filled specialised underground cables	120
UETTDRCJ11B	Install and maintain polymeric specialised underground cables	130
UETTDRCJ12B	Install and maintain oil and gas pressure systems for specialised underground cables	130
UETTDRDP03B	Maintain energised high voltage distribution overhead electrical apparatus (stick)	130
UETTDRDP04B	Maintain energised high voltage distribution overhead electrical apparatus (glove)	130
UETTDRDS01B	Draft and layout an overhead distribution extension	110
UETTDRDS02B	Draft and layout an underground distribution extension	110
UETTDRDS03B	Draft and layout a street lighting system	110
UETTDRDS04B	Draft and layout a distribution substation minor upgrade	120
UETTDRIS08B	Develop HV switching schedule	110
UETTDRIS09B	Develop LV switching schedule	110

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Schedule 4a Power Systems — Elective Group of Certificate IV Units		Individual weighting values
UETTDRIS10B	Coordinate permit procedures	120
UETTDRIS11B	Coordinate and direct switching Schedules	110
UETTDRIS24B	Install mobile generation set for synchronised genset HV	90
UETTDRIS25B	Contribute to coordinated high voltage live line work	100
UETTDRRT11B	Maintain energised direct current traction overhead wiring system	120
UETTDRRT12B	Maintain energised traction overhead electrical apparatus (Stick)	130
UETTDRRT13B	Maintain energised traction overhead electrical apparatus (Glove)	130
UETTDRTP11B	Maintain energised lines (transmission) using live line stick technique	130
UETTDRTP12B	Maintain energised lines (transmission) using Barehand technique	130
UETTDRTP13B	Maintain energised lines (transmission) using Barehand technique on a helicopter platform	120
UETTDRVC10B	Coordinate vegetation control work	120

NOTE: A maximum of 220 points from the following list of imported units may be used as part of the total elective requirements for the completion of the CIV ESI - Power Systems qualification.

BSBWOR401A	Establish effective workplace relationships	110
BSBMGT402A	Implement operational plan	110
BSBINM401A	Implement workplace information system	110
BSBMGT403A	Implement continuous improvement	110
BSBWOR402A	Promote team effectiveness	110

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Schedule 4b – Substations

This Schedule forms an integral part of the respective qualification

Schedule 4b Substations — Elective Group of Certificate IV Units		Individual weighting values
UETTDRIS07B	Sample, test, filter and reinstate insulating oil	80
UETTDRSB06B	Install high current DC switchgear and equipment	110
UETTDRSB07B	Maintain high current DC switchgear and equipment	110
UETTDRSB09B	Maintain voltage regulating equipment - capacitor banks	110
UETTDRSB10B	Maintain HV power system static VAR compensators	110
UETTDRSB11B	Maintain HV power system synchronous condensers	110
UETTDRSB12B	Maintain voltage regulating equipment - on load tapchangers	110
UETTDRSB13B	Install HV plant and equipment	110
UETTDRSB14B	Carry out Thermovision surveys	90
UETTDRSB15B	Maintain discrete protection and control systems	110
UETTDRSB16B	Commission discrete protection and control systems	110
UETTDRSB17B	Maintain distribution field devices	110
UETTDRSB18B	Commission distribution field devices	110

NOTE: A maximum of 220 points from the following list of imported units may be used as part of the total elective requirements for the completion of the CIV ESI — Substations qualification.

BSBWOR401A	Establish effective workplace relationships	110
BSBMGT402A	Implement operational plan	110
BSBINM401A	Implement workplace information system	110
BSBMGT403A	Implement continuous improvement	110
BSBWOR402A	Promote team effectiveness	110

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Schedule 4c – Network Infrastructure

This Schedule forms an integral part of the respective qualification

Schedule 4c Network Infrastructure — Elective Group of Certificate IV Units		Individual weighting values
UETTDRCJ13B	Install and maintain network infrastructure LV underground cables	120
UETTDRCJ14B	Install and maintain network infrastructure HV underground cables	130
UETTDRDP05B	Inspect, maintain and restore energised LV overhead distribution network infrastructure	130
UETTDRIS06B	Install and maintain network infrastructure electrical equipment	110
UETTDRIS27B	Install and maintain overhead distribution network infrastructure	120
UETTDRRT14B	Install and maintain traction network wiring systems	110
UETTDRRT15B	Install and maintain traction network equipment and components	130
UETTDRTP14B	Install and maintain overhead transmission network infrastructure	120
UETTDRTP15B	Install and maintain transmission network infrastructure electrical equipment	130

List of imported units

NOTE: A maximum of 110 points from the following list of imported units may be used as part of the total elective requirements for the completion of the CIV ESI – Network Infrastructure qualification.

BSBWOR401A	Establish effective workplace relationships	110
BSBMGT402A	Implement operational plan	110
BSBINM401A	Implement workplace information system	110
BSBMGT403A	Implement continuous improvement	110
BSBWOR402A	Promote team effectiveness	110

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Schedule 5 – Diploma

This Schedule forms an integral part of the respective qualification

Schedule 5 Elective Group of Diploma Units		Individual weighting values
UEENEED027B	Develop structured programs to control external devices	80
UEENEEH002B	Carry out Basic repairs to electronic apparatus by replacement of components	80
UEENEEH012B	Troubleshoot digital subsystems	120
UEENEEH039B	Troubleshoot basic amplifiers	80
UETTDREL05B	Respond to technical enquiries and requests	90
UETTDRDS05B	Design overhead distribution systems	140
UETTDRDS06B	Design underground distribution systems	140
UETTDRDS07B	Design distribution substations	140
UETTDRDS08B	Design public lighting systems	140
UETTDRDS09B	Prepare and manage detailed construction plans for electrical system infrastructure	140
UETTDRDS12B	Investigate quality of supply issues	140
UETTDRDS13B	Develop HV and LV distribution protection systems	150
UETTDRDS14B	Design zone substations modifications	160
UETTDRDS15B	Organise and implement line and easement surveys	140
UETTDRDS16B	Develop planned outage strategies	140
UETTDRDS19B	Establish and manage geographical information systems data	140
UETTDRIS26B	Manage an electricity supply industry OHS management system	140
UETTDRSO06B	Develop LV distribution switching programs	150

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Schedule 5 Elective Group of Diploma Units		Individual weighting values
UETTDRSO07B	Develop HV distribution and subtransmission switching programs	150
UETTDRSO08B	Develop and evaluate transmission switching programs	150
UETTDRSO09B	Coordinate LV distribution networks	150
UETTDRSO10B	Coordinate HV distribution and subtransmission networks	150
UETTDRSO13B	Coordinate LV distribution network demand	150
UETTDRSO15A	Operate and monitor system equipment (SCADA)	150
UETTDRSO16A	Monitor and control the activities of field staff	150
UETTDRSO17A	Coordinate HV transmission network	150
UETTDRSO18A	Respond to discrete/interdependent protection operations	150
UETTDRSO19A	Coordinate system operations in a regulated energy market	150
UETTDRTS01B	Maintain network protection and control systems (interdependent)	150
UETTDRTS02B	Commission network protection and control systems (interdependent)	150
UETTDRTS05B	Test and maintain metering schemes	140
UETTDRTS06B	Commission metering schemes	150
UETTDRTS07B	Perform accuracy checks on instrument transformers	150
UETTDRTS08B	Test, repair and calibrate protection relays and meters	150
UETTDRTS09B	Develop secondary isolation instructional documents	150
UETTDRTS11B	Maintain, test and commission voltage regulating equipment	150

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Schedule 5 Elective Group of Diploma Units		Individual weighting values
UETTDRTS14B	Install and maintain power system communication equipment	150

List of imported units

NOTE: A maximum of 280 points from the following list of imported units may be used as part of the total elective requirements for the completion of the Diploma of ESI - Power Systems qualification.

BSBWOR501B	Manage personal work priorities and professional development	140
BSBMGT502B	Manage people performance	140
BSBMGT515A	Manage operational plan	140
BSBINM501A	Manage an information or knowledge management system	140
BSBCUS501B	Manage quality customer service	140
BSBMGT516B	Facilitate continuous improvement	140
BSBINN502A	Build and sustain an innovative work environment	140
BSBLED501A	Develop a workplace learning environment	140
BSBWOR502B	Ensure team effectiveness	140
BSBFIM501A	Manage budgets and financial plans	140
BSBSUS501A	Develop workplace policy and procedures for sustainability	140

Schedule 6 – Advanced Diploma

This Schedule forms an integral part of the respective qualification

Schedule 6 Elective Group of Advanced Diploma Units		Individual weighting values

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Schedule 6 Elective Group of Advanced Diploma Units		Individual weighting values
UEENEED017B	Install and configure internetworking systems	160
UEENEED028B	Develop and test code for microcontroller devices	100
UETTDRDS10B	Prepare and appraise financial impact statements	200
UETTDRDS11B	Manage electrical infrastructure projects	200
UETTDRDS17B	Review asset management systems	180
UETTDRDS18B	Analyse and appraise fault and outage data	180
UETTDRDS20B	Design customer substations	150
UETTDRDS21B	Manage transmission and subtransmission design process	180
UETTDRDS22B	Design transmission, subtransmission and zone substation buildings	200
UETTDRDS23B	Design transmission and subtransmission substation primary plant	220
UETTDRDS24B	Design transmission and subtransmission protection and control	220
UETTDRDS25B	Design transmission and subtransmission substation earthing	200
UETTDRDS26B	Design transmission, sub-transmission and zone substation – civil and structural components	200
UETTDRDS27B	Design overhead transmission systems	200
UETTDRDS28B	Design underground transmission systems	200
UETTDRIS26B	Manage an electricity supply industry OHS management system	140
UETTDRSO02B	Manage network faults	220
UETTDRSO03B	Manage critical events	220
UETTDRSO04B	Control generating plant	180
UETTDRSO05B	Manage HV distribution and subtransmission	220

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Schedule 6 Elective Group of Advanced Diploma Units		Individual weighting values
	network demand	
UETTDRSO11B	Manage transmission networks	200
UETTDRSO12B	Manage transmission network demand	200
UETTDRSO14B	Develop crisis management plans	180
UETTDRSO20A	Respond to complex protection operations	220
UETTDRSO21A	Manage network power flows	220
UETTDRTS03B	Conduct evaluation of power system faults within a substation	180
UETTDRTS04B	Design testing and commissioning procedures for substation and field devices	180
UETTDRTS10B	Design secondary isolation instructional documents	200
UETTDRTS12B	Conduct evaluation of primary plant	200
UETTDRTS13B	Undertake project management of substation augmentation and maintenance	220
UETTDRTS15B	Maintain network protection and control systems (Complex)	220
UETTDRTS16B	Commission network protection and control systems (Complex)	220

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1.2.00 Competency Standards

Volume 1 Part 2

2.0 Competency Standards

Information in 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 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. Therefore, each Competency Standard Unit, found in Volume 2, must not be used in isolation or exported without these interrelated components.

There are over 200 Competency Standard Units included.

A definitions/glossary to complement the Competency Standard Units is included in Volume 2 Part 1. The glossary provides a description of those words that are 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 the following:

- an index of the Competency Standard Units – Table 1 – Index of Units and Scopes/Descriptors. The units have been placed in groups that would typically relate to a particular or special area of industry need and for ease in recognition of related unit groupings. Included at the end of Table 1 are the imported units that are located within the core of the qualifications in this Training Package.
- prerequisites of each Competency Standard Unit can be obtained from Table 2. Reference is also given for the correlation of the units within a qualification(s). These are depicted as flowcharts diagrams and located in Volume 1 Part 1 Qualification Framework.
- a list of imported Competency Standard Units — located in Table 3.

1.2.01 Development of Competency Standards

2.1 Development of Competency Standards

Competency Standards were initially developed for the function of Linework and Cable-Jointing, and were endorsed in 1993, by the then National Training Board (NTB). The 1993 version Competency Standard Units were updated and incorporated into the new Training Package framework. They were endorsed in 1998 as the Training Package for the Electricity Supply Industry – Transmission and Distribution sector of the Utilities Industry (UTT98). Subsequent minor amendments were made to include an array of qualifications, variations to Competency Standard Units and the inclusion of Rail as a sector.

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Consequently, these revised units make up the group of units within this Training Package. They cover a broad range of knowledge and skills applied in the Transmission, Distribution and Rail industry. The development project satisfied the following characteristics:

- National Utilities and Electrotechnology ITAB (now knows as EE-OZ Training Standards) and its nation wide focus groups appropriately represented 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 actively encouraged
- The competency standards were subjected to ongoing scrutiny during the process of development.

1.2.02 Industry Coverage

2.2 Industry Coverage

The Australian Standard Classifications of Occupation (ASCO) defines a number of occupations served by this Training Package that describes vocational standards for the Industry.

The typical job functions for specific qualifications can be located in Volume 1 Part 1 of this Training Package and highlight the industry coverage

The formal industry coverage is under ANZSIC Code 3610 in which the sector is defined as consisting of units mainly engaged in the generation, transmission or distribution of electricity. Most vocations in this group have an entry level of skill commensurate with an AQF Certificate III or higher qualification. In some instances relevant experience is required in addition to a formal qualification.

There have been a number of changes within the industry and the sector has characterised during the last few years by the privatisation of many enterprises and the out-sourcing of many functions and activities.

Notwithstanding these changes these Competency Standards will 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 ESI Transmission, Distribution and Rail sector of the Industry contributes greatly to the economic and future needs of Australia. In Volume 1 Part 1, the section 'The Electricity Supply Industry' describes the Industry in detail.

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The intent of the national ESI — Transmission, Distribution and Rail Training Package is to describe the skills and knowledge, which pertain to vocations within the field of Transmission, Distribution and Rail, and to offer a choice and range of qualifications or Competency Standard Unit 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 prime objective of the national ESI — Transmission, Distribution and Rail Training Package is to establish the standards of performance in terms of skills and knowledge required for safe, productive and satisfying work covering a range of work activities referred to above. Registered Training Organisations (RTOs) can subsequently develop appropriate industry approved training programs to meet these objectives or indeed to meet other Training Package objectives. The determining factor will be choice, choice of Training Package, and choice of provider – RTO. Where New Apprenticeships apply choice in relation to funding to RTOs will be facilitated by policy enunciated by State and Territory Training Authorities.

Other industry standards

It is recognised that the ESI - Transmission, Distribution and Rail 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 and Employability Skills.

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

In general employability skills are embedded within the technical aspects of the industry units and in some instances, the Competency Standard Units directly address the employability skills. The relationship of employability skills to industry competencies is shown in the relevant section of Volume 1 Part 1 Qualifications Framework.

Access and equity

The knowledge and skills required of employees in the ESI — Transmission, Distribution and Rail industry are comprehensive and therefore many and varied employment opportunities are available. 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 related to technical content principles, technology, equipment, or processes that may be used to cover the outcomes. The examples should be treated as information that adds clarity for the purposes of assisting in guidance of the depth and breadth that is to be covered.

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As the type, form, process, or technique of technology and equipment may change it is therefore expected and encumbered on RTOs to continue to be current in the content of their delivery arrangements. It is therefore appropriate for RTOs to use the notes in relation to technology and equipment references 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 Unit. 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 the Qualifications Framework section of this ESI - Transmission, Distribution and Rail Training Package.

1.2.03 Unit Construction

2.3 Unit Construction

Competency Standard Units that have been successfully completed by learners are to be acknowledged. Some Competency Standard 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 Electrotechnology Training Package.

Prerequisites

It is important to note that in relation to training delivery of prerequisites 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 ESI 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 Guidelines

2.4 Assessment Guidelines

The National Transmission, Distribution and Rail Industry have developed guidelines for the assessment of these standards. The guidelines are included at Volume 1 Part 3 of this Training Package.

1.2.05 National Qualifications

2.5 National Qualifications

The National Transmission, Distribution and Rail Industry has identified qualifications, which are linked to and use these competency standards. These are included in Volume 1 Part 1 – Qualifications Framework of this Training Package.

A list of the qualification titles contained in this Training Package is provided in Volume 1 Part 1. 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 - Transmission, Distribution and Rail

2.6 Regulatory Arrangements — Transmission, Distribution and Rail

The Transmission, Distribution and Rail Industry is subject to a high level of regulation and codes of practice related to the assembly, installation and maintenance of parts, components and the control and operation of equipment, apparatus and the like. The regulations and codes of practice are based on principles of the operation of overhead and underground wiring systems and associated circuits 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.

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Statutes, regulations and codes of practice

Federal, State and Territory Electricity, Telecommunications, Occupational Health and Safety and Work Cover Acts and Regulations typically cover the Transmission, Distribution and Rail Industry. Further, there are other statutes, regulations, industrial instruments, codes of practice, guidelines and advisory standards, Australian/New Zealand and International Standards that apply to the Transmission, Distribution and Rail Industry.

Information relevant to the Transmission, Distribution and Rail sector can be found in the following Internet sites:

www.fed.gov.au	www.standards.org.au
www.nsw.gov.au	www.erac.gov.au/
www.qld.gov.au	http://www.acma.gov.au
www.sa.gov.au	http://www.dewr.gov.au/
www.nt.gov.au	http://www.ascc.gov.au/
www.act.gov.au	http://www.workplace.gov.au/tra
www.wa.gov.au	http://www.deewr.gov.au/
www.tas.gov.au	http://training.com.au/

Other sources of information are also available.

1.2.07 Maintenance of Competency Standards

2.7 Maintenance of Competency Standards

The Transmission, Distribution and Rail 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.

The Competency Standards must be maintained so that they reflect the ongoing needs of the ESI — Transmission, Distribution and Rail Training Package sector 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 — Transmission, Distribution and Rail Training Package 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.

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1.2.08 What is Competency?

2.8 What is Competency?

The broad concept of industry competency relates to demonstrated performance of specified tasks and duties, expected in the workplace to a given standard as expressed in industry standards. Competency requires the demonstrated application of specified skills and knowledge and the ability to transfer and apply the skills and knowledge to new situations and environments, relevant to effective participation in work for 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 the work environment and working with others.

Work performance competency requires the demonstrated application of specified skills, knowledge and aptitudes consistently over time and to a quality standard in the workplace, and the ability to transfer it to new situations and environments. In line with this concept of competency, Training Packages contain the vocational standards for industry and 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. The measure is not what the individual/leaner knows, but has the individual/learner demonstrated performance to a standard, with what they know in a range of situations and range of applications.

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

Contextualisation of Competency Standard Units by RTOs

RTOs may contextualise Competency Standard Units to reflect local outcomes required, provided that no requirements and/or completion rules of the Training Package for industry are infringed. This also includes any prevailing regulatory requirements that may apply to the Competency Standard Units. Contextualisation could involve additions or amendments to suit particular delivery methods, learner profiles, specific enterprise equipment requirements, or to otherwise meet local needs. The integrity of the overall intended outcome of the Competency Standard Units must be maintained and, not reduced.

Any contextualisation of Competency Standard Units in this endorsed Training Package must be within the bounds of the following advice. In contextualising Competency Standard Units, RTOs:

- must not contravene, diminish or detract from any regulatory/licensing arrangement that may apply to the unit, or its related delivery arrangements, and
- must not remove or add to the number and content of Elements and Performance Criteria
- may add specific industry terminology to Performance Criteria where this does not distort or narrow the competency outcomes, and/or

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- may make amendments and additions to the Range Statement as long as such changes do not diminish the breadth of application of the competency and reduce its portability, and/or
- may add detail to the evidence guide in areas such as the critical aspects of evidence or resources and infrastructure required where these expand the breadth of the competency but do not limit its use.

Components of Competency Standard Units

The components of Competency Standard Units are summarised below, in the order in which they appear in each Competency Standard Unit:

Unit Title

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

Employability Skills

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.

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	

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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.

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.

Scope/Unit Descriptor

The unit scope/descriptor broadly communicates the content and purpose of the Competency Standard Unit and the skill area it addresses. Where Competency Standard Units have been contextualised from Competency Standard Units from other endorsed Training Package summary information is provided.

Prerequisite Competencies and Literacy and Numeracy (optional)

If there are any Competency Standard Units that must be completed before or concurrently, these will be listed. In addition, there may be a sub-section on entry advice related to levels of language and numeracy applicable to the unit.

Application of the Unit

This sub-section fleshes out the Competency Standard Unit’s scope, purpose and operation in different contexts, for example, by showing how it applies in the workplace. It may include a sub-section or second paragraph that describes its relationship with other industry sectors and any licensing application or requirements, such as a licence to practice.

Competency Field (Optional)

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

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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.

Elements of Competency

The elements of competency are the basic building blocks of the Competency Standard Unit. 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, processes, 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 Essential Knowledge and Associated Skills

The Essential Knowledge and Associated Skills (EKAS) 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 and includes the ability to transfer it to new situations and environments. In this Training Package the Essential Knowledge and Associated Skills have been separated from the Competency Standard Units to facilitate user-friendliness for interpretation, applicability and future maintenance. Each Competency Standard Unit has listed within its Essential Knowledge and Associated Skills section a unique Essential Knowledge and Associated Skills clause number and title. Further elaboration of the specification that applies to the Essential Knowledge and Associated Skills clauses is included in the separate Essential Knowledge and Associated Skills section of Volume 2 of this Training Package. This separate essential knowledge and associated skills section forms an integral part of each Competency Standard Unit, and all assessment evidence activities and reporting processes shall include and confirm achievement of this specification.

Range Statement

The Range Statement provides a context for the Competency Standard Unit, 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 an integral part of the Competency Standard Unit. It provides critical assessment information to the RTO and assessors about the critical aspects and 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 Competency Standard Units

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- 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,
- the required critical aspects and underpinning knowledge and skills
- application against relevant legislation, regulation, industrial instruments, codes of practice, guidelines and advisory standards. This also includes anti-discrimination and equal employment opportunity statutes (encompassing application of access, equity and cultural diversity principles associated with under-represented groups).

National Competency Standards

National Competency Standards are the benchmark for the National system of vocational education and training. Through national standards, the industry has established the competencies required for effective performance in employment. The system is industry led and responsive to its changing skill needs.

A competency-based system involves the delivery, assessment and certification of training. It is predicated on the identification and demonstrated attainment of the knowledge, the skills and the application required for effective performance in work. Hence the system is oriented towards outcomes rather than a traditional preoccupation with inputs.

National standards define the competencies required for effective performance in the workplace. A competency comprises the specification of knowledge and skill and the application of that knowledge and skill to the standard of performance required in the workplace. This definition of competency encompasses a range of features:

- The concept of competency focuses on what is expected of an employee in the workplace rather than on the learning process and embodies the ability to transfer and apply skills and knowledge to new situations and environments.
- In competency standards the emphasis is on outcomes and on the application of skills and knowledge, not just specification.
- Competency standards are concerned with what people are able to do (e.g. maintain and use networks), and also with the ability to do this in a range of contexts (e.g. maintain and use networks of suppliers, government agencies).

The national concept of competency includes all aspects of work performance, not only narrow task skills. The four components of competency are:

- task skills
- task management skills
- contingency management skills
- job/role environment skills.

While not every Competency Standard Unit will contain all four components, in a group of units these components of competency should be covered effectively. The four components of competency may emerge in the different parts of the standard format, i.e. Elements, Performance Criteria and the Range Statement.

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In developing the respective Competency Standard Units the following policy considerations were included:

a) A combination of units must cover the four primary components of competency:

- task skills
- task management skills
- contingency management skills
- job/role environment skills.

b) Competency standards must be drafted to:

- avoid any direct or indirect bias or discrimination
- support participation by a diverse workforce
- encourage successful outcomes.

c) When developing competency standards developers must incorporate other relevant industry or cross-industry standards in consultation with the original developer. If relevant standards are not used, the reason for this decision must be stated in the Training Package endorsement submission.

d) The standards format has seven (7) mandatory components:

- Unit code
- Unit title
- Unit descriptor
- Elements of competency
- Performance Criteria
- Range Statement
- Evidence Guide.

e) A single Competency Standard Unit is the smallest competency achievement that can be nationally recognised and recorded.

f) The standards developed must be the result of an extensive consultation process and the application of sound development methodologies. Key stakeholders, both from within and outside the industry for which the standards were developed must validate the outcomes.

Some of the issues associated with constructing Competency Standard Units included:

- breadth
- unit size
- transferability
- interrelationships between units.

Breadth

In best practice standards, units:

- reflect a broad based expression of the application of knowledge and skills
- are useful for the purposes of recognition and transferability of competencies particularly noting the requirements of the Australian Recognition Framework
- facilitate use in a variety of locations, e.g. in different enterprises.

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Competency Standards, developed by industry parties and subsequently endorsed by the National Quality Council (NQC), form the key stone of the national vocational education and training system. The development, endorsement and on-going review of Competency Standards provides a vehicle for industry parties to ensure the integrity and continuing relevance of national vocational education and training, both on and off-the-job.

Unit size

The unit must be useful and manageable for the purposes of recognition and assessment. Therefore it is difficult to generalise about the appropriate size of a Competency Standard Unit. The size of the unit is a reflection of the complexity of skills and knowledge incorporated, or the range of activities undertaken which will vary and was considered important for attention when constructing the units. Factors such as the apparent 'importance' of discrete functions within an industry, or the time required for training were not considered indicators of appropriate unit size. Measures were introduced to attend to differences in unit size such as weighting system for qualifications and completion requirements.

Development of the Competency Standard Units also focused on the uses of the standards and the relative breadth required for flexible job construction. This meant consideration was given to developing units that contained functions that would not normally be completed by one person.

Transferability

Transferability refers to the need for standards to be used in a range of different contexts within an industry or across industries. Development required the use of other endorsed industry or cross industry standards where those standards were relevant. This supported the portability of standards and helped to reduce duplication of development. In general terms, the standards needed to be broad enough to be used across a range of settings, but flexible enough to be useful in any specific context.

Interrelationship between units

Competency Standard Units are constructed in such a way that they can facilitate the recognition, certification and transferability of skills. It is for these reasons that units in their construction deal with discrete functions. At the same time, it was important to examine the interdependence of units as they were being developed. Some closely related competencies emerged which were sufficiently discrete to warrant specification in separate units, but which logically benefited being assessed together.

Importantly however, prerequisites have been designed such that it does not preclude concurrent training and formative assessment events to occur prior to conducting the final assessment event, which attributes competence. Regard must be had for any prevailing regulatory requirements that may apply. It is the final assessment event that must ensure that the prerequisite and co requisite advice is adhered to.

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1.2.09 Index of Competency Standard Units

2.9 Index of Competency Standard Units

Table 1 – Index of Units and Scopes/Descriptors

The units have been placed in Discipline groups that would typically relate to a particular or special area of industry need and for ease in recognition of related unit groupings.

Discipline – Cable Jointing

CSU Code	Title	Scope/Descriptor
UETTDRCJ01B	Lay electrical cables	This Competency Standard Unit covers the laying of cables for electrical purposes and includes the laying of ducts and/or conduit for such cables. It could include direct laying of cables in trenches, on racks, in troughs and/or in conduit or ducts. It also encompasses cable pulling methods, pulling tensions, minimum bending radii, reduction of frictional forces, use of supporting plant (e.g. dynamometers, rigging, winches), working on FRC, PVC, A/C ducted systems and the sealing of cables.
UETTDRCJ02B	Install and maintain de-energised LV underground paper insulated cables.	This Competency Standard Unit covers the installation and maintenance of de-energised low voltage underground paper insulated cables and covers the jointing, terminating, repair and replacement of cables. It includes the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning tests and the updating of system data/maintenance records.
UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables.	This Competency Standard Unit covers the installation and maintenance of de-energised high voltage underground paper insulated cables and covers the jointing, terminating, repair and replacement of cables. It includes the isolation and earthing of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning tests as per enterprise established procedures and the updating of system data/maintenance records.
UETTDRCJ04B	Joint and maintain energised LV underground paper	This Competency Standard Unit covers the jointing and maintenance of energised low voltage underground paper insulated cables according to

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CSU Code	Title	Scope/Descriptor
	insulated cables	established enterprise procedures. It covers the use of specialised live working equipment, tools and devices, the issuing and/or accepting electrical access permits and/or relevant working documentation and the undertaking of authorised cable testing procedures. It also encompasses the pre-commissioning tests and the updating of system data/maintenance records.
UETTDRCJ05B	Perform straight through HV paper insulated to polymeric transition joint	This Competency Standard Unit covers the formation of a HV/LV transition joint(s) from paper insulated to polymeric cable on belted and screened cables and covers the; determination of electrical values of belt papers and core insulation, protection of core and belt papers prior to setting, core setting, termination of belt papers, construction of bell mouth and moisture testing. It includes the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning and/or re-commissioning tests and the updating of system data/maintenance records.
UETTDRCJ06B	Install and maintain de-energised LV underground polymeric cables.	This Competency Standard Unit covers the installation and maintenance of de-energised low voltage underground polymeric cables and covers the jointing, terminating, repair and replacement of cables. It includes the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning and/or re-commissioning tests and the updating of system data/maintenance records.
UETTDRCJ07B	Install and maintain de-energised HV underground polymeric cables.	This Competency Standard Unit covers the installation and maintenance of de-energised high voltage underground polymeric cables and covers the jointing, terminating, repair and replacement of cables. It includes the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning and/or recommissioning tests and the updating of system data/maintenance records.
UETTDRCJ08B	Joint and maintain energised LV underground polymeric cables	This Competency Standard Unit covers the jointing and maintenance of energised low voltage underground polymeric cables according to established enterprise procedures. It covers the use of specialised live working equipment, tools and

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CSU Code	Title	Scope/Descriptor
		devices, the issuing and/or accepting electrical access permits and or relevant working documentation and the undertaking of authorised cable testing procedures. It also encompasses the pre-commissioning and/or re-commissioning tests and the updating of system data/maintenance records.
UETTDRCJ09B	Install oil and gas filled specialised underground cables	This Competency Standard Unit covers the installation, jointing and termination of oil and gas filled specialised underground cables from 33kV and higher. It includes the laying of the specialised underground ground cable, the preparation of the cables and phasing out jointing and terminating and the preparation of the cable jointing bay. It also encompasses the relevant safety procedures to ensure installation of the specialised cable is undertaken according to established enterprise requirements.
UETTDRCJ10B	Maintain oil and gas filled specialised underground cables	This Competency Standard Unit covers the maintenance and repair of oil and gas filled specialised underground cables. It includes testing, diagnosing faults, repairing and replacing the specialised cables. It also encompasses the processes for preliminary pressure control and leak repair, as well as working under induced voltages, cable identification and cable freezing.
UETTDRCJ11B	Install and maintain polymeric specialised underground cables	This Competency Standard Unit covers the installation, maintenance and repair of polymeric specialised underground cables including XLPE and EPR from 33kV and higher. It includes jointing and terminating, as well as working under induced voltages and undertaking the relevant tests required for jointing. It also encompasses the preparation of the cable jointing bay, the preparation of cables and phasing out, cable identification and spiking, the treatment/handling of, but not jointing fibre optical cables.
UETTDRCJ12B	Install and maintain oil & gas pressure systems for specialised underground cables	This Competency Standard Unit covers the installation, maintenance and repair of oil and gas pressure systems for specialised underground cables. It includes the undertaking of pressure control activities, the installation of gauges, oil tanks and gas cubicles. It also includes the knowledge of Oil Route Profiles as well as the operation of pressure equipment for jointing works, and the repairing and

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CSU Code	Title	Scope/Descriptor
		replacing of pressure systems. It also encompasses the procedures associated with performing accessory impregnation, oil flow testing, the processes for oil degasification and performing leak location of pressure systems.
UETTDRCJ13B	Install and maintain network infrastructure LV underground cables	This Competency Standard Unit covers the installation and maintenance of de-energised low voltage underground cables and covers the laying of cables as well as the jointing, terminating, repair and replacement of cables. It could include direct laying of cables in trenches, on racks, in troughs and /or in conduit or ducts and also includes the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning and/or re-commissioning tests and the updating of system data/maintenance records.
UETTDRCJ14B	Install and maintain network infrastructure HV underground cables	This Competency Standard Unit covers the installation and maintenance of de-energised high voltage underground cables and covers the laying of cables as well as the jointing, terminating, repair and replacement of cables. It could include direct laying of cables in trenches, on racks, in troughs and /or in conduit or ducts and also includes the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning and/or re-commissioning tests and the updating of system data/maintenance records.

Discipline – Distribution

CSU Code	Title	Scope/Descriptor
UETTDRDP01B	Inspect overhead structures and electrical apparatus (poles /structures)	This Competency Standard Unit covers the inspection as per requirements of overhead structures such as poles and/or other structures other than towers. It also includes inspection of electrical apparatus such as, overhead conductors and or cables, underground and overhead transition points, electrical equipment, such as pole-mounted transformers, switchgear, hardware and or earthing systems. It encompasses the completion of

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CSU Code	Title	Scope/Descriptor
		inspection reports and other relevant documentation in accordance with requirements.
UETTDRDP02B	Maintain overhead energised LV conductors and cables	This Competency Standard Unit covers the maintenance of overhead energised low voltage conductors and cables and includes the verification of the site conditions and the potential hazards. It also encompasses the selection of appropriate and authorised work method using specialised equipment, the diagnosis of faults, the undertaking of electrical tests and the updating of system data/maintenance records.
UETTDRDP03B	Maintain energised high voltage distribution overhead electrical apparatus (stick)	This Competency Standard Unit covers the maintenance of energised high voltage distribution overhead electrical apparatus using high voltage live line sticks and includes the verification of the site conditions and the potential hazards, the conformation and calculation of physical loads and the selection of appropriate and authorised work method. It includes the preparation and cleaning of specialist material and tools in accordance with authorised technical instructions. It also encompasses the undertaking of OHS and safe working practices and the rendering inoperative of the automatic re-closing device including its restoration in accordance with the work plan and the procedure of issuing/accepting electrical access permits and or relevant working documents.
UETTDRDP04B	Maintain energised high voltage distribution overhead electrical apparatus (glove)	This Competency Standard Unit covers the maintenance of energised high voltage distribution overhead electrical apparatus using high voltage live line glove and barrier method and includes the verification of the site conditions and the potential hazards, the conformation and calculation of physical loads and the selection of appropriate and authorised work method. It includes the preparation and cleaning of specialist material and tools in accordance with authorised technical instructions. It also encompasses the undertaking of OHS and safe working practices and the rendering inoperative of the automatic re-closing device including its restoration in accordance with the work plan and the procedure of issuing/accepting electrical access permits and or relevant working documents.

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CSU Code	Title	Scope/Descriptor
UETTDRDP05B	Inspect, maintain and restore energised LV overhead distribution network infrastructure	This Competency Standard Unit covers the inspection of overhead structures such as poles and/or other structures other than towers and the maintenance of overhead energised low voltage conductors and cables. It includes the conducting of low voltage switching operations involving the operation of circuit breaking and isolation devices from a given switching schedule and in accordance with enterprise procedures. It covers low voltage distribution systems in field situations but also includes paralleling in accordance with the switching schedule. It also includes inspection of electrical apparatus such as, overhead conductors and or cables, underground and overhead transition points, electrical equipment, such as pole-mounted transformers, switchgear, hardware and or earthing systems. It encompasses the completion of inspection reports and other relevant documentation in accordance with requirements.

Discipline – Design

CSU Code	Title	Scope/Descriptor
UETTDRDS01B	Draft and layout an overhead distribution extension	This Competency Standard Unit covers the planning and layout of one or two pole minor overhead distribution extensions, including the estimating of the costs and/or resources for the work to be undertaken. It also encompasses on-the-job design, surveying techniques and layout to the field locations as per enterprise requirements.
UETTDRDS02B	Draft and layout an underground distribution extension	This Competency Standard Unit covers the planning and layout of minor HV and LV underground distribution extension, including the estimating of the costs and/or resources for the work to be undertaken. It also encompasses on-the-job design, surveying techniques, the pegging and or marking out of the trench position, the pit/pillar position and the cable position according to the work order and enterprise requirements.

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CSU Code	Title	Scope/Descriptor
UETTDRDS03B	Draft and layout a street lighting system	This Competency Standard Unit covers the planning and layout of street lighting systems. It includes the conduction of site inspections to confirm and or modify a street lighting system layout, estimation of costs and resources for the works order and the pegging out of the poles/underground cables according to the work order and to optimise visibility and minimise traffic hazards. It also encompasses the provision of advice on conditions of supply and permits and the communication and coordination needed to be undertaken with the relevant authorities and clients.
UETTDRDS04B	Draft and layout a distribution substation minor upgrade	This Competency Standard Unit covers the drafting and laying out of minor LV distribution upgrades, including the estimating of the costs and/or resources for the work to be undertaken. It also encompasses on-the-job design, surveying techniques, the pegging and or marking out of the trench position, the pit/pillar position and the cable position according to the work order and enterprise requirements.
UETTDRDS05B	Design overhead distribution systems	This Competency Standard Unit covers the technical design of overhead distribution and sub transmission networks to relevant standards, including electrical clearances, electrical and mechanical loadings, earthing, environmental considerations, minor civil aspects and the handling of waterway, railway and other crossings. It also includes the necessary established procedures to ensure the line design conforms to specific organisational technical standards, operational and system planning requirements and incorporates the principles of safe design.
UETTDRDS06B	Design underground distribution systems	This Competency Standard Unit covers the technical design of underground distribution and sub transmission networks to relevant standards, including cable sizing and locations, soil resistivity and heat dissipation, backfill and trenching details, minor civil aspects and dynamic and cyclic ratings. It also includes the necessary established procedures to ensure the

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CSU Code	Title	Scope/Descriptor
		line design conforms to specific organisational technical standards, operational and system planning requirements and encompasses.
UETTDRDS07B	Design distribution substations	This Competency Standard Unit covers the technical design of distribution substations to relevant standards and specifications, including earthing, location of substation relevant to load, customer and environmental needs and minor civil aspects. It also includes the necessary established procedures to ensure the substation design conforms to specific organisational technical standards operational and system planning requirements and encompasses.
UETTDRDS08B	Design public lighting systems	This Competency Standard Unit covers the technical design of public lighting systems. This includes pedestrian and traffic route lighting to relevant Australian standards utilising appropriate software to generate design conformance. These activities should be undertaken with minimal supervision and technical support.
UETTDRDS09B	Prepare and manage detailed construction plans for electrical system infrastructure	This Competency Standard Unit covers the preparation of detailed plans to be used during the design phase and preparation of as-built drawings during the construction phase, and utilised by network owners as technical reference materials, to detail system infrastructure. It includes the use of CAD or other relevant drafting methods.
UETTDRDS10B	Prepare and appraise financial impact statements	This Competency Standard Unit covers the creation, interpretation and application of financial implications in distribution, zone, sub-transmission and transmission network augmentations, maintenance and construction activities. It includes project scoping, cost estimating, providing economic justifications and cost benefit analysis and the use of guarantee and capital contribution arrangements with customers.
UETTDRDS11B	Manage electrical infrastructure projects	This Competency Standard Unit covers the work planning and resource requirements, and financial control of infrastructure projects being undertaken within the distribution, sub transmission and transmission, overhead and

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CSU Code	Title	Scope/Descriptor
		underground networks. It includes project management activities, which may involve the simultaneous management of many projects, and must encompass at least 20 identifiable tasks.
UETTDRDS12B	Investigate quality of supply issues	This Competency Standard Unit covers the technical investigation of quality of supply issues and recommend solutions. Quality of supply issues may include television and radio interference, voltage complaints, harmonics and system irregularities.
UETTDRDS13B	Develop HV and LV distribution protection systems	This Competency Standard Unit covers the development of appropriate protection systems for HV and LV distribution networks, including calculations of fault levels, selection of appropriate protection devices and automation requirements and protection coordination schemes. This also includes recommendations to support the calculations and must ensure conformance to specific organisational operational and system planning requirements. and compliance with national or supply authority codes.
UETTDRDS14B	Design zone substations modifications	This Competency Standard Unit covers the design of modifications within a zone substation. This may include busbar upgrades, equipment replacement projects and basic secondary upgrades or SCADA modifications The design may include civil engineering aspects and must conform to safety regulations and environmental standards and incorporates the principles of safe design.
UETTDRDS15B	Organise and implement line and easement surveys	This Competency Standard Unit covers the surveying of distribution and sub transmission lines and easements for activities associated with the design and installation of electrical equipment. This activity should encompass the use of instruments such as compasses, inclinometer, distance measuring devices, etc and be in accordance with customer requirements, nominated design specifications and company processes.

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CSU Code	Title	Scope/Descriptor
UETTDRDS16B	Develop planned outage strategies	This Competency Standard Unit covers the competency required to assess, and manage the impact on the network and customers with regards to planned outages. This includes customer outage times, network and plant loading issues and regulatory requirements. A detailed knowledge of Network performance indicators is included
UETTDRDS17B	Review asset management strategies	This Competency Standard Unit covers the management of assets within the distribution and sub transmission networks. This includes plant optimisation, condition monitoring, maintenance strategies and policies and capital works planning, including recommendations for continual improvement. Cost benefit analysis is fundamental for successful implementation of the afore mentioned asset management functions.
UETTDRDS18B	Analyse and appraise fault and outage data	This Competency Standard Unit covers the data gathering and analysis of system outages and plant failures. It includes the recommending of solutions and maintenance plans to ensure system security.
UETTDRDS19B	Establish and manage geographical information systems data	This Competency Standard Unit covers the preparation and updating of detailed plans to be used during the construction phase of all design activities, and utilised by network owners as technical reference materials, to detail system infrastructure. It includes the use of GIS.
UETTDRDS20B	Design customer substations	This Competency Standard Unit covers the design of basic primary and secondary plant within a customer substation. Such designs will usually include relay-operated HV switchgear, distribution transformers LV switchgear, including customer distribution boards. The design may include minor civil engineering aspects and must conform to relevant Australian standards, safety regulations, environmental standards and customer requirements taking into account costs as an important criterion.
UETTDRDS21B	Manage transmission and sub-transmission	This Competency Standard Unit covers the management of transmission, Sub-transmission

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CSU Code	Title	Scope/Descriptor
	design process	and Zone substation design process activities. This applies to all design projects whether they be basic secondary upgrades, SCADA modifications or new installations on green field sites. The design and management must conform to safety regulations and environmental standards and incorporate the principles of safe design.
UETTDRDS22B	Design transmission, sub-transmission and zone substation buildings	This Competency Standard Unit covers the design of Transmission, Sub-Transmission and Zone Substation Buildings. This may include basic augmentations or new installations on green field sites. The design must conform to safety and building regulations and environmental standards and incorporate the principles of safe design.
UETTDRDS23B	Design transmission and sub-transmission substation primary plant	This Competency Standard Unit covers the design of transmission, sub-transmission and zone substation primary plant. This may include busbar upgrades, equipment replacement projects, basic secondary upgrades or new installations on green field sites. The design must conform to safety regulations and environmental standards and incorporate the principles of safe design.
UETTDRDS24B	Design transmission and sub-transmission protection and control	This Competency Standard Unit covers the design of Transmission, Sub-transmission and Zone Substation Protection and Control. This may include basic secondary upgrades, SCADA modifications or new installations on green field sites. The design must conform to safety regulations and environmental standards and incorporate the principles of safe design.
UETTDRDS25B	Design transmission and sub-transmission substation earthing	This Competency Standard Unit covers the design of transmission and sub-transmission zone Substation Earthing. This may include earth resistivity tests coordination, design of the earth grid, electrodes, grid connections, equipment connections and remote earthing connections to conduct maximum earth fault currents without exceeding the maximum allowable earth potential rise. The design includes earthing engineering aspects and must conform to safety regulations and environmental standards and incorporate the principles of safe design. However, it excludes

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CSU Code	Title	Scope/Descriptor
		the certification of earthing design.
UETTDRDS26B	Design transmission, sub-transmission and zone substation – civil and structural components	This Competency Standard Unit covers the design of transmission, sub-transmission and zone substation — civil and structure. This may include augmentations of existing substations or new substations on green field sites. The design includes civil and structural engineering aspects and must conform to safety regulations and environmental standards and incorporate the principles of safe design. However, it excludes the certification of civil and structural design.
UETTDRDS27B	Design overhead transmission systems	This Competency Standard Unit covers the technical design of overhead transmission networks to relevant standards, including electrical clearances, electrical and mechanical loadings, earthing, environmental considerations, minor civil aspects and the handling of waterway, railway and other crossings. It also includes the necessary established procedures to ensure the line design conforms to specific organisational technical standards, operational and system planning requirements and incorporates the principles of safe design.
UETTDRDS28B	Design underground transmission systems	This Competency Standard Unit covers the technical design of underground transmission networks to relevant standards, including cable sizing and locations, soil resistivity and heat dissipation, backfill and trenching details, minor civil aspects and dynamic and cyclic ratings. It also includes the necessary established procedures to ensure the line design conforms to specific organisational technical standards, operational and system planning requirements and incorporates the principles of safe design.

Discipline – Entry Level Cross Discipline

CSU Code	Title	Scope/Descriptor
UETTDREL01B	Apply environmental and sustainable energy procedures	This Competency Standard Unit covers the implementation of relevant environmental procedures to specific projects/sites. It includes

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CSU Code	Title	Scope/Descriptor
		the identification of possible environmental risks and impacts, the undertaking of work in accordance with sustainable energy and energy conservation principles, the provision of re-cycling materials and the recording and reporting of environmental incidents. It also encompasses the process of reviewing and participating and contributing in environmental procedures according to established enterprise requirements.
UETTDREL02B	Operate plant and equipment near live electrical conductors/apparatus	This Competency Standard Unit covers the operation of plant and equipment near live electrical conductors and/or apparatus. It encompasses plant and equipment relevant to the enterprise and is in addition to any Commonwealth, State/Territory or Local Government legislation and or regulatory requirements regarding the operation of that plant and or equipment. It includes the conducting of operational checks, the correct positioning of road signs, barriers and or warning devices. It also encompasses the completion of log books and job completion documentation.
UETTDREL03B	Comply with environmental and incidental response procedures	This Competency Standard Unit covers the compliance of environmental and incidental response procedures whilst undertaking tasks in the Electricity Supply Industry workplace and refers to relevant legislation, codes and practices and established procedures. The competency standard refers to compliance with relevant sections of Federal and State OHS and Environmental Protection Acts. The checking of plant and equipment should be performed through visual and mechanical checks. The plant and equipment used is that typically used in preparing work sites and compliance with environmental policies and procedures. Relevant regulations and procedures are referred to, but not limited to, the work site and the use of plant; machinery/equipment; cleaning materials and aids; equipment operation; personal protective equipment e.g. safety boots, eye and ear protection, safety helmets.

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CSU Code	Title	Scope/Descriptor
UETTDREL04B	Working safely near live electrical apparatus as non electrical worker	This Competency Standard Unit covers compliance with working safely up to the defined "safe working zone" near energised electrical apparatus (inc. electrical powerlines) for non-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 a non-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.
UETTDREL05B	Respond to technical enquiries and requests	This Competency Standard Unit covers responding to enquiries of a technical nature using electricity supply industry (ESI) requirements, techniques and processes. It includes the relevant application of knowledge of relevant acts and regulations, codes of practice, guidelines and compliance regimes, and arrangements used to facilitate a response to enquiries or requests. The enquiries may be internal or with customers.
		Note: Examples include "storm codes" identification of key equipment, recognition of normal and abnormal industry situations, key processes and systems used in the industry such as, maps and the application of general safety and environmental processes and practices used in the industry.

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Discipline – Industry Specific

CSU Code	Title	Scope/Descriptor
UETTDRIS01B	Install electrical equipment (network infrastructure).	This Competency Standard Unit covers the installation of electrical equipment, such as fuse switches, drop out switches, sectionalisers, links, surge arrestors, gas filled and or oil filled switches, which are relevant to the transmission, distribution and rail networks. It includes the termination/connection of the equipment in accordance to enterprise requirements; the relevant pre-commissioning tests involving the equipment/system and the interpretation of these tests against agreed specifications.
UETTDRIS02B	Maintain electrical equipment (Network Infrastructure).	This Competency Standard Unit covers the maintenance of electrical equipment and associated hardware, such as fuse switches, drop out switches, sectionalisers, links, surge arrestors, gas filled and or oil filled switches, relevant to the transmission, distribution and rail traction networks and includes the repair and/or replacement of "like for like" electrical equipment and associated hardware as well as the termination and/or connection of this equipment according to requirements and may include sampling of insulating oils. It also encompasses the identification of faults, the pre-commissioning tests involving the equipment/system and the interpretation of these tests against agreed specifications.
UETTDRIS03B	Perform LV field switching operation to a given schedule.	This Competency Standard Unit covers the conducting of low voltage switching operations involving the operation of circuit breaking and isolation devices from a given switching schedule and in accordance with enterprise procedures. It covers low voltage distribution systems in field situations but also includes paralleling in accordance with the switching schedule. It also encompasses the procedure 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

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CSU Code	Title	Scope/Descriptor
		affected circuits to service
UETTDRIS04B	Perform high voltage field switching operation to a given schedule	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
UETTDRIS05B	Perform substation switching operation to a given schedule	This Competency Standard Unit covers the conducting of switching operations in a distribution substation in accordance to a given instructions, switching schedule and established enterprises procedures. The use of operating sticks, Voltage detectors, Circuit Breakers, Air Break switches and fuses in association with reclosers, ring main units and isolators is also included in this unit.
UETTDRIS06B	Install and maintain network infrastructure electrical equipment	This Competency Standard Unit covers the installation and maintenance of electrical equipment, such as fuse switches, drop out switches, sectionalisers, links, surge arrestors, gas filled and or oil filled switches, which are relevant to the transmission, distribution and rail networks. It includes the termination/connection of the equipment in accordance to enterprise requirements; the repair and/or replacement of "like for like" electrical equipment and associated hardware, and may include sampling of insulating oils. It also encompasses the identification of faults, the relevant pre-commissioning tests involving the equipment/system and the interpretation of these tests against agreed specifications. It excludes the energisation of the equipment maintained in a highly complex, interdependent and interconnected electricity supply Network system, where the affects of unintended

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CSU Code	Title	Scope/Descriptor
		consequences on the system are high risk and appropriate personnel effect energisation.
UETTDRIS07B	Sample, test, filter, and reinstate insulating oil	This Competency Standard Unit covers the filtering, sampling, testing and reinstating of insulating oil. This may include the dispatching of oil samples to a laboratory for higher level testing if required. Post operational servicing of equipment and or plant and, the identification of any related environment issues concerning disposal, safety and the like are also associated with this unit.
UETTDRIS08B	Develop HV switching schedule	This Competency Standard Unit covers the preparation of a basic switching schedule for interconnected HV network plant. It includes planning basic outages and taking into account loading of network components. It also includes the calculation of network loading conditions to ensure the network is operating within designed parameters.
UETTDRIS09B	Develop LV switching schedule	This Competency Standard Unit covers the preparation of a basic switching schedule for LV network. It includes planning basic outages and taking into account loading of network components. It also includes the calculation of network loading conditions to ensure the network is operating within design parameters.
UETTDRIS10B	Coordinate permit procedures	This Competency Standard Unit covers the coordination of work procedures that require the issue of electrical permits to work and other permits for working on major parts of the electrical network. It encompasses the analysis and coordination of all work activities planned to be undertaken within more or less the same time timeframe to ensure that: the organisation’s work safety and statutory requirements are complied with; the extent of power interruption, and hence inconvenience to customers, is minimised; and the effective utilisation of available resources, both from the organisation and from its contractors to ensure all planned activities are timely completed to specified standards and requirements.

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CSU Code	Title	Scope/Descriptor
UETTDRIS11B	Coordinate and direct switching schedules	This Competency Standard Unit covers the co-ordination and direction of switching the HV and LV system. It includes coordinating switching between operating authorities and HV customers, etc. It also includes the direction of switching on the HV and LV electrical network.
UETTDRIS12B	Install and maintain poles/structures and associated hardware	This Competency Standard Unit covers the installation and maintenance of poles and/or structures and associated hardware, other than towers, which may consist of wood, steel, concrete or composite type material. It includes the fixing and or securing of hardware associated as well as the repair and or replacement of poles and or structures used in the distribution and or rail traction industry sectors. It encompasses the implementation of a suitable traffic management plan.
UETTDRIS13B	Install and maintain public lighting systems	This Competency Standard Unit covers the installation, maintenance and repair of public lighting systems. This also includes the inspection, testing and commissioning of the system associated with the street lighting circuit, the associated hardware and the earthing system. Installation will include the installation of, the associated hardware and components and, the wiring and earthing system. Maintenance may also include work on energised LV overhead or underground public lighting systems including the diagnosis of faults and the updating of relevant system data and or public lighting maintenance records.
UETTDRIS14B	Install and maintain overhead conductors and cables (poles and structures)	This Competency Standard Unit covers the installation and maintenance of overhead conductors and cables used on poles and structures (excluding towers) which includes the stringing, tensioning and terminating of the conductor/cable, as well as the cleaning of insulators (de-energised), the securing of the conductor to the insulators or supports and the undertaking of the electrical connections. It also covers maintenance work associated with the diagnosing of faults, the conducting of visual inspections, the confirmation of phasing and the

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CSU Code	Title	Scope/Descriptor
		completion of other enterprise tests. It also encompasses the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits and the updating of system data/maintenance records.
UETTDRIS15B	Install and maintain low voltage services (underground)	This Competency Standard Unit covers the installation, maintenance and connection of low voltage underground service lines and associated equipment (between the connection point and the point of supply — customers' premises). Maintenance includes the repair and replacement of service cables, service fuses and the replacement and repair of service hardware, the identification and rectification of faults. It also covers insulation, voltage, and polarity testing and phase rotation.
UETTDRIS16B	Install and maintain low voltage services (overhead)	This Competency Standard Unit covers the installation, maintenance and connection of low voltage overhead service lines and associated equipment (between the connection point and the point of supply — customers' premises). Maintenance includes the repair and replacement of service cables, service fuses and the replacement and repair of service hardware, the identification and rectification of faults. It also covers insulation, voltage, and polarity testing and phase rotation.
UETTDRIS17B	Conduct visual checking and treatment of poles and structures	This Competency Standard Unit covers the conducting of ground line inspection and treatment of poles and structures in accordance with enterprise procedures. It includes work associated with testing or examining, at eye level to below ground and the visual checking above ground of the crossarm and hardware attached with the use of binoculars, so as to determine the integrity of the poles and structures. It also encompasses the completion of inspection reports and the updating of records to enterprise requirements.
UETTDRIS18B	Locate faults in underground power cables	This Competency Standard Unit covers the diagnosis and location of faults in underground power cables. It includes obtaining the required "access to test" or equivalent permit, setting up

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CSU Code	Title	Scope/Descriptor
		of the fault location test equipment and following the procedure to carry out the cable fault location test plan. It also encompasses the interpreting test results, documenting the actual fault location and likely cause and, listing the recommendations for correcting the cable fault to meet client requirements.
UETTDRIS19B	Conduct high potential testing of underground power cables	This Competency Standard Unit covers the conducting of high potential testing of underground power cables. It includes obtaining the required "access to test" or equivalent permit, setting up of the fault location test equipment and following the procedure to carry out the cable test plan. It also encompasses the interpreting test results, documenting the actual testing and, recommendations to meet client requirements.
UETTDRIS20B	Install and replace energy meters and associated equipment	This Competency Standard Unit covers the installation and replacement of whole current energy meters and associated equipment, where replacement may include the identification of faults in accordance with established procedures and return to service. It includes the requirements to ascertain if normal functions of the meters and associated equipment are in accordance with established procedures.
UETTDRIS21B	Install mobile generation set for synchronised Genset LV	This Competency Standard Unit covers installation of temporary portable generation sets to LV distribution assets thereby maintaining supply in accordance with industry regulations and established procedures. It encompasses the operation, connection and disconnection of a temporary portable generator and includes the estimation of LV load and assessing the appropriateness of the generator for the required outcome.
UETTDRIS22B	Implement and monitor the organisational OHS policies, procedures and programs	This Competency Standard Unit covers the implementation and monitoring of the participative arrangements for the management of the organizational OHS policies procedures, programs and issues, including disseminating information on hazards and risk assessment to meet OHS standards. It also encompasses the

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CSU Code	Title	Scope/Descriptor
		collation of work group input, as well as implementation of enterprise procedures for resolving OHS issues.
UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures	This Competency Standard Unit specifies the outcomes for the collecting, interpretation and application of environmental management information, identification of environmental impacts and assessment of risks and establishment of best practice procedures for implementation of the management plans to ensure compliance. It also consists of monitoring during the implementing of, environmental and sustainable energy policies and plans and, development of modifications as part of the review process.
UETTDRIS24B	Install mobile generation set for synchronised genset HV	This Competency Standard Unit covers installation of temporary portable generation sets to HV distribution assets thereby maintaining supply in accordance with industry regulations and established procedures. It encompasses the operation, connection and disconnection of a temporary portable generator and includes the estimation of HV load and assessing the appropriateness of the generator for the required outcome.
UETTDRIS25B	Contribute to coordinated high voltage live line work	This Competency Standard Unit specifies the outcomes required of live line working team members to work effectively as a cohesive team to ensure safety of all team members and the community when undertaking high voltage (HV) live line work. It includes the pre-work briefing on tasks to be undertaken, roles of individual team members, identification of possible hazards, risk management analysis and implementation of palliative measures to control or mitigate the risk to acceptable levels. It also encompasses the monitoring of work performance to ensure safety, and the post-work debriefing to identify areas for continuous improvement.
UETTDRIS26B	Manage an electricity supply industry OHS	This Competency Standard Unit is to be applied to establish, maintain and manage systematic approaches to managing OHS in the Electricity

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CSU Code	Title	Scope/Descriptor
	management system	Supply Industry. It will be applied in a management context in terms of responsibility to ensure that the workplace is as far as practicable safe and without risk to employees, clients and other present visitors.
UETTDRIS27B	Install and maintain overhead distribution network infrastructure	This Competency Standard Unit covers the installation and maintenance of poles and/or structures and associated hardware, other than towers, which may consist of wood, steel, concrete or composite type material. It includes installation and maintenance of overhead conductors and cables used on poles and structures (excluding towers) which includes the stringing, tensioning and terminating of the conductor/cable, as well as the cleaning of insulators (de-energised), the securing of the conductor to the insulators or supports and the undertaking of the electrical connections. It also covers maintenance work associated with the diagnosing of faults, the conducting of visual inspections, the confirmation of phasing and the completion of other enterprise tests. It also encompasses the isolation of systems and circuits, the fixing and or securing of hardware associated as well as the repair and or replacement of poles and or structures used in the distribution and or rail traction industry sectors. It encompasses the implementation of a suitable traffic management plan.
UETTDRIS28A	Analyse and develop solutions for problems in extra-low voltage, single path circuits	This Competency Standard Unit covers the analysis and development of solutions for problems in single path circuits operated at extra-low voltage as they apply to various electricity supply industry work functions. It encompasses working safely, problem solving procedures, including the use of voltage, current and resistance measuring devices.
UETTDRIS29A	Analyse and develop solutions for problems in multiple path d.c. circuits	This Competency Standard Unit covers determining correct operation of single source d.c. parallel and series-parallel circuits and the analysis and development of solutions for problems in multi path d.c. circuits as they apply to various electricity supply industry work

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CSU Code	Title	Scope/Descriptor
		functions. It encompasses working safely, problem solving procedures, the use of voltage, current and resistance measuring devices as well as providing solutions to problems in multiple path circuit derived by the use of measurements and calculations
UETTDRIS30A	Analyse and develop solutions for problems in electromagnetic circuits	This Competency Standard Unit covers determining correct operation of electromagnetic circuits and analysing, providing solutions to problems as they apply to electrical installations and equipment used in the electricity supply industry. 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 problems in multiple path circuit.
UETTDRIS31A	Analyse and develop solutions for problems in single and three phase low voltage circuits	This Competency Standard Unit covers ascertaining correct operation of single and three phase 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.
UETTDRIS81A	Install and maintain telecommunications infrastructure on electricity supply industry assets	This Competency Standard Unit covers the installation of telecommunications infrastructure equipment within the communications corridor, such as cables, cable support, termination enclosures, which are relevant to the transmission of data. It includes the termination/connection of the telecommunication equipment in accordance to enterprise requirements.

Discipline – Refresher Training

CSU Code	Title	Scope/Descriptor

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UETTDRRF01A	Apply ESI safety rules, codes of practice and procedures for work on or near electrical apparatus	This Competency Standard Unit covers the knowledge and application of Electricity Supply Industry (ESI) safety rules and codes of practice for work on or near electrical apparatus it includes the application of relevant State and Territory safety rules, codes of practice and enterprise based procedures and how they apply in the context of transmission, distribution or rail work functions. It encompasses responsibilities for, health, safety and risk management processes at all operative levels and adherence to safety practices as part of the normal way of doing work.
UETTDRRF02A	Perform pole top rescue	This Competency Standard Unit covers the performance of pole top rescue procedures as an emergency procedure required in the work place. It specifies the mandatory requirements of rescue from a pole top and how they apply in the context of transmission, distribution and rail work functions. It encompasses responsibilities for rescue, health, safety and risk management processes at all operative levels and adherence to safety practices as part of the normal way of doing work.
UETTDRRF03A	Perform EWP rescue	This Competency Standard Unit covers the performance of rescue procedures from an Elevating Work Platform (EWP) in the work place. It specifies the mandatory requirements of rescue from a raised EWP by a work party member on the ground and how they apply in the context of transmission, distribution or rail work functions. It encompasses responsibilities for, health, safety and risk management processes at all operative levels and adherence to safety practices as part of the normal way of doing work.
UETTDRRF04A	Perform tower rescue	This Competency Standard Unit covers the performance of rescue procedures from a tower in the work place. It specifies the mandatory requirements of rescue from a tower and how they apply in the context of transmission, distribution or rail work functions. It encompasses responsibilities for,

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CSU Code	Title	Scope/Descriptor
UETTDRRF01A	Apply ESI safety rules, codes of practice and procedures for work on or near electrical apparatus	This Competency Standard Unit covers the knowledge and application of Electricity Supply Industry (ESI) safety rules and codes of practice for work on or near electrical apparatus it includes the application of relevant State and Territory safety rules, codes of practice and enterprise based procedures and how they apply in the context of transmission, distribution or rail work functions. It encompasses responsibilities for, health, safety and risk management processes at all operative levels and adherence to safety practices as part of the normal way of doing work.
		health, safety and risk management processes at all operative levels and adherence to safety practices as part of the normal way of doing work.
UETTDRRF05A	Perform rescue from switchyard structures at heights	This Competency Standard Unit covers the performance of rescue procedures from switchyard structures at heights in the work place. It specifies the mandatory requirements of rescue from switchyard structures and how they apply in the context of transmission, distribution or rail work functions. It encompasses responsibilities for health, safety and risk management processes at all operative levels and adherence to safety practices as part of the normal way of doing work.
UETTDRRF06A	Perform rescue from a live LV panel	This Competency Standard Unit covers the performance of rescue procedures from live LV apparatus, not including overhead lines and underground cables in the work place. It specifies the mandatory requirements of rescue from a live LV panel and how they apply in the context of transmission, distribution or rail work functions. It encompasses responsibilities for, health, safety and risk management processes at all operative levels and adherence to safety practices as part of the normal way of doing work.
UETTDRRF07A	Perform cable pit/trench/excavation	This Competency Standard Unit covers the performance of cable pit/trench/excavation

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CSU Code	Title	Scope/Descriptor
UETTDRRF01A	Apply ESI safety rules, codes of practice and procedures for work on or near electrical apparatus	This Competency Standard Unit covers the knowledge and application of Electricity Supply Industry (ESI) safety rules and codes of practice for work on or near electrical apparatus it includes the application of relevant State and Territory safety rules, codes of practice and enterprise based procedures and how they apply in the context of transmission, distribution or rail work functions. It encompasses responsibilities for, health, safety and risk management processes at all operative levels and adherence to safety practices as part of the normal way of doing work.
	rescue	rescue procedures as they apply to live LV cable jointing in the work place. It specifies the mandatory requirements of rescue from a cable pit/trench/excavation and how they apply in the context of transmission, distribution or rail work functions. It encompasses responsibilities for health, safety and risk management processes at all operative levels and adherence to safety practices as part of the normal way of doing work.
UETTDRRF08A	Perform EWP controlled descent escape	This Competency Standard Unit covers the performance of Elevating Work Platform (EWP) controlled descent escape procedures in the work place. It specifies the mandatory requirements for self rescue from a raised EWP and how they apply in the context of transmission, distribution or rail work functions. It encompasses responsibilities for, health, safety and risk management processes at all operative levels and adherence to safety practices as part of the normal way of doing work.
UETTDRRF09A	Apply access procedures to work on or near electrical network infrastructure	This Competency Standard Unit covers the performance of the procedures to gain access for work on or near electrical network infrastructure in the context of transmission, distribution or rail work functions. It encompasses responsibilities for, safety and risk management processes at all operative

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CSU Code	Title	Scope/Descriptor
UETTDRRF01A	Apply ESI safety rules, codes of practice and procedures for work on or near electrical apparatus	This Competency Standard Unit covers the knowledge and application of Electricity Supply Industry (ESI) safety rules and codes of practice for work on or near electrical apparatus it includes the application of relevant State and Territory safety rules, codes of practice and enterprise based procedures and how they apply in the context of transmission, distribution or rail work functions. It encompasses responsibilities for, health, safety and risk management processes at all operative levels and adherence to safety practices as part of the normal way of doing work.
		levels and adherence to safety practices as part of the normal way of doing work.
UETTDRRF10A	Provide first aid in an ESI environment	This Competency Standard Unit covers the provision of first aid in an Electricity Supply Industry (ESI) environment. It includes the recognition and provision of an initial response where first aid is required in emergency situations by providing essential first aid using basic life support measures according to established workplace first aid policies and procedures.

Discipline – Rail Traction

CSU Code	Title	Scope/Descriptor
UETTDRRT01B	Install overhead traction wiring systems	This Competency Standard Unit covers the installation of overhead traction wiring systems to ensure their proper installation, in particular the correct registration of the contact wire with respect to the current collectors. It includes the undertaking of safe working practices on or about the running line/track and the preparation needed for stringing and profiling including the isolation of systems and circuits for safe working according to work plans. It may also encompass the correct positioning of road signs, barriers and or warning devices, and the procedure of issuing/accepting electrical permits. It also includes the visual and other necessary checks to confirm that

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CSU Code	Title	Scope/Descriptor
		equipment and associated hardware have been correctly installed according to design and are in a safe condition to undertake pre-commissioning tests prior to, putting into service, and updating of, installation data such as as-built drawings, relevant quality assurance documentation, system data and/or maintenance records.
UETTDRRT02B	Maintain overhead traction wiring systems	This Competency Standard Unit covers the maintenance and repair of overhead traction wiring systems to ensure their serviceability, in particular the correct registration of the contact wire with respect to the current collectors. It includes the undertaking of safe working practises on or about the running line/track, the preparation needed for stringing and profiling including the isolation of systems and circuits for safe working according to work plans, the diagnosis of faults and the modification and re-adjustment to appropriate standards. It may also encompasses the correct positioning of road signs, barriers and or warning devices and the procedure of issuing/accepting electrical permits, the re-commissioning tests as required to ensure the integrity of the traction system prior to returning to service and, the updating of system data and/or maintenance records.
UETTDRRT03B	Install traction bonds	This Competency Standard Unit covers the installation of the temporary and permanent traction bonds and bonding cables. It includes the undertaking of safe working practices on or about the running line/track. It may also encompasses the isolation of systems and circuits for safe working according to work plans and the correct positioning of road signs, barriers and or warning devices and the procedure of issuing/accepting electrical permits and includes the necessary checks to confirm that bonds, bonding cables and associated hardware have been correctly installed according to design and are in a safe condition to test prior to putting into service. It also includes the undertaking of pre-commissioning tests and the updating of installation data and relevant quality assurance documentation.
UETTDRRT04B	Maintain traction bonds	This Competency Standard Unit covers the maintenance and repair of the temporary and

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CSU Code	Title	Scope/Descriptor
		permanent traction bonds and bonding cables. It includes the undertaking of OHS and safe working practices on or about the running line/track. It also encompasses the isolation of systems and circuits for safe working according to work plans and the correct positioning of road signs, barriers and or warning devices and the procedure of issuing/accepting electrical permits. It also includes the visual inspection and other necessary checks to confirm that equipment and associated hardware are in a safe condition to test and/or return to service and the undertaking of re-commissioning tests to ensure the integrity of the bonding system prior to a return to service and the updating of system data/maintenance records.
UETTDRRT05B	Install overhead traction configurations	This Competency Standard Unit covers the installation of overhead traction configurations, which include overlaps, cross-overs, turnouts, crossings and/or train/tram crossing. It includes the undertaking of safe working practices on or about the running line/track. It also encompasses; the isolation of systems and circuits for safe working according to work plans, the correct positioning of road signs, barriers and/or warning devices and the procedure for issuing/accepting electrical permits. It also includes the visual inspection and necessary checks to confirm that equipment and associated hardware have been correctly installed according to design and are in a safe condition to test prior to putting into service, as well as the undertaking of pre-commissioning tests and the updating of installation data and relevant quality assurance documentation.
UETTDRRT06B	Maintain overhead traction configurations	This Competency Standard Unit covers the maintenance and repair of overhead traction configurations, which include overlaps, cross-overs, turnouts, crossings and/or train/tram crossing. It includes the repair and/or replacement of "like for like" electrical equipment and associated hardware according to requirements and the undertaking of safe working practices on or about the running line/track, including the correct positioning of road signs, barriers and/or warning devices and the procedure for issuing/accepting electrical permits. It also encompasses the isolation of systems and circuits for safe working according to work plans and the visual

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CSU Code	Title	Scope/Descriptor
		inspection and necessary checks to confirm that equipment and associated hardware are in a safe condition to test and/or return to service as well as the undertaking of re-commissioning tests to ensure the integrity of the traction system prior to a return to service and the updating of system data and/or maintenance records.
UETTDRRT07B	Install overhead traction equipment and components	This Competency Standard Unit covers the installation of the overhead traction electrical equipment and components as well as associated hardware including ancillary equipment. It includes the undertaking of safe working practices on or about the running line/track. It also encompasses the isolation of systems and circuits for safe working according to work plans and the correct positioning of road signs, barriers and or warning devices and the procedure of issuing/accepting electrical permits. It also includes the visual inspection and necessary checks to confirm that equipment, components and associated hardware have been correctly installed according to design and are in a safe condition to test prior to putting to service, the undertaking of pre-commissioning tests as required to ensure the integrity of the traction system prior to a return to service and the updating of installation data and relevant quality assurance documentation.
UETTDRRT08B	Maintain overhead traction equipment and components	This Competency Standard Unit covers the maintenance and repair of the overhead traction electrical equipment and components as well as associated hardware including ancillary equipment. It includes the repair or replacement of "like for like" electrical components/equipment and associated hardware and the undertaking of safe working practices on or about the running line/track. It also encompasses the isolation of systems and circuits for safe working according to work plans and the correct positioning of road signs, barriers and or warning devices and the procedure of issuing/accepting electrical permits. It also includes the visual inspection and necessary checks to confirm that equipment; components and associated hardware are in a safe condition to test and/or return to service, the re-commissioning tests of the electrical equipment, components and associated hardware and the updating

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CSU Code	Title	Scope/Descriptor
		of system data/maintenance records.
UETTDRRT09B	Operate road rail traction height access equipment.	This Competency Standard Unit covers the operation and use of road rail traction height access equipment to install and maintain the overhead traction systems. It includes the pre-operational inspection, servicing of plant/equipment and the undertaking of safe working practices on or about the running line/track. It also encompasses the isolation of systems and circuits for safe working according to work plans and the correct positioning of road signs, barriers and/or warning devices.
UETTDRRT10B	Perform rail traction switching operations to a given schedule	This Competency Standard Unit covers the operation of circuit breaking and isolation devices associated with energy reticulation systems/networks, which applies to rail systems in field situations according to established procedures. It also encompasses the procedure 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 or rail-connected, the issuing/accepting or holding of electrical permits and the returning of the affected circuits to service
UETTDRRT11B	Maintain energised direct current traction overhead wiring system	This Competency Standard Unit covers the maintenance and repair of energised DC traction Overhead Wiring system through the use of insulated ladder and working bare hand or insulated stick and includes the verification of the site conditions and the potential hazards, the conformance with and calculation of mechanical loads, the selection of appropriate tools and equipment, and authorised work method. It includes the undertaking of OHS and safe working practices to ensure that correct procedures and precautions to working live in accordance with the work plan and enterprise requirements are followed. It also includes; the visual inspection and necessary checks to confirm that overhead wiring components and associated hardware are in a safe condition to test and/or return to service, the re-commissioning tests of the components and associated hardware and the updating of system data/maintenance records.
UETTDRRT12B	Maintain energised traction overhead	This Competency Standard Unit covers the maintenance and repair of energised traction overhead

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CSU Code	Title	Scope/Descriptor
	electrical apparatus (stick)	electrical apparatus via the use of approved live line insulated stick techniques and includes the verification of site conditions and the potential hazards, the conformance with and calculation of physical loads, the selection of appropriate tools and equipment, and authorised work methods. It encompasses the undertaking of correct procedures and precautions to working live line in accordance with the work plan and enterprise requirements. It also includes the visual inspection and necessary checks to confirm that; the electrical apparatus and components are in a safe condition to test and/or return to service, and the recommissioning tests of the electrical apparatus and components.
UETTDRRT13B	Maintain energised traction overhead electrical apparatus (glove)	This Competency Standard Unit covers the maintenance and repair of energised traction overhead electrical apparatus via the use of approved live line glove and barrier techniques and includes the verification of site conditions and the potential hazards, the conformance with and calculation of physical loads, the selection of appropriate tools and equipment, and authorised work methods. It encompasses the undertaking of correct procedures and precautions to working live line in accordance with the work plan and enterprise requirements. It also includes the visual inspection and necessary checks to confirm that the electrical apparatus and components are in a safe condition to test and/or return to service, and the recommissioning tests of the electrical apparatus and components.
UETTDRRT14B	Install and maintain traction network wiring systems	This Competency Standard Unit covers the installation and maintenance of overhead traction wiring systems to ensure their proper installation, in particular the correct registration of the contact wire with respect to the current collectors. It includes the undertaking of safe working practices on or about the running line/track and the preparation needed for stringing and profiling including the isolation of systems and circuits for safe working according to work plans, the diagnosis of faults and the modification and re-adjustment to appropriate standards. It may also encompass the correct positioning of road signs, barriers and or warning devices, and the procedure of issuing/accepting electrical permits. It also includes

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CSU Code	Title	Scope/Descriptor
		the visual and other necessary checks to confirm that equipment and associated hardware have been correctly installed according to design and are in a safe condition to undertake pre-commissioning tests prior to, putting into service, and updating of, installation and maintenance data such as as-built drawings and relevant quality assurance documentation.
UETTDRRT15B	Install and maintain traction network equipment and components	This Competency Standard Unit covers the installation and maintenance of the overhead traction electrical equipment and components as well as associated hardware including ancillary equipment. It includes the repair or replacement of "like for like" electrical components/equipment and associated hardware and the undertaking of safe working practices on or about the running line/track. It also encompasses the isolation of systems and circuits for safe working according to work plans and the correct positioning of road signs, barriers and or warning devices and the procedure of issuing/accepting electrical permits. It also includes the visual inspection and necessary checks to confirm that equipment, components and associated hardware have been correctly installed according to design and are in a safe condition to test prior to putting to service, the undertaking of pre-commissioning tests as required to ensure the integrity of the traction system prior to putting back into service and the updating of installation data and relevant quality assurance documentation.

Discipline – Substation

CSU Code	Title	Scope/Descriptor
UETTDRSB01B	Diagnose and rectify faults in power system substation environment	This Competency Standard Unit covers the identification and analysis of fault conditions including the isolation, repair and restoration of substation control circuits. It encompasses the application of the full range of knowledge and skills from previous competencies associated with the installation and maintenance of substations.
UETTDRSB02B	Carry out substation	This Competency Standard Unit covers the security, electrical and environmental inspections of substations.

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CSU Code	Title	Scope/Descriptor
	inspection	It includes inspection, recording of information and reporting of defective/non-compliant conditions in accordance with established enterprise standards and procedures.
UETTDRSB03B	Install and maintain substation DC systems	This Competency Standard Unit covers the installation and maintenance of substation DC systems such as main batteries, communication batteries, audio frequency control equipment, DC lighting systems, battery chargers, uninterrupted power supply (UPS) systems and associated control circuit in accordance with enterprise requirements. It includes the diagnosis of faults, the replacement of faulty equipment, the conducting of pre-commissioning/re-commissioning tests and the interpretation of test results against agreed specification.
UETTDRSB04B	Maintain HV power system breakers	This Competency Standard Unit covers the maintenance of high voltage power system circuit breakers including the diagnosis of faults and the repair and replacement of high voltage power system circuit breakers components in accordance with enterprise requirements. It includes the diagnostic checks, pre-commissioning tests and function checks involving the circuit breakers and their associated control circuits and interpretation of these tests against agreed specifications.
UETTDRSB05B	Maintain HV power system – transformers and instrument transformers	This Competency Standard Unit covers the maintenance of high voltage power system transformers and instrument transformers including routine diagnostic tests within agreed specifications. It includes maintenance of the associated cooling systems, control and alarm systems and tertiary cabling and/or busbar systems in accordance with enterprise procedures.
UETTDRSB06B	Install high current DC switchgear and equipment	This Competency Standard Unit covers the installation of DC switchgear and other equipment which may include rectifier transformers, rectifiers, invertors, isolators and links, harmonic filters, negative reactors and EDR’s to ensure correct installation to prescribed procedures and standards. It also encompasses the isolation of systems and/or circuits for safe working according to work plans and the visual inspection and necessary checks to ensure that equipment and components have been correctly installed according to design and are in a safe condition for pre-commissioning tests prior to energisation, as well as updating of installation data and relevant quality assurance

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CSU Code	Title	Scope/Descriptor
		documentation.
UETTDRSB07B	Maintain high current DC switchgear and equipment	This Competency Standard Unit covers the maintenance of DC switchgear and other equipment which may include rectifier transformers, rectifiers, invertors, isolators and links, harmonic filters, negative reactors and EDRs. It encompasses the maintenance, including the diagnosing of faults and replacement and repair to ensure correct maintenance to prescribed procedures and standards. It also encompasses the isolation of systems and/or circuits for safe working according to work plans and the visual inspection and necessary checks to ensure safe energisation, as well as updating of maintenance data and relevant quality assurance documentation.
UETTDRSB09B	Maintain voltage regulating equipment – capacitor banks	This Competency Standard Unit covers the maintenance and repair of substation voltage regulating equipment and is restricted to high voltage capacitor banks and their associated switching reactors and the inspection, recording of information, testing and measurement of the associated control circuits. It also includes the range of acceptance tests and discharge requirements for complete units within a substation in accordance with established enterprise standards and procedures. It also encompasses fault diagnosis and pre-commissioning tests and interpretation of test results against agreed specifications.
UETTDRSB10B	Maintain HV power system static VAR compensators	This Competency Standard Unit covers the maintenance and repair of High Voltage Power System Static VAR Compensators including the diagnosis of faults and the replacement and repairing of High Voltage Power System Static VAR Compensator components in accordance with enterprise requirements. It includes diagnostic and pre-commissioning tests and the interpretation of tests results against agreed specifications.
UETTDRSB11B	Maintain HV power system synchronous condensers	This Competency Standard Unit covers the maintenance of High Voltage power system synchronous condensers including the diagnosis of faults and the replacement and repairing of High Voltage power system synchronous condenser components in accordance with enterprise requirements. It encompasses the diagnostic and pre-commissioning tests involving synchronous condensers and the interpretation of these tests against

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CSU Code	Title	Scope/Descriptor
		agreed specifications.
UETTDRSB12B	Maintain voltage regulating equipment – on load tapchangers	This Competency Standard Unit covers the maintenance, repair and overhaul of substation voltage regulating equipment and is restricted to resistor and reactor type high speed on load tapchangers and does not include the main tank tap selector mechanism. It includes the inspection, recording of information, testing and measurement of associated control circuits. It also includes the range of acceptance tests required on installed complete units within the parent power transformer in accordance with established enterprise standards and procedures. It encompasses the diagnostic and pre-commissioning checks and tests involving the tapchangers and the interpretation of these results against agreed specifications.
UETTDRSB13B	Install HV plant and equipment	This Competency Standard Unit covers the installation of High Voltage Plant and equipment and includes the pre-commissioning tests within agreed specifications. It includes the installation of the earthing systems, tertiary cabling and/or busbar systems in accordance with enterprise procedures but does not include the necessary protection systems.
UETTDRSB14B	Carry out Thermovision surveys	This Competency Standard Unit of competence covers the thermographic inspections of transmission/distribution systems and/or substation equipment. It includes surveying, inspecting, recording of information and reporting of defective/non compliant conditions in accordance with established enterprise standards and procedures.
UETTDRSB15B	Maintain discrete protection and control systems	This Competency Standard Unit covers the isolation, inspection, testing, adjustment, and repair, refurbishment and/or overhaul and functional checks of discrete protection and control devices. It includes the requirements to prove the functionality of discrete devices such as DC supplies over-current, overload, earth fault, transformer temperature controls, alarms and indication circuits.
UETTDRSB16B	Commission discrete protection and control systems	This Competency Standard Unit covers the commissioning/testing of discrete protection and control systems and includes isolation, inspection, monitoring, testing, adjustment and functional checks on systems such as over-current, overloads, earth fault, alarms and

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CSU Code	Title	Scope/Descriptor
		controls.
UETTDRSB17B	Maintain distribution field devices	This Competency Standard Unit covers the maintenance of ACRs, gas switches, regulators and line capacitors, communication systems including mobile phones and TMR radio. It includes secondary injection, timing, and function tests and proving correct tripping, reclosing and remote operation.
UETTDRSB18B	Commission distribution field devices	This Competency Standard Unit covers the commissioning of ACRs, gas switches, regulators and line capacitors, communication systems including mobile phones and TMR radio. It also includes communication with the Operating Authority, testing, clearing after test and energising using techniques that are acceptable to the Operating Authority.

Discipline – System Operations

CSU Code	Title	Scope/Descriptor
UETTDRSO01A	Reserved	
UETTDRSO02B	Manage network faults	This Competency Standard Unit covers the management of single incident faults on electrical network plant to ensure prompt restoration of supply to affected customers. Electrical network plant includes feeders, transformers and busbars from transmission to distribution voltages. This unit includes single incident faults ranging from simple, involving a single item and no loss of supply, to complex, involving multiple substations with extensive loss of supply. This unit also encompasses liaison with operating authorities and dispatching and managing field crews. It also encompasses monitoring of safe access to the network
UETTDRSO03B	Manage critical events	This Competency Standard Unit covers the management of critical events such as simultaneous multiple network faults, and storm events of various magnitudes. It includes liaison procedures with multiple operating authorities and dispatching and managing multiple field crews. It also encompasses monitoring of safe access to the network and invoking crisis management procedures and mutual

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CSU Code	Title	Scope/Descriptor
		aid plans.
UETTDRSO04B	Control generating plant	This Competency Standard Unit covers the control of the generation side of a generation plants. It includes the assessment, evaluation and achievement of the synchronization requirements to ensure machine and or system stability during synchronisation. It also includes the control of the generation of electrical energy, the co-ordination of the generation control and the monitoring of the system/plant. It also encompasses the analysis of the system/plant faults, the updating of the relevant documentation and the reporting of plant problems, movements, abnormalities and status in accordance with enterprise/site procedures.
UETTDRSO05B	Manage HV distribution and subtransmission network demand	This Competency Standard Unit covers the management of the switching of HV network components with due regard to the loadings and prevailing network constraints and may include scheduling of generators, VAR compensators, load shedding and non-essential loads in response to NEMMCO or network requirements. It also includes voltage control equipment.
UETTDRSO06B	Develop LV distribution switching programs	This Competency Standard Unit covers the preparation and/or checking of activities required to place the LV distribution network in a state in which work can safely be performed whilst minimising customer outages. The format is typically a written sequence of switching items in a pre-defined format. It includes planning outages and taking into account loading of network components. It also includes planning the management of multiple outages on the LV distribution network and the calculation of network loading conditions to ensure the network is operating within designed parameters.
UETTDRSO07B	Develop HV distribution and subtransmission switching programs	This Competency Standard Unit covers the preparation and/or checking of activities required to place the HV distribution and sub transmission network in a state in which work can safely be performed whilst minimising customer outages. The format is typically a written sequence of switching items in a pre-defined format. It includes planning outages and taking into account loading of network components. It also includes planning the

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CSU Code	Title	Scope/Descriptor
		management of multiple outages on the HV distribution and sub transmission network and the calculation of network loading conditions to ensure the network is operating within designed parameters.
UETTDRSO08B	Develop and evaluate transmission switching programs	This Competency Standard Unit covers the development and evaluation of activities required to place the transmission network in a state in which work can safely be performed whilst minimising customer outages. The format is typically a written sequence of switching items in a pre-defined format. It includes planning for the management of the network and multiple outages. It encompasses the calculation of network loading conditions to ensure the network will operate within design parameters and in compliance with national electricity code.
UETTDRSO09B	Coordinate LV distribution networks	This Competency Standard Unit covers the monitoring of LV distribution networks in real time. This includes voltage control and monitoring the status of access authorities and ensuring that the network is operated within design parameters at all times. It also includes dispatching and management of field repair crews to respond to and rectify abnormalities.
UETTDRSO10B	Coordinate HV distribution and subtransmission networks	This Competency Standard Unit covers the monitoring of HV distribution and sub transmission networks in real time. This includes voltage control and monitoring the status of access authorities and ensuring that the network is operated within design parameters at all times. It also includes dispatching and coordination of field repair crews to respond to and rectify abnormalities and liaison with other electrical authorities.
UETTDRSO11B	Manage transmission networks	This Competency Standard Unit covers the monitoring of EHV transmission networks in real time. This includes voltage control and monitoring the status of access authorities and ensuring that the network is operated within design parameters at all times. It also includes dispatching and management of field repair crews to respond to and rectify abnormalities and liaison with other electrical authorities.

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CSU Code	Title	Scope/Descriptor
UETTDRSO12B	Manage transmission network demand	This Competency Standard Unit covers the management of the switching of transmission network components with due regard to the loadings and prevailing network constraints and may include scheduling of generators, VAR compensators, load shedding and non-essential loads in response to NEMMCO or network requirements. It also includes voltage and frequency controls.
UETTDRSO13B	Coordinate LV distribution network demand	This Competency Standard Unit covers the coordination of the switching of LV distribution network components with due regard to the loadings and prevailing network constraints and may include scheduling of generators, VAR compensators, load shedding and non-essential loads in response to NEMMCO or network requirements. It also includes voltage control equipment.
UETTDRSO14B	Develop crisis management plans	This Competency Standard Unit covers the preparation of crisis management plans, which can be implemented following the loss of one or more items of plant. This unit involves the activities associated with the assessment of risk, the probability of failure, the consequences of failure and the plant and/or network loads that will result as per established enterprise procedures.
UETTDRSO15A	Operate and monitor system equipment (SCADA)	This Competency Standard Unit covers the skills and knowledge to operate, monitor and control HV apparatus on the network via SCADA control.
UETTDRSO16A	Monitor and control the activities of field staff	This Competency Standard Unit covers the monitoring of permit to work requests, dispatching personnel, responding to alarms, travel and activity monitoring of field personnel, monitoring work activities of field personnel against work schedule, contingency skills, response to third party enquiries, out of hour, response to man down alarm, tracking of field personnel (remote area), monitoring activities on system equipment, monitoring availability of assets (maintain a log), monitor equipment status, coordinating field activities, controlling and authorising field works, preparing incident reports.
UETTDRSO17A	Coordinate HV	This Competency Standard Unit covers the

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CSU Code	Title	Scope/Descriptor
	transmission network	monitoring of HV transmission networks in real time. This includes power quality, alarm interpretation, facilitating and monitoring the status of access authorities and ensuring that the network is operated within design parameters at all times. It also includes dispatching and coordination of field repair crews to respond to and rectify abnormalities and liaise with other electrical authorities.
UETTDRSO18A	Respond to discrete/ interdependent protection operations	This Competency Standard Unit covers the coordination of response to discreet and interdependent protection operations due to system faults.
UETTDRSO19A	Coordinate system operations in a regulated energy market	This Competency Standard Unit covers the coordination of system operations in a regulated energy market. It includes the relevant application of knowledge of the National Electricity Market (NEM), the practices and rules used in facilitating the coordination of operations in a regulated energy market.
UETTDRSO20A	Respond to complex protection operations	This Competency Standard Unit covers the coordination of response to complex protection operations due to system faults.
UETTDRSO21A	Manage network power flows	This Competency Standard Unit covers the management of electrical network active and reactive power flows ensuring the network is operated within design parameters at all times. The electrical network includes feeders from distribution to transmission voltages; substation and generation assets that can influence power flows.

Discipline – Transmission

CSU Code	Title	Scope/Descriptor
UETTDRTP01A	Reserved	
UETTDRTP02B	Establish and reinstate a transmission tower work site	This Competency Standard Unit covers the operation/maintenance of support plant and equipment and tools used for excavation work associated with foundations and footings for the construction of transmission towers. It also covers

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CSU Code	Title	Scope/Descriptor
		the preparation of the work site and the reinstatement of the ground surface. Scope of maintenance includes and is limited to visual inspection; lubrication; gland nipping; draining of water taps; degreasing; replacing gaskets. Use of relevant personal protective equipment is required.
UETTDRTP03B	Erect transmission towers	This Competency Standard Unit covers the erection of towers in sections or in parts, in accordance with construction plans and specifications. It includes the correct positioning of road signs, barriers and or warning devices, the inspection and confirmation that excavation/foundation construction is in accordance with the works order and the identification of potential hazards and safety risks with recommendations for preventative action being referred to appropriate authorities.
UETTDRTP04B	Erect transmission tower hardware	This Competency Standard Unit covers the erection of hardware and/or associated equipment used on transmission towers. It includes the correct positioning of hardware on the towers in accordance with construction plans and specifications. It also encompasses the inspection and confirmation that the hardware and associated equipment are in accordance with the works order and the identification of potential hazards and safety risks with recommendations for preventative action being referred to appropriate authorities.
UETTDRTP05B	Pre-tension stringing transmission overhead conductors and cables	This Competency Standard Unit covers the stringing of overhead conductors and cables with no electrical connections being made. It includes the preparation of the site, the pre-positioning of conductors and fitting of conductor/cable stringing equipment where appropriate and the cleaning of insulators in accordance with works order.
UETTDRTP06B	Erect transmission towers and associated hardware	This Competency Standard Unit covers the erection of non-energised, pyramid, delta, Pi or enterprise specific transmission towers and associated hardware. It includes the erection of components in accordance with construction plans, specifications, work orders and standing enterprise requirements. Erection could also involve cleaning and welding. The updating of system data, records and or completion of relevant documentation in accordance

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CSU Code	Title	Scope/Descriptor
		with enterprise requirements also forms part of this competency.
UETTDRTP07B	Maintain transmission towers and associated hardware	This Competency Standard Unit covers the maintenance of non-energised, pyramid, delta, Pi or enterprise specific transmission towers and associated hardware. It includes the repair, and or replacement of components in accordance with construction plans, specifications, work orders and standing enterprise requirements. Maintenance could also involve cleaning and welding. The updating of system data, records and or completion of relevant documentation in accordance with enterprise requirements also forms part of this competency.
UETTDRTP08B	Transmission tower stub setting	This Competency Standard Unit covers the utilisation of geographical maps and site surveys to set out, excavate, prepare, align and install the foundation footings of a transmission tower and establish the tower stubs to ground level for the erection of a transmission towers. Survey processes and operation of survey equipment is associated with this unit.
UETTDRTP09B	Install and maintain overhead conductors and cables (towers)	This Competency Standard Unit covers the installation and maintenance of overhead conductors and cables used on towers which includes the stringing, tensioning and terminating of the conductor/cable while de energised, securing of the conductor to the insulators or supports and the undertaking of the electrical connections. It also covers maintenance work associated with the diagnosing of faults, the conducting of visual inspections, the confirmation of phasing and the completion of other enterprise tests. It also encompasses confirming isolation of systems and circuits, and/accepting/ issuing electrical permits and the updating of system data/maintenance records.
UETTDRTP10B	Inspect overhead structures and electrical apparatus (towers)	This Competency Standard Unit covers the inspection as per requirements of overhead structures such as towers and electrical apparatus. Overhead structures include towers and overhead conductors and or cables include, underground and overhead transition points, electrical equipment,

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CSU Code	Title	Scope/Descriptor
		hardware and or earthing systems. It also includes the completion of inspection reports and other relevant documentation in accordance with requirements.
UETTDRTP11B	Maintain energised lines (transmission) using live line stick technique	This Competency Standard Unit covers the maintenance of energised high voltage transmission overhead electrical apparatus, i.e. live line work using Live Line Stick techniques and includes the verification of the site conditions and the potential hazards, the conformation and calculation of physical loads and the selection of appropriate and authorised work method. It includes the preparation and cleaning of specialist material and tools in accordance with authorised technical instructions. It also encompasses the undertaking of OHS and safe working practices and the rendering inoperative of the automatic re-closing device including its restoration in accordance with the work plan and the procedure of issuing/accepting electrical access permits and or relevant work document.
UETTDRTP12B	Maintain energised lines (transmission) using Barehand Technique	This Competency Standard Unit covers the maintenance of energised high voltage transmission overhead electrical apparatus, i.e. live line work using bare hand techniques and includes the verification of the site conditions and the potential hazards, the conformation and calculation of physical loads and the selection of appropriate and authorised work method. It includes the preparation and cleaning of specialist material and tools in accordance with authorised technical instructions. It also encompasses the undertaking of OHS and safe working practices and the rendering inoperative of the automatic re-closing device including its restoration in accordance with the work plan and the procedure of issuing/accepting electrical access permits and or relevant work document
UETTDRTP13B	Maintain energised lines (transmission) using Barehand Technique on a helicopter platform	This Competency Standard Unit covers the maintenance of energised high voltage transmission overhead electrical apparatus, i.e. live line work using bare hand techniques from a helicopter platform and includes the verification of the site conditions and the potential hazards, the conformation and calculation of physical loads and

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CSU Code	Title	Scope/Descriptor
		the selection of appropriate and authorised work method. It includes the preparation and cleaning of specialist material and tools in accordance with authorised technical instructions. It also encompasses the undertaking of OHS and safe working practices and the rendering inoperative of the automatic re-closing device including its restoration in accordance with the work plan and the procedure of issuing/accepting electrical access permits and or relevant work document.
UETTDRTP14B	Install and maintain overhead transmission network infrastructure	This Competency Standard Unit covers the erection of non-energised, pyramid, delta, Pi or enterprise specific transmission towers and associated hardware and includes installation and maintenance of poles and/or structures and associated hardware and the installation and maintenance of overhead conductors and cables used on towers. It encompasses the erection of components in accordance with construction plans, specifications, work orders and standing enterprise requirements. Erection could also involve cleaning and welding. It also encompasses maintenance work associated with the diagnosing of faults, the conducting of visual inspections, the confirmation of phasing and the completion of other enterprise tests on overhead conductors and cables. It also encompasses confirming isolation of systems and circuits, and/accepting/ issuing electrical permits. The updating of system data, records and or completion of relevant documentation in accordance with enterprise requirements also forms part of this competency.
UETTDRTP15B	Install and maintain transmission network infrastructure electrical equipment	This Competency Standard Unit covers the maintenance of non-energised, pyramid, delta, Pi or enterprise specific transmission towers and associated hardware and, the inspection as per requirements of overhead structures such as towers and electrical apparatus. Overhead structures include towers and overhead conductors and or cables include, underground and overhead transition points, electrical equipment, hardware and or earthing systems. This unit encompasses the repair, and or replacement of components in accordance with construction plans, specifications, work orders and

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CSU Code	Title	Scope/Descriptor
		standing enterprise requirements. Maintenance could also involve cleaning and welding. The updating of system data, records and or completion of relevant documentation in accordance with enterprise requirements also forms part of this competency.

Discipline – Protection/Testing

CSU Code	Title	Scope/Descriptor
UETTDRTS01B	Maintain network protection and control systems (interdependent)	This Competency Standard Unit covers the maintenance of network protection and control in interdependent situations and includes isolation, inspection, monitoring, testing, adjustment, and repair, refurbishment and or overhaul and functional checks of interdependent network protection and control systems. It includes the requirements to prove the functionality of interdependent and discrete schemes such as, CB Fail, master controlled Earth Fault, inter-tripping, blocking, synchronising, pilot wire, phase comparison, load shedding, voltage control, parallel operation and load rejection.
UETTDRTS02B	Commission network protection and control systems (interdependent)	This Competency Standard Unit covers the commissioning of network protection and control systems in interdependent situations and includes isolation, inspection, monitoring, testing, adjustment, and repair, refurbishment and or overhaul and functional checks. It also includes schemes such as, CB Fail, master controlled Earth Fault, impedance and differential relays intertripping, blocking, synchronising, pilot wire, phase comparison, load shedding, voltage control, parallel operation and load rejection. This includes commissioning of discrete and interdependent schemes
UETTDRTS03B	Conduct evaluation of power system faults within a substation	This Competency Standard Unit covers the procedure in evaluating power system incidents by following a process of downloading event and disturbance record information from protection relays. This includes interpreting such items as, alarms, relay targets, relay settings, event records,

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CSU Code	Title	Scope/Descriptor
		disturbance records and sequence of events records. It also encompasses the evaluation and or investigation of relay operation, relay schemes functionality and relay settings.
UETTDRTS04B	Design testing and commissioning procedures for substation and field devices	This Competency Standard Unit covers the testing and commissioning procedures for new substation and field devices in accordance with design. This will involve analysis of settings, and a thorough understanding of the circuit design, which will involve covering such areas as metering, communication circuits and SCADA. It also includes the procedures needed to enable proof of correct operation of all circuits to design specifications. It also encompasses the need for supplying accurate communication in the format that is acceptable to the Operating or Testing Authority.
UETTDRTS05B	Test and maintain metering schemes	**This Competency Standard Unit covers the testing of metering schemes and includes isolation, inspection, monitoring, testing, adjustment, and repair, refurbishment and or overhaul and functional checks on schemes including ammeters, voltmeters, wattmeters, VAR meters and energy metering. It also includes the understanding of the purpose of the testing so as to prove accuracy and suitability of the metering for the required task.**
UETTDRTS06B	Commission metering schemes	This Competency Standard Unit covers the commissioning of metering schemes and includes, isolation, inspection, monitoring, testing, adjustment, and repair, refurbishment and or overhaul and function checks on schemes including ammeters, voltmeters, wattmeters, VAR meters and energy metering. It also includes an emphasis on ensuring that the metering is connected into the power system safely and correctly and that it returns valid information.
UETTDRTS07B	Perform accuracy checks on instrument transformers	This Competency Standard Unit covers the task of undertaking accuracy checks on instrument transformers and includes proving their functionality. It also includes both current and voltage instrument transformers having various operating principles, which are designed for

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CSU Code	Title	Scope/Descriptor
		metering, protection, monitoring or control usage. It also encompasses tasks associated with the isolation from other secondary circuits, inspection, measurement of excitation curves, measurement of phase and ratio errors and comparison of results with previous historical results and/or published specifications.
UETTDRTS08B	Test, repair and calibrate protection relays and meters	This Competency Standard Unit covers the repair, calibration and testing of various types of protection relays. These can include electromechanical, analogue, digital electronic and numerical devices. It also involves the finding and replacing faulty components, testing to manufacturers or users specifications and proving all functions of the devices under test.
UETTDRTS09B	Develop secondary isolation instructional documents	This Competency Standard Unit covers the skills needed to develop secondary isolations. This will involve analysis of tripping and a thorough understanding of secondary voltage and current, DC, alarm, metering and communication circuits. It also involves accurate communication of this information in a format acceptable to the Operating or Testing authority.
UETTDRTS10B	Design secondary isolation instructional documents	This Competency Standard Unit covers the skills needed to design secondary isolations. This will involve analysis of tripping and a thorough understanding of secondary voltage and current, DC, alarm, metering and communication circuits. It also involves accurate communication of this information in a format acceptable to the Operating or Testing authority.
UETTDRTS11B	Maintain, test and commission voltage regulating equipment	This Competency Standard Unit covers the maintenance, testing and commissioning of Distribution field devices to relevant standards, including voltage regulators, automatic circuit reclosers control boxes, line capacitors, and associated communication devices. It includes communicating with the Operating Authority, testing, clearing after test and energisation using techniques that are acceptable to the Operating Authority

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CSU Code	Title	Scope/Descriptor
UETTDRTS12B	Conduct evaluation of primary plant	This Competency Standard Unit covers the commissioning and maintenance testing requirements (excluding HV Tests) for primary plant and equipment. It includes both the practical application of the tests and analysis of results, covering, but is not limited to; applied HV testing and induced HV testing, ratio, polarity, winding resistance, impedance, dielectric loss angle, partial discharge and watts loss insulation resistance and transformer vector group. It encompasses a complete understanding of the nature of the tests being conducted and the ability to conduct the tests in a safe manner.
UETTDRTS13B	Undertake project management of substation augmentation and maintenance	This Competency Standard Unit covers the coordination, planning and supervision of projects including but not limited to; commissioning of new plant and equipment, maintenance projects and retrofit works. It includes the coordinating and facilitating of the work of others and the collation of the relevant outcomes and results and involves an overview of both primary and secondary works to ensure completion of all aspects of the project, and must encompass at least 20 identifiable tasks.
UETTDRTS14B	Install and maintain power system communication equipment	This Competency Standard Unit covers the installation and maintenance of Network Communication Systems and includes the isolation and functional checks of discrete and interdependent communication schemes associated with power systems. It also encompasses power line carrier equipment, protection signalling equipment, radio systems and telephone systems, VF systems, multiplexing systems and fibre optic systems, but does not include wiring.
UETTDRTS15B	Maintain network protection and control systems (Complex)	This Competency Standard Unit covers the maintenance of network protection and control systems in complex situations and includes isolation, inspection, monitoring, testing, adjustment, and repair, refurbishment and or overhaul and functional checks. It includes schemes from discrete and interdependent and also schemes such as, distance, differential, transformer differential, bus zone, bus overcurrent, revenue metering, , SCADA, communications, harmonic

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CSU Code	Title	Scope/Descriptor
		control, point on wave.
UETTDRTS16B	Commission network protection and control systems (complex)	This Competency Standard Unit covers the commissioning of network protection and control systems in complex situations and includes isolation, inspection, monitoring, testing, adjustment, and repair, refurbishment and or overhaul and functional checks. It includes schemes from discrete and interdependent and also schemes such as, distance, differential, transformer differential, bus zone, bus overcurrent, revenue metering, current transformer accuracy, SCADA, communications, harmonic control, point on wave, HV plant testing

Discipline – Vegetation

CSU Code	Title	Scope/Descriptor
UETTDRVC01B	Cut vegetation above ground outside live work zone near live electrical apparatus (climbing)	This Competency Standard Unit covers cutting and/or pruning vegetation above ground level (using climbing techniques) and removal of vegetation obstructions up to the climber exclusion zone as defined for both Authorised and Instructed Persons in the industry guidelines associated with live electrical apparatus using the established cutting plan relevant to the vegetation type. It encompasses the safe use of appropriate/specialised tools and equipment according to requirements and established procedures. It includes the utilisation of climbing techniques in conjunction with aerial emergency rescue procedures and, inspection and preparation of climbing equipment with recommendations for corrective action being referred to appropriate authorities. It includes safely accessing trees from above ground level to install restraints/slings, removing tree limbs in a safe manner and, clearing debris from the felling site to eliminate the occurrence of electrical incidents. It does not include entry of Authorised or Instructed Persons and/or mobile plant and equipment into to the safe approach distance (SAD) as defined. Also included is the preparation of risk assessment control measures that encompass job safety

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CSU Code	Title	Scope/Descriptor
		assessment. All work and zones are in compliance with 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.
UETTDRVC02B	Operate vegetation control plant, machinery and equipment near live electrical apparatus	This Competency Standard Unit covers the operation and routine maintenance of vegetation control machinery and equipment such as chippers, chainsaws, brush cutters, power pruners, chemical control and other related associated and powered vegetation control machinery and equipment used near live electrical apparatus. It excludes plant and machinery that encompasses driving/flying and associated licenses, such as aerial croppers, slashers, tritters, boom-operated mowers, stump grinders, insulated elevating work platforms and the like. Also included is the preparation of risk assessment control measures that encompass job safety assessment. It also includes traffic control measures and compliance with relevant State or Territory regulatory agencies/bodies, local government legislation, Industry bi-partite body – Guidelines/Codes of Practices or other related requirements for safe use of equipment near live electrical and mechanical apparatus.
UETTDRVC03B	Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus	This Competency Standard Unit covers the preparation for the controlled removal of vegetation near live electrical apparatus up to the high voltage live work zone as defined for both Authorised and Instructed Persons in the industry guidelines associated with live electrical apparatus. This includes electrical and communications conductors and cables/powerlines and associated equipment on poles and structures according to requirements and established procedures. It does not include the full gamut of rigging techniques and practices required of a Rigger or entry into to the safe approach distance (SAD) as defined for persons and mobile plant and equipment. It includes the preparation of a plan for the control and removal of vegetation, specification of appropriate chemical control methods, use of slinging

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CSU Code	Title	Scope/Descriptor
		and loading techniques and practices to be used, traffic management, and appropriate pruning and/or cutting techniques and practices (encompasses cutting plan) for given vegetation species to minimise regrowth within the electrical field according to requirements and procedures. Also included is the preparation of risk assessment control measures that encompass job safety assessment. Encompassed is compliance with 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.
UETTDRVC04B	Assess vegetation and recommend control measures for work near live electrical apparatus	This Competency Standard Unit covers the assessment of vegetation and in particular trees for defects and hazards prior to cutting and pruning around live powerlines up to the high voltage live work zone as defined for both Instructed and Authorised Persons in the industry guidelines associated with live electrical apparatus. The assessment is compiled and recorded in accordance with requirements and/or established procedures for defined species of vegetation and/or particular tree types. Also included is the preparation of risk assessment control measures that encompass job safety assessment and compliance with 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.
UETTDRVC05B	Cut vegetation above ground outside live work zone near live electrical apparatus (platform)	This Competency Standard Unit covers cutting and/or pruning vegetation above ground level and removal of vegetation obstructions up to the high voltage live work zone as defined for both Authorised and Instructed Persons in the industry guidelines associated with live electrical apparatus using the established cutting plan relevant to the vegetation type. It encompasses the safe use of appropriate/specialised tools and equipment according to requirements and established procedures. It includes safely accessing trees from

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CSU Code	Title	Scope/Descriptor
		above ground level to install restraints/slings, removing tree limbs in a safe manner and, clearing debris from the felling site to eliminate the occurrence of electrical incidents. It does not include entry of Authorised or Instructed Persons and/or mobile plant and equipment into to the safe approach distance (SAD) as defined. Also included is the preparation of risk assessment control measures that encompass job safety assessment. All work and zones is in compliance with 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.
UETTDRVC06B	Cut vegetation at ground level outside 'vegetation exclusion zone' near live electrical apparatus	This Competency Standard Unit covers cutting and/or pruning vegetation at ground level and removal of vegetation obstructions up to the high voltage live work zone as defined for both Instructed and Authorised Persons in the industry guidelines associated with live electrical apparatus using the established cutting plan relevant to the vegetation type. It encompasses the safe use of appropriate/specialised tools and equipment according to requirements and established procedures. It includes safely accessing trees to install restraints/slings, removing small trees in a safe manner and, clearing debris from the felling site to eliminate the occurrence of electrical incidents. It does not include entry of Instructed or Authorised Persons and/or mobile plant and equipment into to the safe approach distance (SAD) as defined. Also included is the preparation of risk assessment control measures that encompass job safety assessment. All work is in compliance with 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.
UETTDRVC07B	Monitor safety compliance for vegetation work near live electrical	This Competency Standard Unit covers the control and monitor of work associated with vegetation control near live electrical apparatus. This includes observing, spotting, rendering warnings to stop

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CSU Code	Title	Scope/Descriptor
	apparatus	unsafe work activities, and/or encroachment of ordinary persons, public, personnel and mobile plant and equipment into the safe approach distance (SAD) as defined for persons and mobile plant and equipment. A person designated as a Safety Observer, solely dedicated to the role, normally carries out this work. Also included is the preparation of risk assessment control measures that encompass job safety assessment. All work and zones is in compliance with 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.
UETTDRVC08B	Safe use of Elevating Work Platform (EWP) near live electrical apparatus	This Competency Standard Unit covers the operation of the use of insulated Elevating Work Platform (EWP) near live electrical apparatus. It includes the identification of hazards and the correct procedures to follow to minimise risk to self and to others. It also encompasses periodical and pre-operational checks on the insulated EWP according to requirements and established procedures. Also included is the preparation of risk assessment control measures that encompass job safety assessment. All work and zones is in compliance with 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.
UETTDRVC09B	Control vegetation (linework)	This Competency Standard Unit covers the control of vegetation including tree trimming in accordance with enterprise practices. It includes working near live low voltage conductors, as specified in the relevant State/Territory legislation and the completion of inspection reports and the updating of records to enterprise requirements.
UETTDRVC10B	Coordinate vegetation control work	This Competency Standard Unit covers the coordination and implementation of continuous vegetation control and takes into account, arboreal regeneration, environmental issues and liaison and consultation procedures with, appropriate government

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CSU Code	Title	Scope/Descriptor
		agencies, property owners and environmental groups. It also encompasses conducting and/or contributing to public education processes and legislation issues.

Discipline – Imported Units

Information on Imported Units including those used as Electives in any Qualification in this Training Package can be found in Volume 2 Part 2.1.12 – Imported Units.

The list of Imported Units is included in Table 6, below

1.2.10 Diagrams showing Unit Relationships

2.10 Diagrams showing Unit Relationships

Prerequisites and co requisites of each Competency Standard Unit can be obtained from the following Table 2. The correlation of the units within a qualification(s) can be found in flowcharts diagrams located in Volume 1 Part 1 Qualification Framework

The units in Table 2 are listed in alphabetical order and include their relationship to the previous Training Package and their prerequisite and co requisite requirements.

CSU relationship to former Training Package and prerequisites

Included in this Training Package is a summary of:

Competency Standard Units in the Electricity Supply Industry - Transmission, Distribution and Rail Training Package;

The relationship to former Competency Standard Units

Comments to units in the former Training Package;

AQF alignment and weighting points of each Competency Standard Unit; and

the Prerequisite requirements.

Note:

1. The following is a guide to assist RTOs in granting equivalent units when implementing this Training Package.
2. The alignment of more than one UET unit to a UTT unit does not necessarily mean that the one UTT unit is equivalent to all aligned UET units.

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3. RTOs shall ensure appropriate analysis of all the skills and knowledge specified in the respective Competency Standard Units in this Training Package is undertaken with that of the former Training Package (UTT98), in determining equivalence.
4. In granting an equivalence of UET unit for a UTT unit;
   - the prerequisite units specified for the UET unit shall be included, and the critical aspects of evidence of the UET unit and its specified prerequisite units shall be at least equal to that of the UTT unit.

1.2.10.2 Table 2 Relationship between UET06 Version 1 Units and UTT98 Version 3 Units

Table 2 Relationship between UET06 Version 1 Units and UTT98 Version 3 Units

This table includes the relationship of UET06 Version 1 units to units in the former Training Package UTT98 Version 3 and Unit weighting points

Discipline – Cable Jointing

UET06 Version 1 **CSU Code**	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRCJ 01A	Lay electrical cables	New Unit – Version 1	New Unit	UETTDREL 01A UETTDREL 02A UETTDREL 04A UEENEEE00 1A UEENEEE00 2A UEENEEG0 02A	2	30	Not

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UET06 Version 1 **CSU Code**	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEENEEE008A			
UETTDRCJ02A	Install and maintain de-energised LV underground paper insulated cables	UTTNTD307A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ01A	3	100	Part
UETTDRCJ03A	Install and maintain de-energised HV underground paper insulated cables.	UTTNTD307A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ01A	3	100	Part
UETTDRCJ04A	Joint and maintain energised LV underground paper insulated	UTTNTD307A	Minor resemblance to previous unit. Unit has been	UETTDRCJ02A	3	100	Part

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UET06 Version 1 **CSU Code**	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	cables		updated, realigned and reformatted.				
UETTDRCJ05A	Perform straight through HV paper insulated to polymeric transition joint	New Unit	New Unit	UETTDRCJ07A	3	90	Part
UETTDRCJ06A	Install and maintain de-energised LV underground polymeric cables	UTTNTD320A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ01A	3	90	Part
UETTDRCJ07A	Install and maintain de-energised HV underground polymeric	UTTNTD320A	Minor resemblance to previous unit. Unit has been	UETTDRCJ06A	3	90	Part

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UET06 Version 1 **CSU Code**	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	cables		updated, realigned and reformatted.				
UETTDRCJ08A	Joint and maintain energised LV underground polymeric cables	UTTNTD320A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ06A	3	90	Part
UETTDRCJ09A	Install oil and gas filled specialised underground cables	UTTNTD405A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ03A & UETTDRCJ07A	4	120	Part
UETTDRCJ10A	Maintain oil and gas filled specialise	New Unit	New Unit	UETTDRCJ09A	4	120	Not

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UET06 Version 1 **CSU Code**	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	d underground cables						
UETTDRCJ11A	Install and maintain polymeric specialised underground cables	UTTNTD405A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ03A & UETTDRCJ07A	4	130	Part
UETTDRCJ12A	Install and maintain oil and gas pressure systems for specialised underground cables	UTTNTD405A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ03A & UETTDRCJ07A	4	130	Part
UETTDRCJ13A	Install and maintain network infrastructure LV undergrou	New Unit	New Unit	UETTDRIS06A	4	120	Not

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UET06 Version 1 **CSU Code**	**Title**	**UTT98 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	nd cables						
UETTDRCJ14A	Install and maintain network infrastructure HV undergrou nd cables	New Unit	New Unit	UETTDRCJ13A	4	130	Not

Discipline – Distribution

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRDP01A	Inspect overhead structures and electrical apparatus (poles and structures)	UTTNTD303A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS12A	3	90	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRDP02A	Maintain overhead energised LV conductors and cables	UTTNTD306A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS14A	3	100	Part
UETTDRDP03A	Maintain energised high voltage distribution overhead electrical apparatus (Stick)	UTTNTD404A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	BSBFLM412A & UETTDRDP02A & UETTDRIS02A & UETTDRIS25A	4	130	Part
UETTDRDP04A	Maintain energised high voltage distribution overhead electrical apparatus (Glove)	UTTNTD404A	Minor resemblance to previous unit. Unit has been updated, realigned and	BSBFLM412A & UETTDRDP02A & UETTDRIS02A & UETTDRIS25A	4	130	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
			reformatted.				
UETTDRDP05A	Inspect, maintain and restore energised LV overhead distribution network infrastructure	New Unit	New Unit	UETTDRIS06A UETTDRIS27A	4	130	Not

Discipline – Design

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRDS01A	Draft and layout an overhead distribution extension	UTTNTD402A	Minor resemblance to previous unit. Unit has been updated, realigned and	UETTDRIS22A & UETTDRIS23A & UEENEEE002A & UEENEEE019A &	4	110	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
			reformatted.	UEENEEE008A			
UETTDRDS02A	Draft and layout an underground distribution extension	UTTNTD403A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS22A & UETTDRIS23A & UEENEEE002A & UEENEEG002A & UEENEEE008A	4	110	Part
UETTDRDS03A	Draft and layout a street Lighting system	UTTNTD421A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS22A & UETTDRIS23A & UEENEEE002A & UEENEEG002A & UEENEEE008A &	4	110	Part
UETTDRDS04A	Draft and layout a distribution substation minor upgrade	UTTNTD403A	Minor resemblance to previous unit. Unit has been updated,	UETTDRIS22A & UETTDRIS23A & UEENEEE002A & UEENEEG00	4	120	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
			realigned and reformatted.	2A & UEENEEE008A			
UETTDRDS05A	Design overhead distribution systems	New Unit	New Unit	UETTDRDS15A& UETTDRDS13A	5	140	Not
UETTDRDS06A	Design underground distribution systems	New Unit	New Unit	UETTDRDS15A& UETTDRDS13A	5	140	Not
UETTDRDS07A	Design distribution substations	New Unit	New Unit	UETTDRDS15A& UETTDRDS13A	5	140	Not
UETTDRDS08A	Design public lighting systems	New Unit	New Unit	UETTDRDS15A& UETTDRDS13A	5	140	Not
UETTDRDS09A	Prepare and manage detailed construction plans for electrical system infrastructure	New Unit	New Unit	BSBMGT507A and UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002	5	140	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
				A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRDS10A	Prepare and appraise financial impact statements	New Unit	New Unit	UETTDRDS20A or UETTDRDS21A or UETTDRDS22A or UETTDRDS23A or UETTDRDS24A or UETTDRDS25A or UETTDRDS26A or UETTDRDS2	6	200	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
				7A or UETTDRDS28A			
UETTDRDS11A	Manage electrical infrastructure projects	New Unit	New Unit	UETTDRDS10A	6	200	Not
UETTDRDS12A	Investigate quality of supply issues	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26	5	140	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
				A			
UETTDRDS13A	Develop HV and LV distribution protection systems	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A	5	150	Not
UETTDRDS14A	Design zone substations modifications	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED00	5	160	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
				4A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRDS15A	Organise and implement line and easement surveys	New Unit	New Unit	UETTDRDS05A & UETTDRDS06A	5	140	Not
UETTDRDS16A	Develop planned outage strategies	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A &	5	140	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
				UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRDS17A	Review asset management strategies	New Unit	New Unit	UETTDRDS10A	6	180	Not
UETTDRDS18A	Analyse and appraise fault and outage data	New Unit	New Unit	UETTDRDS17A	6	180	Not
UETTDRDS19A	Establish and manage geographical information systems	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED00	5	140	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
	data			4A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG047A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRDS20A	Design customer substations	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED02	5	150	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
				8A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRDS07A			
UETTDRDS21A	Manage transmission and subtransmission design process	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED02	6	180	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
				8A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRDS09A & UETTDRDS14A			
UETTDRDS22A	Design transmission, subtransmission and zone substation buildings	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED02	6	200	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
				7A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRDS09A & UETTDRDS14A			
UETTDRDS23A	Design transmission and subtransmission substation primary plant	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED01	6	220	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
				7A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRDS09A & UETTDRDS14A			
UETTDRDS24A	Design transmission and subtransmission protection	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED00	6	220	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
	and control			4A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRDS09A & UETTDRDS14A			
UETTDRDS25A	Design transmission and subtransmis	New Unit	New Unit	BSBMGT507A & UEENEED00	6	200	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
	sion substation earthing			2A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRDS09A & UETTDRDS14A			
UETTDRDS	Design transmission		New Unit	BSBMGT507	6	200	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
26A	, subtransmission and zone substation – civil and structural components	New Unit		A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRDS09A & UETTDRDS14A			

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRDS27A	Design overhead transmission systems	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRDS15A	6	200	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRDS28A	Design underground transmission systems	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRDS15A	6	200	Not

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Discipline – Entry Level Cross Discipline

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDREL01A	Apply environment and sustainable energy procedures	UTTNTD321A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	Nil	3	Core	Part
UETTDREL02A	Operate plant and equipment near live electrical conductors/apparatus	UTTNTD202A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	Nil	3	Core	Part
UETTDREL03A	Comply with environmental and incidence response	UTTNTD321A	Minor resemblance to previous	Nil	2	Core TLA and Possible Skill	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
	procedures		unit. Unit has been updated, realigned and reformatted.			Sets Unit	
UETTDREL04A	Working safely near live electrical apparatus as non electrical worker	New Unit	New Unit	Nil	2	Core TLA and Possible Skill Sets Unit	Not

Discipline – Industry Specific

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalence - Full, part or not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalence - Full, part or not
UETTDRIS01A	Install electrical equipment (Network Infrastructure)	UTTNTD308A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDREL01A & UETTDREL02A & UETTDREL04A & UEENEEE001A & UEENEEE002A & UEENEEG002A & UEENEEE008A	3	100	Part
UETTDRIS02A	Maintain electrical equipment (Network Infrastructure)	UTTNTD308A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS01A	3	100	Part
UETTDRIS03A	Perform LV field switching operation to a given	UTTNTD309A	Minor resemblance to previous unit.	UETTDRCJ03A or UETTDRCJ07A or UETTDRIS0	3	80	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalence - Full, part or not
	schedule		Unit has been updated, realigned and reformatted.	2A or UETTDRIS14A or UETTDRTP09A			
UETTDRIS04A	Perform HV field switching operations to a given schedule	UTTNTD310A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ03A or UETTDRCJ07A or UETTDRIS02A or UETTDRIS14A or UETTDRTP09A	3	80	Part
UETTDRIS05A	Perform substation switching operation to a given schedule	New Unit	New Unit	UETTDRCJ03A or UETTDRCJ07A or UETTDRIS02A or UETTDRIS14A or UETTDRTP09A	3	80	Not
UETTDRIS06A	Install and maintain network infrastructur	New Unit	New Unit	UETTDREL01A & UETTDREL	4	110	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalence - Full, part or not
	e electrical equipment			02A & UETTDREL04A & UETTDRIS22A & UETTDRIS23A & UEENEEG005A			
UETTDRIS07A	Sample, test, filter, and reinstate insulating oil	UTTNTD204A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UEENEEG005A	3	80	Part
UETTDRIS08A	Develop HV switching schedule	New Unit	New Unit	UETTDRIS03A or UETTDRIS04A or UETTDRIS05A or UETTDRRT10A	4	110	Not
UETTDRIS09A	Develop LV switching	New Unit	New Unit	UETTDRIS03A or	4	110	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalence - Full, part or not
	schedule			UETTDRIS04A or UETTDRIS05A or UETTDRRT10A			
UETTDRIS10A	Coordinate permit procedures	New Unit	New Unit	UETTDRIS03A or UETTDRIS04A or UETTDRIS05A or UETTDRRT10A	4	120	Not
UETTDRIS11A	Coordinate and direct switching schedules	New Unit	New Unit	UETTDRIS03A or UETTDRIS04A or UETTDRIS05A or UETTDRRT10A	4	110	Not
UETTDRIS12A	Install and maintain poles/structures and associated hardware	UTTNTD301A	Minor resemblance to previous unit. Unit has been updated,	UETTDREL01A & UETTDREL02A & UETTDREL04A & UEENEEE001A &	3	90	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalence - Full, part or not
			realigned and reformatted.	UEENEEE002A & UEENEEG002A & UEENEEE008A			
UETTDRIS13A	Install and maintain public lighting systems	UTTNTD304A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ03A or UETTDRCJ07A or UETTDRIS02A or UETTDRIS14A or UETTDRTP09A	3	80	Part
UETTDRIS14A	Install & maintain overhead conductors and cables (Poles and Structures)	UTTNTD305A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS12A	3	100	Part
UETTDRIS	Install and maintain			UETTDRCJ0	3	80	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalence - Full, part or not
15A	low voltage services (Underground)	New Unit	New Unit	3A or UETTDRCJ07A or UETTDRIS02A or UETTDRIS14A or UETTDRTP09A			
UETTDRIS16A	Install and maintain low voltage services (overhead)	New Unit	New Unit	UETTDRCJ03A or UETTDRCJ07A or UETTDRIS02A or UETTDRIS14A or UETTDRTP09A	3	80	Not
UETTDRIS17A	Conduct visual checking and treatment of poles and structures	UTTNTD206A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS12A	2	40	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalence - Full, part or not
UETTDRIS18A	Locate faults in underground power cables	UTTNTD322A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRCJ03A or UETTDRCJ07A or UETTDRIS02A or UETTDRIS14A or UETTDRTP09A	4	110	Part
UETTDRIS19A	Conduct high potential testing of underground power cables	New Unit	New Unit	UETTDRCJ03A or UETTDRCJ07A or UETTDRIS02A or UETTDRIS14A or UETTDRTP09A	3	90	Not
UETTDRIS20A	Install and replace energy meters and associated equipment	UTTNTD311A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatt	UETTDRCJ03A or UETTDRCJ07A or UETTDRIS02A or UETTDRIS14A or UETTDRTP	3	90	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalence - Full, part or not
			ed.	09A			
UETTDRIS21A	Install mobile generation set for synchronised Genset LV	New Unit	New Unit	UETTDRCJ03A or UETTDRCJ07A or UETTDRIS02A or UETTDRIS14A or UETTDRTP09A	3	90	Not
UETTDRIS22A	Implement and monitor the organisational OHS policies, procedures and programs	UTTNTD413A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UEENEEE001A & UETTDREL04A	4	Core	Part
UETTDRIS23A	Implement and monitor environmental and sustainable energy management policies and	UTTNTD414A	Minor resemblance to previous unit. Unit has been updated, realigned	UETTDREL01A	4	Core	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalence - Full, part or not
	procedures		and reformatted.				
UETTDRIS24A	Install mobile generation set for synchronised genset HV	New Unit	New Unit	UETTDRIS03A or UETTDRIS04A or UETTDRIS05A or UETTDRRT10A & UETTDRIS21A	3	90	Not
UETTDRIS25A	Contribute to coordinated High Voltage live line work	New Unit	New Unit	Nil	3	100	Not
UETTDRIS26A	Manage an electricity supply industry OHS management system	New Unit	New Unit	Nil	5	Core	Not
UETTDRIS27A	Install and maintain network infrastructure electrical equipment	New Unit	New Unit	UETTDREL01A & UETTDREL02A & UETTDREL	4	120	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalence - Full, part or not
				04A & UETTDRIS22A & UETTDRIS23A & UEENEEG005A			

Discipline – Rail Traction

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRRT01A	Install overhead traction wiring systems	UTTNTD323A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS14A	3	90	Part
UETTDRRT	Maintain		Minor	UETTDRRT	3	100	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
02A	overhead traction wiring systems	UTTNTD323A	resemblance to previous unit. Unit has been updated, realigned and reformatted.	01A			
UETTDRRT03A	Install traction bonds	UTTNTD324A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS14A	3	80	Part
UETTDRRT04A	Maintain traction bonds	UTTNTD324A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatt	UETTDRRT03A	3	90	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
			ed.				
UETTDRRT05A	Install overhead traction configurations	UTTNTD325A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRRT02A & UETTDRRT08A	3	90	Part
UETTDRRT06A	Maintain overhead traction configurations	UTTNTD325A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRRT05A	3	100	Part
UETTDRRT07A	Install overhead traction equipment and components	UTTNTD326A	Minor resemblance to previous unit. Unit has been updated, realigned	UETTDRIS14A	3	90	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
			and reformatted.				
UETTDRRT08A	Maintain overhead traction equipment and components	UTTNTD326A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRRT07A	3	100	Part
UETTDRRT09A	Operate road rail traction height access equipment	UTTNTD327A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRRT02A & UETTDRRT08A	2	40	Part
UETTDRRT10A	Perform rail traction switching operation to a given schedule	New Unit	New Unit	UETTDRRT02A & UETTDRRT08A	3	80	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRRT11A	Maintain energised DC traction overhead wiring system	New Unit	New Unit	BSBFLM412A & UETTDRIS25A & UETTDRRT06A & UETTDRRT09A	4	120	Not
UETTDRRT12A	Maintain energised traction overhead electrical apparatus (Stick)	New Unit	New Unit	UETTDRRT11A	4	130	Not
UETTDRRT13A	Maintain energised traction overhead electrical apparatus (Glove)	New Unit	New Unit	UETTDRRT11A	4	130	Not
UETTDRRT14A	Install and maintain traction network wiring systems	New Unit	New Unit	UETTDRIS27A	4	110	Not
UETTDRRT15A	Install and maintain traction network	New Unit	New Unit	UETTDRRT14A	4	130	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
	equipment & components						

Discipline – Substation

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRSB01A	Diagnose and rectify faults in power systems substation environment	New Unit	New Unit	UEENEEG005A	4	Core	Not
UETTDRSB02A	Carry out substation inspections	New Unit	New Unit	UEENEEG005A	4	Core	Not
UETTDRSB03A	Install and maintain substation DC systems	New Unit	New Unit	UEENEEG005A	4	Core	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRSB04A	Maintain HV power system circuit breakers	New Unit	New Unit	UEENEEG005A	4	Core	Not
UETTDRSB05A	Maintain HV power system – transformers & instrument transformers	New Unit	New Unit	UEENEEG005A	4	Core	Not
UETTDRSB06A	Install high current DC switchgear & equipment	New Unit	New Unit	UEENEEG005A	4	110	Not
UETTDRSB07A	Maintain high current DC switchgear & equipment	New Unit	New Unit	UEENEEG005A	4	110	Not
UETTDRSB08A	RESERVED						
UETTDRSB09A	Maintain HV regulating equipment – capacitor banks	New Unit	New Unit	UEENEEG005A	4	110	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRSB10A	Maintain HV power system static VAR compensators	New Unit	New Unit	UEENEEG005A	4	110	Not
UETTDRSB11A	Maintain HV power system synchronous condensers	New Unit	New Unit	UEENEEG005A	4	110	Not
UETTDRSB12A	Maintain voltage regulating equipment – on load Tapchangers	New Unit	New Unit	UEENEEG005A	4	110	Not
UETTDRSB13A	Install HV plant and equipment	New Unit	New Unit	UEENEEG005A	4	110	Not
UETTDRSB14A	Carry out thermovision surveys	New Unit	New Unit	UEENEEG005A	3	90	Not
UETTDRSB15A	Maintain discrete protection and control systems	New Unit	New Unit	UEENEEG005A	4	110	Not
UETTDRSB1	Commission discrete			UEENEEG00	4	110	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
6A	protection and control systems	New Unit	New Unit	5A			
UETTDRSB17A	Maintain distribution field devices	New Unit	New Unit	UEENEEG005A	4	110	Not
UETTDRSB18A	Commission distribution field devices	New Unit	New Unit	UEENEEG005A	4	110	Not

Discipline – Systems Operations

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRSO02A	Manage network faults	New Unit	New Unit	UETTDRSO05A or UETTDRSO12A or UETTDRSO13A	6	220	Not
UETTDRSO	Manage	New Unit	New Unit	UETTDRSO	6	220	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
03A	critical events			02A			
UETTDRSO04A	Control generating plant	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS2	6	180	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
				6A			
UETTDRSO 05A	Manage HV distribution and subtransmission network demand	New Unit	New Unit	UETTDRSO 10A	6	220	Not
UETTDRSO 06A	Develop LV distribution switching programs	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS2	5	150	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
				6A			
UETTDRSO07A	Develop HV distribution and subtransmission switching programs	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A	5	150	Not
UETTDRSO08A	Develop and evaluate transmission switching	New Unit	New Unit	BSBMGT507A & UEENEED00	5	150	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
	programs			2A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRSO09A	Coordinate LV distribution networks	New Unit	New Unit	UETTDRSO06A	5	150	Not
UETTDRSO10A	Coordinate HV distribution and subtransmission networks	New Unit	New Unit	UETTDRSO07A	5	150	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRSO11A	Manage transmission networks	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRSO08A	6	200	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRSO 12A	Manage transmission network demand	New Unit	New Unit	UETTDRSO 11A	6	200	Not
UETTDRSO 13A	Coordinate LV distribution network demand	New Unit	New Unit	UETTDRSO 09A	5	150	Not
UETTDRSO 14A	Develop crisis management plans	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A &	6	180	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
				UEENEEH039A & UEENEEH070A & UETTDRIS26A			

Discipline – Transmission

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRTP02A	Establish and reinstate a transmission tower work site	New Unit	New Unit	UETTDREL03A & UEENEEE001A	2	35	Not
UETTDRTP03A	Erect transmission towers	UTTNTD208A	Minor resemblance to previous unit. Unit has been updated, realigned	UETTDREL03A & UEENEEE001A	2	Core	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
			and reformatted.				
UETTDRTP04A	Erect transmission tower hardware	UTTNTD208A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRTP03A	2	30	Part
UETTDRTP05A	Pre-tension stringing transmission overhead conductors and cables	UTTNTD211A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRTP04A	2	35	Part
UETTDRTP06A	Erect transmission towers and associated hardware	UTTNTD208A	Minor resemblance to previous unit. Unit has been	UETTDREL01A & UETTDREL02A & UETTDREL04A &	3	100	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
			updated, realigned and reformatted.	UEENEEE001A & UEENEEE002A & UEENEEG002A & UEENEEE008A			
UETTDRTP07A	Maintain transmission towers and associated hardware	UTTNTD302A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRTP06A	3	100	Part
UETTDRTP08A	Transmission tower stub setting	New Unit	New Unit	Nil	3	90	Not
UETTDRTP09A	Install and maintain overhead conductors and cables (Towers).	UTTNTD305A	Minor resemblance to previous unit. Unit has been updated, realigned and	UETTDRTP07A	3	100	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
			reformatted.				
UETTDRTP10A	Inspect overhead structures and electrical apparatus (Towers)	UTTNTD303A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRTP07A	3	100	Part
UETTDRTP11A	Maintain energised lines (Transmission) using live line stick technique	UTTNTD444A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	BSBFLM412A & UETTDRIS25A & UETTDRTP09A	4	130	Part
UETTDRTP12A	Maintain energised lines (Transmission) using Barehand Technique	UTTNTD444A	Minor resemblance to previous unit. Unit has been updated,	UETTDRTP11A	4	130	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
			realigned and reformatted.				
UETTDRTP13A	Maintain energised lines (Transmission) using Barehand Technique on a helicopter platform	UTTNTD444A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRTP12A	4	130	Part
UETTDRTP14A	Install and maintain overhead transmission network infrastructure	New Unit	New Unit	UETTDREL01A & UETTDREL02A & UETTDREL04A & UETTDRIS22A & UETTDRIS23A & UEENEEG005A	4	120	Not
UETTDRTP15A	Install and maintain transmission network	New Unit	New Unit	UETTDRTP14A	4	130	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
	infrastructure electrical equipment						

Discipline – Protection/Testing

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRTS01A	Maintain network protection and control systems (Interdependent)	New Unit	New Unit	UETTDRTS09A	5	150	Not
UETTDRTS02A	Commission network protection and control systems (Interdependent)	New Unit	New Unit	UETTDRTS01A	5	150	Not
UETTDRTS03A	Conduct evaluation of power system faults	New Unit	New Unit	BSBMGT507A &	6	180	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
	within a substation			UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRTS04A	Design testing and commissioning procedures for substation	New Unit	New Unit	UETTDRTS06A & UETTDRTS08A & UETTDRTS1	6	180	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
	and field devices			2A & UETTDRTS15A			
UETTDRTS05A	Test and maintain metering schemes	New Unit	New Unit	UETTDRTS09A	5	140	Not
UETTDRTS06A	Commission metering schemes	New Unit	New Unit	UETTDRTS05A	5	150	Not
UETTDRTS07A	Perform accuracy checks on instrument transformers	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH03	5	150	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
				9A & UEENEEH070A & UETTDRIS26A			
UETTDRTS08A	Test, repair and calibrate protection relays and meters	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A	5	150	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRTS09A	Develop secondary isolation instructional documents	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A	5	150	Not
UETTDRTS10A	Design secondary isolation instructional documents	New Unit	New Unit	BSBMGT507A & UEENEED002A &	6	200	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
				UEENEED004A & UEENEED017A & UEENEED027A & UEENEED028A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRTS11A	Maintain, test and commission voltage regulating equipment	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED00	4	120	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
				4A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRTS12A	Conduct evaluation of primary plant	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED02	6	200	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
				8A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRTS13A	Undertake project management of substation augmentation and maintenance	New Unit	New Unit	UETTDRTS06A & UETTDRTS08A & UETTDRTS12A & UETTDRTS15A	6	220	Not
UETTDRTS14A	Install and maintain power system communication equipment	New Unit	New Unit	BSBMGT507A & UEENEED002A &	5	150	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
				UEENEED004A & UEENEED027A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A			
UETTDRTS15A	Maintain network protection and control systems (Complex)	New Unit	New Unit	BSBMGT507A & UEENEED002A & UEENEED004A & UEENEED017A & UEENEED027A & UEENEED02	6	220	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
				8A & UEENEEE002A & UEENEEE007A & UEENEEG049A & UEENEEH011A & UEENEEH012A & UEENEEH039A & UEENEEH070A & UETTDRIS26A & UETTDRTS01A			
UETTDRTS16A	Commission network protection and control systems (complex)	New Unit	New Unit	UETTDRTS02A & UETTDRTS15A	6	220	Not

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Discipline – Vegetation

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRVC01A	Cut vegetation above ground outside live work zone near live electrical apparatus (Climbing)	New Unit	New Unit	UETTDRVC07A	2	35	Not
UETTDRVC02A	Operate vegetation control plant, machinery and equipment near live electrical apparatus	New Unit	New Unit	UETTDRVC03A	2	Core	Not
UETTDRVC03A	Plan for the removal of vegetation up to vegetation exclusion zone near live	New Unit	New Unit	UETTDREL03A & UETTDREL04A & UEENEEE001A	2	Core	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
	electrical apparatus						
UETTDRVC04A	Assess vegetation and recommend control measures for work near live electrical apparatus	New Unit	New Unit	UETTDRVC01A or UETTDRVC05A or UETTDRVC06A or UETTDRVC08A	2	35	Not
UETTDRVC05A	Cut vegetation above ground outside live work zone near live electrical apparatus (Platform)	New Unit	New Unit	UETTDRVC07A	2	30	Not
UETTDRVC06A	Cut vegetation at ground level outside vegetation exclusion zone near	New Unit	New Unit	UETTDRVC07A	2	30	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
	live electrical apparatus						
UETTDRVC07A	Monitor safety compliance for vegetation work near live electrical apparatus	New Unit	New Unit	UETTDRVC02A	2	Core	Not
UETTDRVC08A	Safe use of elevating work platform (EWP) near live electrical apparatus	New Unit	New Unit	UETTDRVC07A	2	35	Not
UETTDRVC09A	Control vegetation (Linework)	UTTNTD318A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS14A	3	80	Part

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UETTDRVC10A	Coordinate vegetation control work	UTTNTD406A	Minor resemblance to previous unit. Unit has been updated, realigned and reformatted.	UETTDRIS22A & UETTDRIS23A	4	120	Part

Discipline – Universal Electrotechnology Units

UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UEUNEED002A	Assemble, set-up and test personal computers	New Unit	New Unit	UEUNEEE002A & UEUNEEE007A	2	Core	Not
UEUNEED004A	Use engineering applications software	New Unit	New Unit	Nil	3/4	Core	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UEUNEED017A	Install and configure internetworking systems	New Unit	New Unit	Nil	4	Core	Not
UEUNEED027A	Develop structured programs for control sub systems to access external devices	New Unit	New Unit	Nil	3/4	Core	Not
UEUNEED028A	Develop and test basic specification for microcontroller equipped devices	New Unit	New Unit	Nil	5/6	Core	Not
UEUNEEE001A	Apply OHS practices in the work place	New Unit	New Unit	Nil	1/2	Core	Not
UEUNEEE002A	Dismantle, assemble and fabricate electrotechnology components	New Unit	New Unit	Nil	1/2	Core	Not
UEUNEEE003A	Solve problems in extra-low	New Unit	New Unit	Nil	1/2	Core	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
	voltage single path circuits						
UEUNEEE004A	Solve problems in multiple path d.c. circuits	New Unit	New Unit	UEUNEEE003A	1/2	Core	Not
UEUNEEE005A	Fix and secure equipment	New Unit	New Unit	Nil	1/2/3	Core	Not
UEUNEEE007A	Use drawings, diagrams, schedules and manuals	New Unit	New Unit	Nil	2	Core	Not
UEUNEEE008A	Lay wiring/cabling and terminate accessories for extra-low voltage circuits	New Unit	New Unit	UEUNEEE002A & UEUNEEE005A & UEUNEEE007A	2	Core	Not
UEUNEEG001A	Solve problems in electromagnetic circuits	New Unit	New Unit	UEUNEEE004A	3	Core	Not
UEUNEEG002A	Solve problems in single and three phase low voltage circuits	New Unit	New Unit	UEUNEEG001A	3	Core	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
UEUNEEG047A	Provide computational solutions to power engineering problems	New Unit	New Unit	UEUNEEG002A	4/5	Core	Not
UEUNEEG048A	Solve problems in complex multiple path power circuits	New Unit	New Unit	UEUNEEG047A	4/5	Core	Not
UEUNEEG049A	Solve problems in complex polyphase power circuits	New Unit	New Unit	UEUNEEG048A	5/6	Core	Not
UEUNEEH011A	Solve problems in d.c. power supplies with single phase input.	New Unit	New Unit	UEUNEEH002A & UEUNEEH014A	3	Core	Not
UEUNEEH012A	Solve problems in digital components of electronic apparatus	New Unit	New Unit	UEUNEEH002A or UEUNEEE070A	3	Core	Not
UEUNEEH039A	Solve problems in basic amplifier	New Unit	New Unit	UEUNEEH002A or UEUNEEH0	3	Core	Not

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UET06 Version 1 CSU Code	Title	UTT98 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements **(for relevant pre-requisite or co-requisite refer respective unit)**	AQF Align.	Weighting Points	Equivalent - Full, part or not
	circuits			70A & UEUNEEH014A or UEENEEG002A			
UEUNEEH070A	Terminate and connect components, conductors, wiring and cables for electronic circuits	New Unit	New Unit	UEUNEEE002A & UEUNEEE007A & UEUNEEG012A or UEUNEEG049A	6	Core	Not

1.2.10.3 Table 3 Relationship between UET09 Version 1 Units and UET06 Version 1 Units

Table 3 Relationship between UET09 Version 1 Units and UET06 Version 1 Units

Full prerequisite chains for unit prerequisites are listed where applicable in italicised text.

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Discipline – Cable Jointing

UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
UETTDRCJ01B	Lay electrical cables	UETTDRCJ01A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDREL01B & UETTDREL02B & UETTDREL04B & UEENEEE001B & UEENEEE002B & UEENEEE004B & UEENEEE005B & UEENEEE007B & UEENEEG001B & UEENEEG002B *UEENEEE003B*	3	30	Full
UETTDRCJ02B	Install and maintain de-energised LV underground paper insulated cables	UETTDRCJ02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisi	UETTDRCJ01B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B*	3	100	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
			tes	*UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables.	UETTDRCJ03A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ01B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE00*	3	100	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
				3B *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRCJ04B	Joint and maintain energised LV underground paper insulated cables	UETTDRCJ04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ02B *UETTDRCJ01B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE00*	3	100	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
				4B *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRCJ05B	Perform straight through HV paper insulated to polymeric transition joint	UETTDRCJ05A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ07B *UETTDRCJ01B* *UETTDRCJ06B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B*	3	90	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
				UEENEEE005B *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRCJ06B	Install and maintain de-energised LV underground polymeric cables	UETTDRCJ06A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ01B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG0*	3	90	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
				01B			
UETTDRCJ07B	Install and maintain de-energised HV underground polymeric cables	UETTDRCJ07A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ06B *UETTDRCJ01B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*	3	90	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
UETTDRCJ08B	Joint and maintain energised LV underground polymeric cables	UETTDRCJ08A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ06B *UETTDRCJ01B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*	3	90	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
UETTDRCJ09B	Install oil and gas filled specialised underground cables	UETTDRCJ09A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B & UETTDRCJ07B *UETTDRCJ01B* *UETTDRCJ06B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG0*	4	120	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
				02B			
UETTDRCJ10B	Maintain oil and gas filled specialised underground cables	UETTDRCJ10A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ09B *UETTDRCJ01B* *UETTDRCJ03B* *UETTDRCJ06B* *UETTDRCJ07B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B*	4	120	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
				UEENEEE005B *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRCJ11B	Install and maintain polymeric specialised underground cables	UETTDRCJ11A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B & UETTDRCJ07B *UETTDRCJ01B* *UETTDRCJ06B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B*	4	130	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
				UEENEEE004B *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRCJ12B	Install and maintain oil & gas pressure systems for specialised underground cables	UETTDRCJ12A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B & UETTDRCJ07B *UETTDRCJ01B* *UETTDRCJ06B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B*	4	130	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
				UEENEEE003B *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRCJ13B	Install and maintain network infrastructure LV underground cables	UETTDRCJ13A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS06B *A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.*	4	120	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
				& *UETTDREL02B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE001B* *UETTDREL01B* *UETTDREL04B*			
UETTDRCJ14B	Install and maintain network infrastructure HV underground cables	UETTDRCJ14A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ13B *A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.* *&*	4	130	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF	Weighting Points	Equivalent - Full, part or not
				UETTDRIS06B *UETTDREL02B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE001B* *UETTDREL01B* *UETTDREL04B*			

Discipline - Distribution

UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
UETTDRDP01B	Inspect overhead structures and electrical apparatus (poles	UETTDRDP01A	Revised Unit includes editorial changes, reformatted unit	UETTDRIS12B *UETTDREL01B*	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	/structures)		layout and updated pre-requisites	*UETTDREL02B* *UETTDREL04B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRDP02B	Maintain overhead energised LV conductors and cables	UETTDRDP02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS14B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B*	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEUNEEE001B *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRDP03B	Maintain energised high voltage distribution overhead electrical apparatus (stick)	UETTDRDP03A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	BSBWOR402A & UETTDRDP02B & UETTDRIS02B & UETTDRIS25B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS0*	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				1B *UETTDRIS12B* *UETTDRIS14B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRDP04B	Maintain energised high voltage distribution overhead electrical apparatus (glove)	UETTDRDP04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requis	BSBWOR402A & UETTDRDP02B & UETTDRIS02B & UETTDRIS25B	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			ites	*UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS01B* *UETTDRIS12B* *UETTDRIS14B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRDP05B	Inspect, maintain and restore energised LV overhead distribution network infrastructure	UETTDRDP05A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS06B UETTDRIS27B *A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.* *&* *UETTDREL02B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE001B* *UETTDREL01B* *UETTDREL04B*	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**

Discipline - Design

UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRDS01B	Draft and layout an overhead distribution extension	UETTDRDS01A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS22B & UETTDRIS23B & UEENEEE002B & UEENEEE007B & UEENEEG002B *UETTDREL01B* *UETTDREL04B*	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEENEEE001B			
UETTDRDS02B	Draft and layout an underground distribution extension	UETTDRDS02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS22B & UETTDRIS23B & UEENEEE002B & UEENEEE007B & UEENEEG002B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B*	4	110	Full
UETTDRDS03B	Draft and layout a street lighting system	UETTDRDS03A	Revised Unit includes editorial changes, reformatte	UETTDRIS22B & UETTDRIS23B & UEENEEE002B &	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			d unit layout and updated pre-requisites	UEENEEE007B & UEENEEG002B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B*			
UETTDRDS04B	Draft and layout a distribution substation minor upgrade	UETTDRDS04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS22B & UETTDRIS23B & UEENEEE002B & UEENEEE007B & UEENEEG002B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B*	4	120	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRDS05B	Design overhead distribution systems	UETTDRDS05A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS13B & UETTDRDS15B *UETTDRDS09B* *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE001B* *UEENEEE007B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*	5	140	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRDS06B	Design underground distribution systems	UETTDRDS06A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS13B & UETTDRDS15B *UETTDRDS09B* *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE001B* *UEENEEE007B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*	5	140	Full
UETTDRDS07B	Design distribution	UETTDRDS07A	Revised Unit includes	UETTDRDS13B & UETTDRDS	5	140	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	substations		editorial changes, reformatted unit layout and updated pre-requisites	15B *UETTDRDS09B* *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE001B* *UEENEEE007B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRDS08B	Design public lighting systems	UETTDRDS08A	Revised Unit includes editorial changes, reformatte	UETTDRDS13B & UETTDRDS15B	5	140	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			d unit layout and updated pre-requisites	*UETTDRDS09B* *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE001B* *UEENEEE007B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRDS09B	Prepare and manage detailed construction plans for electrical system infrastructure	UETTDRDS09A	Revised Unit includes editorial changes, reformatted unit layout and	UEENEEG002B & UETTDRIS23B *UETTDREL01B*	5	140	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			updated pre-requisites				
UETTDRDS10B	Prepare and appraise financial impact statements	UETTDRDS10A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS09B OR UETTDRTS16B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRTS01B* *UETTDRTS02B* *UETTDRTS09B* *UETTDRTS15B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEED0*	6	200	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				04B *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRDS11B	Manage electrical infrastructure projects	UETTDRDS11A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS10B *UETTDREL01B* *UETTDREL04B* *UETTDRDS09B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRTS01B* *UETTDRTS02B* *UETTDRTS09B* *UETTDRTS*	6	200	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				15B *UETTDRTS16B* *UEENEEE001B* *UEENEED004B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRDS12B	Investigate quality of supply issues	UETTDRDS12A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS05B & UETTDRDS06B *UETTDRDS09B* *UETTDRDS13B* *UETTDRDS*	5	140	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				15B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE001B* *UEENEEE007B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRDS13B	Develop HV and LV distribution protection systems	UETTDRDS13A	Revised Unit includes editorial changes, reformatted unit layout and updated	UEENEEG049B & UEENEEE007B & UETTDRIS22B & UETTDRIS23B	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			pre-requisites	*UETTDREL01B* *UETTDREL04B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEE001B*			
UETTDRDS14B	Design zone substations modifications	UETTDRDS14A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEEE002B & UEENEEE007B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B*	5	160	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRDS15B	Organise and implement line and easement surveys	UETTDRDS15A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS09B *UEENEEG002B* *UETTDRIS23B* *UETTDREL01B*	5	140	Full
UETTDRDS16B	Develop planned outage strategies	UETTDRDS16A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B OR UETTDRIS22B *UETTDREL04B* *UEENEEE001B*	5	140	Full
UETTDRDS17B	Review asset management strategies	UETTDRDS17A	Revised Unit includes editorial changes, reformatted unit layout and	UETTDRDS09B OR UETTDRTS16B *UETTDREL01B* *UETTDREL*	6	180	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			updated pre-requisites	*04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEED004B* *UEENEEE001B* *UEENEEG002B*			
UETTDRDS18B	Analyse and appraise fault and outage data	UETTDRDS18A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS09B *UEENEEG002B* *UETTDRIS23B* *UETTDREL01B*	6	180	Full
UETTDRDS19B	Establish and manage geographical information systems data	UETTDRDS19A	Revised Unit includes editorial changes, reformatted unit layout	UEENEED004B & UEENEEE007B & UETTDRIS22B *UETTDREL*	5	140	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			and updated pre-requisites	*04B* *UEENEEE001B*			
UETTDRDS20B	Design customer substations	UETTDRDS20A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS07B *UETTDRDS09B* *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE001B* *UEENEEE007B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRDS21B	Manage transmission and sub-transmission design process	UETTDRDS21A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS09B *UEENEEG002B* *UETTDRIS23B* *UETTDREL01B*	6	180	Full
UETTDRDS22B	Design transmission, sub-transmission and zone substation buildings	UETTDRDS22A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS09B & UETTDRDS14B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEG002B* *UEENEEE001B* *UEENEEE002B*	6	200	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEENEEE007B			
UETTDRDS23B	Design transmission and sub-transmission substation primary plant	UETTDRDS23A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS09B & UETTDRDS14B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEG002B* *UEENEEE001B* *UEENEEE002B* *UEENEEE007B*	6	220	Full
UETTDRDS24B	Design transmission and sub-transmission protection and control	UETTDRDS24A	Revised Unit includes editorial changes, reformatted unit layout	UETTDRDS09B & UETTDRDS14B *UETTDREL*	6	220	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			and updated pre-requisites	*01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEG002B* *UEENEEE001B* *UEENEEE002B* *UEENEEE007B*			
UETTDRDS25B	Design transmission and sub-transmission substation earthing	UETTDRDS25A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS09B & UETTDRDS14B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEG0*	6	200	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B *UEENEEE001B* *UEENEEE002B* *UEENEEE007B*			
UETTDRDS26B	Design transmission, sub-transmission and zone substation – civil and structural components	UETTDRDS26A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS09B & UETTDRDS14B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEG002B* *UEENEEE001B* *UEENEEE002B* *UEENEEE007B*	6	200	Full
UETTDRDS	Design	UETTDRDS	Revised	UETTDRDS	6	200	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
27B	overhead transmission systems	27A	Unit includes editorial changes, reformatted unit layout and updated pre-requisites	15B *UETTDRDS09B* *UEENEEG002B* *UETTDRIS23B* *UETTDREL01B*			
UETTDRDS28B	Design underground transmission systems	UETTDRDS28A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRDS15B *UETTDRDS09B* *UEENEEG002B* *UETTDRIS23B* *UETTDREL01B*	6	200	Full

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Discipline – Entry Level Cross Discipline

UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDREL01B	Apply environmental and sustainable energy procedures	UETTDREL01A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	Nil	3	Core	Full
UETTDREL02B	Operate plant and equipment near live electrical conductors/apparatus	UETTDREL02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	Nil	3	Core	Full
UETTDREL03B	Comply with environmental and incidental response procedures	UETTDREL03A	Revised Unit includes editorial changes, reformatted unit layout	Nil	2	Core TLA and Possible Skill Sets Unit	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			and updated pre-requisites				
UETTDREL04B	Working safely near live electrical apparatus as non electrical worker	UETTDREL04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	Nil	2	Core TLA and Possible Skill Sets Unit	Full
UETTDREL05B	Respond to technical enquiries and requests	UETTDREL05A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	Nil	3	Possible Skill Sets Unit 90	Full

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Discipline – Industry Specific

UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
UETTDRIS01B	Install electrical equipment (network infrastructure)	UETTDRIS01A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDREL01B & UETTDREL02B & UETTDREL04B & UEENEEE001B & UEENEEE002B & UEENEEE004B & UEENEEE005B & UEENEEE007B & UEENEEG001B & UEENEEG002B *UEENEEE003B*	3	100	Full
UETTDRIS02B	Maintain electrical equipment (network infrastructure)	UETTDRIS02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requis	UETTDRIS01B *UETTDREL01B* *UETTDREL02B* *UETTDREL*	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			ites	*04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS03B	Perform LV field switching operation to a given schedule	UETTDRIS03A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS02B or UETTDRIS14B or UETTDRTP09B *UETTDREL01B* *UETTDREL*	3	80	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B *UETTDREL04B* *UETTDRCJ01B* *UETTDRCJ06B* *UETTDRIS01B* *UETTDRIS12B* *UETTDRTP06B* *UETTDRTP07B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B			
UETTDRIS04B	Perform high voltage field switching operation to a given schedule	UETTDRIS04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS02B or UETTDRIS14B or UETTDRTP09B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRCJ01B* *UETTDRCJ06B* *UETTDRIS01B*	3	80	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDRIS12B *UETTDRTP06B* *UETTDRTP07B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS05B	Perform substation switching operation to a given schedule	UETTDRIS05A	Revised Unit includes editorial changes, reformatted unit layout and updated	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS02B or UETTDRIS14B or UETTDRTP	3	80	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			pre-requisites	09B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRCJ01B* *UETTDRCJ06B* *UETTDRIS01B* *UETTDRIS12B* *UETTDRTP06B* *UETTDRTP07B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				07B *UEENEEG001B* *UEENEEG002B*			
UETTDRIS06B	Install and maintain network infrastructure electrical equipment	UETTDRIS06A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDREL02B & UETTDRIS22B & UETTDRIS23B & A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence. *UEENEEE001B* *UETTDREL*	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				01B UETTDREL 04B			
UETTDRIS 07B	Sample, test, filter and reinstate insulating oil	UETTDRIS 07A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	3	80	Full
UETTDRIS 08B	Develop HV switching schedule	UETTDRIS 08A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requis	UETTDRIS03B or UETTDRIS04B or UETTDRIS05B or UETTDRRT10B	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			ites	*UETTDRCJ01B* *UETTDRCJ03B* *UETTDRCJ06B* *UETTDRCJ07B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS01B* *UETTDRIS02B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRTP06B* *UETTDRTP07B* *UETTDRTP09B* *UETTDRRT01B* *UETTDRRT*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B *UETTDRRT08B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS09B	Develop LV switching schedule	UETTDRIS09A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS03B or UETTDRIS04B or UETTDRIS05B or UETTDRRT10B *UETTDRCJ01B* *UETTDRCJ0*	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				3B *UETTDRCJ06B* *UETTDRCJ07B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS01B* *UETTDRIS02B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRTP06B* *UETTDRTP07B* *UETTDRTP09B* *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				08B *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS10B	Coordinate permit procedures	UETTDRIS10A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS03B or UETTDRIS04B or UETTDRIS05B or UETTDRRT10B *UETTDRCJ01B* *UETTDRCJ03B*	4	120	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDRCJ06B *UETTDRCJ07B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS01B* *UETTDRIS02B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRTP06B* *UETTDRTP07B* *UETTDRTP09B* *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT08B* *UEENEEE0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				01B *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS11B	Coordinate and direct switching schedules	UETTDRIS11A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS03B or UETTDRIS04B or UETTDRIS05B or UETTDRRT10B *UETTDRCJ01B* *UETTDRCJ03B* *UETTDRCJ06B*	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDRCJ07B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS01B* *UETTDRIS02B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRTP06B* *UETTDRTP07B* *UETTDRTP09B* *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT08B* *UEENEEE001B* *UEENEEE0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS12B	Install and maintain poles/structures and associated hardware	UETTDRIS12A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDREL01B & UETTDREL02B & UETTDREL04B & UEENEEE001B & UEENEEE002B & UEENEEE004B & UEENEEE005B & UEENEEE007B & UEENEEG001B	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEENEEE003B			
UETTDRIS13B	Install and maintain public lighting systems	UETTDRIS13A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS02B or UETTDRIS14B or UETTDRTP09B	3	80	Full
UETTDRIS14B	Install and maintain overhead conductors and cables	UETTDRIS14A	Revised Unit includes editorial changes,	UETTDRIS12B *UETTDREL*	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	(poles and structures)		reformatted unit layout and updated pre-requisites	*01B* *UETTDREL02B* *UETTDREL04B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRIS15B	Install and maintain low voltage services (underground)	UETTDRIS15A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS02B or UETTDRIS14B or UETTDRTP09B *UETTDREL*	3	80	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				01B *UETTDREL02B* *UETTDREL04B* *UETTDRCJ01B* *UETTDRCJ06B* *UETTDRIS01B* *UETTDRIS12B* *UETTDRTP06B* *UETTDRTP07B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				01B *UEENEEG002B*			
UETTDRIS16B	Install and maintain low voltage services (overhead)	UETTDRIS16A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS02B or UETTDRIS14B or UETTDRTP09B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRCJ01B* *UETTDRCJ06B* *UETTDRIS01B* *UETTDRIS12B* *UETTDRTP06B* *UETTDRTP*	3	80	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				07B *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS17B	Conduct visual checking and treatment of poles and structures	UETTDRIS17A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS12B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEUNEEE001B* *UEUNEEE0*	2	40	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRIS18B	Locate faults in underground power cables	UETTDRIS18A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS02B or UETTDRIS14B or UETTDRTP09B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRCJ01B* *UETTDRCJ0*	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				6B *UETTDRIS01B* *UETTDRIS12B* *UETTDRTP06B* *UETTDRTP07B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS19B	Conduct high potential testing of undergroun	UETTDRIS19A	Revised Unit includes editorial changes,	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS0	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	d power cables		reformatted unit layout and updated pre-requisites	2B or UETTDRIS14B or UETTDRTP09B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRCJ01B* *UETTDRCJ06B* *UETTDRIS01B* *UETTDRIS12B* *UETTDRTP06B* *UETTDRTP07B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				04B *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS20B	Install and replace energy meters and associated equipment	UETTDRIS20A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS02B or UETTDRIS14B or UETTDRTP09B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRCJ01B* *UETTDRCJ06B* *UETTDRIS0*	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				1B *UETTDRIS12B* *UETTDRTP06B* *UETTDRTP07B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS21B	Install mobile generation set for synchronised Genset LV	UETTDRIS21A	Revised Unit includes editorial changes, reformatted unit layout and	UETTDRCJ03B or UETTDRCJ07B or UETTDRIS02B or UETTDRIS14B or	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			updated pre-requisites	UETTDRTP09B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRCJ01B* *UETTDRCJ06B* *UETTDRIS01B* *UETTDRIS12B* *UETTDRTP06B* *UETTDRTP07B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				05B *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*			
UETTDRIS22B	Implement and monitor the organisational OHS policies, procedures and programs	UETTDRIS22A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEEE001B & UETTDREL04B	4	Core	Full
UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures	UETTDRIS23A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDREL01B	4	Core	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRIS24B	Install mobile generation set for synchronised genset HV	UETTDRIS24A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS03B or UETTDRIS04B or UETTDRIS05B or UETTDRRT10B & UETTDRIS21B *UETTDRCJ01B* *UETTDRCJ03B* *UETTDRCJ06B* *UETTDRCJ07B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS01B* *UETTDRIS02B* *UETTDRIS12B* *UETTDRIS1*	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				4B *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT07B* *UETTDRRT08B* *UETTDRTP06B* *UETTDRTP07B* *UETTDRTP09B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B			
UETTDRIS25B	Contribute to coordinated high voltage live line work	UETTDRIS25A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	Nil	3	100	Full
UETTDRIS26B	Manage an electricity supply industry OHS management system	UETTDRIS26A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	Nil	5	Core	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRIS27B	Install and maintain overhead distribution network infrastructure	UETTDRIS27A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDREL02B & UETTDRIS22B & UETTDRIS23B & A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence. *UETTDREL01B* *UETTDREL04B* *UEENEEE001B*	4	120	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRIS28A	Analyse and develop solutions for problems in extra-low voltage, single path circuits	New Unit – Version 2	New Unit	Nil	6	Core	
UETTDRIS29A	Analyse and develop solutions for problems in multiple path d.c. circuits	New Unit – Version 2	New Unit	UETTDRIS28A	6	Core	
UETTDRIS30A	Analyse and develop solutions for problems in electromagnetic circuits	New Unit – Version 2	New Unit	Nil	6	Core	
UETTDRIS31A	Analyse and develop solutions for problems in single and three phase low voltage circuits	New Unit – Version 2	New Unit	Nil	6	Core	

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Discipline – Rail Traction

UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
UETTDRRT01B	Install overhead traction wiring systems	UETTDRRT01A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS14B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*	3	90	Full
UETTDRRT02B	Maintain overhead traction	UETTDRRT02A	Revised Unit includes	UETTDRRT01B	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	wiring systems		editorial changes, reformatted unit layout and updated pre-requisites	*UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRRT03B	Install traction bonds	UETTDRRT03A	Revised Unit includes editorial changes,	UETTDRIS14B *UETTDREL*	3	80	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			reformatted unit layout and updated pre-requisites	*01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRRT04B	Maintain traction bonds	UETTDRRT04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requis	UETTDRRT03B *UETTDREL01B* *UETTDREL02B* *UETTDREL*	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			ites	*04B* *UETTDRIS12B* *UETTDRIS14B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRRT05B	Install overhead traction configurations	UETTDRRT05A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRRT02B & UETTDRRT08B *UETTDREL01B* *UETTDREL02B* *UETTDREL*	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				04B *UETTDRIS12B* *UETTDRIS14B* *UETTDRRT01B* *UETTDRRT07B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRRT06B	Maintain overhead traction configurations	UETTDRRT06A	Revised Unit includes editorial changes, reformatted unit layout and	UETTDRRT05B *UETTDREL01B* *UETTDREL*	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			updated pre-requisites	*02B* *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT07B* *UETTDRRT08B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRRT07B	Install overhead traction equipment and components	UETTDRRT07A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS14B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*	3	90	Full
UETTDRRT08B	Maintain overhead traction equipment and	UETTDRRT08A	Revised Unit includes editorial changes,	UETTDRRT07B *UETTDREL*	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	components		reformatted unit layout and updated pre-requisites	*01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRRT09B	Operate road rail traction height access equipment	UETTDRRT09A	Revised Unit includes editorial changes, reformatted unit layout and	UETTDRRT02B & UETTDRRT08B *UETTDREL*	2	40	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			updated pre-requisites	*01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRRT01B* *UETTDRRT07B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRRT10B	Perform rail traction switching operations to a given schedule	UETTDRRT10A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRRT02B & UETTDRRT08B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRRT01B* *UETTDRRT07B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE0*	3	80	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				07B *UEENEEG001B*			
UETTDRRT11B	Maintain energised direct current traction overhead wiring system	UETTDRRT11A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	BSBWOR402A & UETTDRIS25B & UETTDRRT06B & UETTDRRT09B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT05B* *UETTDRRT*	4	120	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				07B *UETTDRRT08B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRRT12B	Maintain energised traction overhead electrical apparatus (stick)	UETTDRRT12A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRRT11B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B*	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDRIS25B *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT05B* *UETTDRRT06B* *UETTDRRT07B* *UETTDRRT08B* *UETTDRRT09B* *UEUNEEE001B* *UEUNEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *BSBWOR402*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				A			
UETTDRRT13B	Maintain energised traction overhead electrical apparatus (glove)	UETTDRRT13A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRRT11B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRIS25B* *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT05B* *UETTDRRT06B* *UETTDRRT07B*	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDRRT08B *UETTDRRT09B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *BSBWOR402A*			
UETTDRRT14B	Install and maintain traction network wiring systems	UETTDRRT14A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS27B & A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence. *UETTDREL02B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE001B* *UETTDREL01B* *UETTDREL04B*			
UETTDRRT15B	Install and maintain traction network equipment and components	UETTDRRT15A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRRT14B & A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence. *UETTDRRT11B* *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UETTDRIS14B* *UETTDRIS25B* *UETTDRRT01B* *UETTDRRT02B* *UETTDRRT05B* *UETTDRRT06B* *UETTDRRT*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				07B *UETTDRRT08B* *UETTDRRT09B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *BSBWOR402A*			

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Discipline – Substation

UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
UETTDRSB01B	Diagnose and rectify faults in power system substation environment	UETTDRSB01A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	Core	Full
UETTDRSB02B	Carry out substation inspection	UETTDRSB02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted	4	Core	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				electrician's licence.			
UETTDRSB03B	Install and maintain substation DC system	UETTDRSB03A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	Core	Full
UETTDRSB04B	Maintain HV power system breakers	UETTDRSB04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue	4	Core	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				of an unrestricted electrician's licence.			
UETTDRSB05B	Maintain HV power system – transformers and instrument transformers	UETTDRSB05A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	Core	Full
UETTDRSB06B	Install high current DC switchgear and equipment	UETTDRSB06A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				for the issue of an unrestricted electrician's licence.			
UETTDRSB07B	Maintain high current DC switchgear and equipment	UETTDRSB07A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	110	Full
UETTDRSB08A	RESERVED						
UETTDRSB09B	Maintain voltage regulating equipment – capacitor	UETTDRSB09A	Revised Unit includes editorial changes, reformatte	A current 'Unrestricted Electrician's Licence' or equivalent issued in an	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	banks		d unit layout and updated pre-requisites	Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.			
UETTDRSB10B	Maintain HV power system static VAR compensators	UETTDRSB10A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRSB11B	Maintain HV power system synchronous condensers	UETTDRSB11A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	110	Full
UETTDRSB12B	Maintain voltage regulating equipment – on load tapchangers	UETTDRSB12A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRSB13B	Install HV plant and equipment	UETTDRSB13A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	110	Full
UETTDRSB14B	Carry out thermovision surveys	UETTDRSB14A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRSB15B	Maintain discrete protection and control systems	UETTDRSB15A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	110	Full
UETTDRSB16B	Commission discrete protection and control systems	UETTDRSB16A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRSB15B & A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an	4	110	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				unrestricted electrician's licence.			
UETTDRSB17B	Maintain distribution field devices	UETTDRSB17A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.	4	110	Full
UETTDRSB18B	Commission distribution field devices	UETTDRSB18A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an	4	110	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
				unrestricted electrician's licence.			

Discipline – System Operations

UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
UETTDRSO02B	Manage network faults	UETTDRSO02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRSO20A *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO04B* *UETTDRSO*	6	220	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
				05B *UETTDRSO07B* *UETTDRSO08B* *UETTDRSO10B* *UETTDRSO11B* *UETTDRSO12B* *UETTDRSO17A* *UETTDRSO18A* *UETTDRSO19A* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				48B *UEENEEG049B*			
UETTDRSO03B	Manage critical events	UETTDRSO03A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRSO02B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO04B* *UETTDRSO05B* *UETTDRSO07B* *UETTDRSO08B* *UETTDRSO10B* *UETTDRSO11B* *UETTDRSO12B* *UETTDRSO*	6	220	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				17A *UETTDRSO 18A* *UETTDRSO 19A* *UETTDRSO 20A* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO 04B	Control generating plant	UETTDRSO 04A	Revised Unit includes editorial changes, reformatted unit layout	UETTDRSO 18A & UETTDRSO 19A *UETTDREL*	6	180	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
			and updated pre-requisites	*01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO07B* *UETTDRSO08B* *UETTDRSO10B* *UETTDRSO17A* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				49B			
UETTDRSO05B	Manage HV distribution and subtransmission network demand	UETTDRSO05A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRSO18A & UETTDRSO19A *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO07B* *UETTDRSO08B* *UETTDRSO10B* *UETTDRSO17A* *UEENEED004B* *UEENEEE001B* *UEENEEE0*	6	220	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				07B *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO06B	Develop LV distribution switching programs	UETTDRSO06A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG049B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B* *UEENEEG0*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B *UEENEEG047B* *UEENEEG048B*			
UETTDRSO07B	Develop HV distribution and subtransmission switching programs	UETTDRSO07A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG049B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B* *UEENEEG002B* *UEENEEG0*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				47B *UEENEEG048B*			
UETTDRSO08B	Develop and evaluate transmission switching programs	UETTDRSO08A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG049B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRSO09B	Coordinate LV distribution networks	UETTDRSO09A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRSO06B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*	5	150	Full
UETTDRSO10B	Coordinate HV	UETTDRSO10A	Revised Unit	UETTDRSO07B	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	distribution and subtransmission networks		includes editorial changes, reformatted unit layout and updated pre-requisites	*UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO11B	Manage transmission networks	UETTDRSO11A	Revised Unit includes editorial changes,	UETTDRSO18A & UETTDRSO19A	6	200	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			reformatted unit layout and updated pre-requisites	*UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO07B* *UETTDRSO08B* *UETTDRSO10B* *UETTDRSO17A* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				48B *UEENEEG049B*			
UETTDRSO12B	Manage transmission network demand	UETTDRSO12A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRSO11B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO07B* *UETTDRSO08B* *UETTDRSO10B* *UETTDRSO17A* *UETTDRSO18A* *UETTDRSO19A* *UEENEED004B*	6	200	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEENEEE001B *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO13B	Coordinate LV distribution network demand	UETTDRSO13A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRSO09B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO06B* *UEENEED004B*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEENEEE001B *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO14B	Develop crisis management plans	UETTDRSO14A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRSO03B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO02B* *UETTDRSO04B*	6	180	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
				UETTDRSO05B *UETTDRSO07B* *UETTDRSO08B* *UETTDRSO10B* *UETTDRSO11B* *UETTDRSO12B* *UETTDRSO17A* *UETTDRSO18A* *UETTDRSO19A* *UETTDRSO20A* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG0*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				47B *UEENEEG048B* *UEENEEG049B*			
UETTDRSO15A	Operate and monitor system equipment (SCADA)	New Unit – Version 2	New Unit	UETTDREL05B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO07B* *UETTDRSO08B* *UETTDRSO10B* *UETTDRSO17A* *UETTDRSO18A* *UETTDRSO19A* *UEENEED0*	5	150	

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				04B *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO16A	Monitor and control the activities of field staff	New Unit – Version 2	New Unit	Nil	5	150	
UETTDRSO17A	Coordinate HV transmission network	New Unit – Version 2	New Unit	UETTDRSO08B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B*	5	150	

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDRIS23B *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO18A	Respond to discrete/ interdependent protection operations	New Unit – Version 2	New Unit	UETTDRSO10B OR UETTDRSO17A *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS2*	5	150	

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				3B *UETTDRSO07B* *UETTDRSO08B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO19A	Coordinate system operations in a regulated energy market	New Unit – Version 2	New Unit	UETTDRSO10B OR UETTDRSO17A *UETTDREL01B* *UETTDREL*	5	150	

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				04B *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO07B* *UETTDRSO08B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO20A	Respond to complex protection operations	New Unit – Version 2	New Unit	UETTDRSO04B Or UETTDRSO05B Or UETTDRSO	6	220	

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				12B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO07B* *UETTDRSO08B* *UETTDRSO10B* *UETTDRSO11B* *UETTDRSO17A* *UETTDRSO18A* *UETTDRSO19A* *UEENEED004B* *UEENEEE001B* *UEENEEE007B*			

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEENEEE024B *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRSO21A	Manage network power flows	New Unit – Version 2	New Unit	UETTDRSO02B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRSO04B* *UETTDRSO05B* *UETTDRSO07B* *UETTDRSO08B*	6	220	

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
				UETTDRSO10B *UETTDRSO11B* *UETTDRSO12B* *UETTDRSO17A* *UETTDRSO18A* *UETTDRSO19A*			

Discipline – Transmission

UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
UETTDRTP02B	Establish and reinstate a transmission tower work site	UETTDRTP02A	Revised Unit includes editorial changes, reformatted unit	UEENEEE001B & UETTDREL03B	2	35	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			layout and updated pre-requisites				
UETTDRTP03B	Erect transmission towers	UETTDRTP03A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEEE001B & UETTDREL03B	2	Core	Full
UETTDRTP04B	Erect transmission tower hardware	UETTDRTP04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTP03B *UETTDREL03B* *UEENEEE001B*	2	30	Full
UETTDRTP05B	Pre-tension stringing transmission overhead	UETTDRTP05A	Revised Unit includes editorial changes,	UETTDRTP04B *UETTDREL*	2	35	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	conductors and cables		reformatted unit layout and updated pre-requisites	*03B* *UETTDRTP03B* *UEENEEE001B*			
UETTDRTP06B	Erect transmission towers and associated hardware	UETTDRTP06A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDREL01B & UETTDREL02B & UETTDREL04B & UEENEEE001B & UEENEEE002B & UEENEEE004B & UEENEEE005B & UEENEEE007B & UEENEEG001B & UEENEEG002B *UEENEEE003B*	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRTP07B	Maintain transmission towers and associated hardware	UETTDRTP07A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTP06B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B*	3	100	Full
UETTDRTP08B	Transmission tower stub setting	UETTDRTP08A	Revised Unit includes editorial changes,	Nil	3	90	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			reformatted unit layout and updated pre-requisites				
UETTDRTP09B	Install and maintain overhead conductors and cables (towers).	UETTDRTP09A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTP07B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRTP06B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG0*	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				01B *UEENEEG002B*			
UETTDRTP10B	Inspect overhead structures and electrical apparatus (towers)	UETTDRTP10A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTP07B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRTP06B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*	3	100	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEENEEG002B			
UETTDRTP11B	Maintain energised lines (transmission) using live line stick technique	UETTDRTP11A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	BSBWOR402A & UETTDRIS25B & UETTDRTP09B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRTP06B* *UETTDRTP07B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B*	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEENEEE007B *UEENEEG001B* *UEENEEG002B*			
UETTDRTP12B	Maintain energised lines (transmission) using Barehand Technique	UETTDRTP12A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTP11B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS25B* *UETTDRTP06B* *UETTDRTP07B* *UETTDRTP09B* *UEENEEE001B* *UEENEEE002B* *UEENEEE003B*	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEENEEE004B *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B* *BSBWOR402A*			
UETTDRTP13B	Maintain energised lines (transmission) using Barehand Technique on a helicopter platform	UETTDRTP13A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTP12B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS25B* *UETTDRTP06B* *UETTDRTP07B* *UETTDRTP09B*	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDRTP11B *UEENEEE001B* *UEENEEE002B* *UEENEEE003B* *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B* *UEENEEG002B* *BSBWOR402A*			
UETTDRTP14B	Install and maintain overhead transmission network infrastructure	UETTDRTP14A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDREL02B & UETTDRIS22B & UETTDRIS23B & A current 'Unrestricted Electrician's Licence' or equivalent	4	120	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
				issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence. *UETTDREL01B* *UETTDREL04B* *UEENEEE001B*			
UETTDRTP15B	Install and maintain transmission network infrastructure electrical equipment	UETTDRTP15A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTP14B & A current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or	4	130	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence. *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEEE001B*			

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Discipline – Protection/Testing

UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
UETTDRTS01B	Maintain network protection and control systems (interdependent)	UETTDRTS01A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTS09B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRTS02B	Commission network protection and control systems (Interdependent)	UETTDRTS02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTS01B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRTS09B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRTS03B	Conduct evaluation of power system faults within a substation	UETTDRTS03A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG049B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B*	6	180	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRTS04B	Design testing and commissioning procedures for substation and field devices	UETTDRTS04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTS06B or UETTDRTS08B or UETTDRTS12B or UETTDRTS15B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRTS01B* *UETTDRTS05B* *UETTDRTS09B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B*	6	180	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEENEEG002B *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRTS05B	Test and maintain metering schemes	UETTDRTS05A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTS09B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG0*	5	140	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				47B *UEENEEG048B* *UEENEEG049B*			
UETTDRTS06B	Commission metering schemes	UETTDRTS06A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTS05B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRTS09B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG0*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				47B *UEENEEG048B* *UEENEEG049B*			
UETTDRTS07B	Perform accuracy checks on instrument transformers	UETTDRTS07A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG049B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRTS08B	Test, repair and calibrate protection relays and meters	UETTDRTS08A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG049B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B*	5	150	Full
UETTDRTS09B	Develop secondary isolation instructional documents	UETTDRTS09A	Revised Unit includes editorial changes, reformatted unit	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG0	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
			layout and updated pre-requisites	49B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B*			
UETTDRTS10B	Design secondary isolation instructional documents	UETTDRTS10A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG049B & UETTDRIS22B & UETTDRIS23B	6	200	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UETTDREL01B *UETTDREL04B* *UEENEEE001B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B*			
UETTDRTS11B	Maintain, test and commission voltage regulating equipment	UETTDRTS11A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG049B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B*	4	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEENEEG002B *UEENEEG047B* *UEENEEG048B*			
UETTDRTS12B	Conduct evaluation of primary plant	UETTDRTS12A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTS09B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B*	6	200	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEENEEG048B *UEENEEG049B*			
UETTDRTS13B	Undertake project management of substation augmentation and maintenance	UETTDRTS13A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTS06B or UETTDRTS08B or UETTDRTS12B or UETTDRTS15B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRTS01B* *UETTDRTS05B* *UETTDRTS09B* *UEENEED004B* *UEENEEE0*	6	220	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				01B *UEENEEE007B* *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRTS14B	Install and maintain power system communication equipment	UETTDRTS14A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEED004B & UEENEEE007B & UEENEEE024B & UEENEEG049B & UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE0*	5	150	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				01B *UEENEEG002B* *UEENEEG047B* *UEENEEG048B*			
UETTDRTS15B	Maintain network protection and control systems (Complex)	UETTDRTS15A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTS01B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRTS09B* *UEENEED004B* *UEENEEE001B* *UEENEEE007B* *UEENEEE024B* *UEENEEG0*	6	220	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				02B *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			
UETTDRTS16B	Commission network protection and control systems (complex)	UETTDRTS16A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRTS02B & UETTDRTS15B *UETTDREL01B* *UETTDREL04B* *UETTDRIS22B* *UETTDRIS23B* *UETTDRTS01B* *UETTDRTS09B* *UEENEED004B* *UEENEEE001B* *UEENEEE0*	6	220	Full

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UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
				07B *UEENEEE024B* *UEENEEG002B* *UEENEEG047B* *UEENEEG048B* *UEENEEG049B*			

Discipline – Vegetation

UET09 Version 1 CSU Code	Unit Title	UET06 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
UETTDRVC01B	Cut vegetation above ground outside live work zone	UETTDRVC01A	Revised Unit includes editorial changes, reformatted unit layout and	UETTDRVC07B *UETTDREL03B* *UETTDREL0*	2	35	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	near live electrical apparatus (climbing)		updated pre-requisites	*4B* *UETTDRVC02B* *UETTDRVC03B* *UEENEEE001B*			
UETTDRVC02B	Operate vegetation control plant, machinery and equipment near live electrical apparatus	UETTDRVC02A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRVC03B *UETTDREL03B* *UETTDREL04B* *UEENEEE001B*	2	Core	Full
UETTDRVC03B	Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus	UETTDRVC03A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UEENEEE001B & UETTDREL03B & UETTDREL04B	2	Core	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRVC04B	Assess vegetation and recommend control measures for work near live electrical apparatus	UETTDRVC04A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRVC01B OR UETTDRVC05B OR UETTDRVC06B OR UETTDRVC08B *UETTDREL03B* *UETTDREL04B* *UETTDRVC02B* *UETTDRVC03B* *UETTDRVC07B* *UEENEEE001B*	2	35	Full
UETTDRVC05B	Cut vegetation above ground outside live work zone near live electrical apparatu	UETTDRVC05A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisi	UETTDRVC07B *UETTDREL03B* *UETTDREL04B* *UETTDRVC02B*	2	30	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
	s (platform)		tes	*UETTDRVC03B* *UEENEEE001B*			
UETTDRVC06B	Cut vegetation at ground level outside ‘vegetation exclusion zone’ near live electrical apparatus	UETTDRVC06A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRVC07B *UETTDREL03B* *UETTDREL04B* *UETTDRVC02B* *UETTDRVC03B* *UEENEEE001B*	2	30	Full
UETTDRVC07B	Monitor safety compliance for vegetation work near live electrical apparatus	UETTDRVC07A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRVC02B *UETTDREL03B* *UETTDREL04B* *UETTDRVC03B* *UEENEEE001B*	2	Core	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRVC08B	Safe use of Elevating Work Platform (EWP) near live electrical apparatus	UETTDRVC08A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRVC07B *UETTDREL03B* *UETTDREL04B* *UETTDRVC02B* *UETTDRVC03B* *UEENEEE001B*	2	35	Full
UETTDRVC09B	Control vegetation (linework)	UETTDRVC09A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS14B *UETTDREL01B* *UETTDREL02B* *UETTDREL04B* *UETTDRIS12B* *UEUNEEE001B* *UEUNEEE002B*	3	80	Full

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UET09 Version 1 CSU Code	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
				UEENEEE003B *UEENEEE004B* *UEENEEE005B* *UEENEEE007B* *UEENEEG001B*			
UETTDRVC10B	Coordinate vegetation control work	UETTDRVC10A	Revised Unit includes editorial changes, reformatted unit layout and updated pre-requisites	UETTDRIS22B & UETTDRIS23B *UETTDREL01B* *UETTDREL04B* *UEENEEE001B*	4	120	Full

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1.2.10.4 Table 4 - Replacement of Universal Electrotechnology Units with Imported Units

Table 4 — Replacement of Universal Electrotechnology Units with Imported Units

The Universal Electrotechnology (UEU) Units have been replaced with units imported from UEE07 Electrotechnology Training Package. This table indicates relevant equivalences and points weightings for the imported units.

Unit Imported to Replace **UEU Unit in UET09 Version 1**	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship to units in the former Training Package**	**Prerequisite requirements of Imported Unit**	**AQF**	**Weighting Points**	**Equivalent - Full, part or not**
		UEUNEED002A	Unit Deleted from UET09 V1				
UEENEED004B	Use engineering applications software	UEUNEED004A	Unit Deleted from UET09 V1 and replaced by imported unit	Nil	2	Core	Full
UEENEED017B	Install and configure internetworking systems	UEUNEED017A	Unit Deleted from UET09 V1 and replaced by imported unit	Nil	4	160	Full
UEENEED0	Develop	UEUNEED0	Unit	Nil	3/4	80	Full

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Unit Imported to Replace **UEU Unit in UET09 Version 1**	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship to units in the former Training Package**	**Prerequisite requirements of Imported Unit**	**AQF**	**Weighting Points**	**Equivalent - Full, part or not**
27B	structured programs to control external devices	27A	Deleted from UET09 V1 and replaced by imported unit				
UEENEED028B	Develop and test code for microcontroller devices	UEUNEED028A	Unit Deleted from UET09 V1 and replaced by imported unit	Nil	5/6	100	Full
UEENEEE001B	Apply OHS practices in the work place	UEUNEEE001A	Unit Deleted from UET09 V1 and replaced by imported unit	Nil	1/2	Core	Full
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components	UEUNEEE002A	Unit Deleted from UET09 V1 and replaced by imported unit	Nil	1/2	Core	Full
UEENEEE0	Solve problems in	UEUNEEE0	Unit Deleted	Nil	1/2	Core	Full

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Unit Imported to Replace **UEU Unit in UET09 Version 1**	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship to units in the former Training Package**	**Prerequisite requirements of Imported Unit**	**AQF**	**Weighting Points**	**Equivalent - Full, part or not**
03B	extra-low voltage single path circuits	03A	from UET09 V1 and replaced by imported unit				
UEENEEE004B	Solve problems in multiple path d.c. circuits	UEUNEEE004A	Unit Deleted from UET09 V1 and replaced by imported unit	UEENEEE003B	1/2	Core	Full
UEENEEE005B	Fix and secure equipment	UEUNEEE005A	Unit Deleted from UET09 V1 and replaced by imported unit	Nil	1/2/3	Core	Full
UEENEEE007B	Use drawings, diagrams, schedules and manuals	UEUNEEE007A	Unit Deleted from UET09 V1 and replaced by imported unit	Nil	2	Core	Full
UEENEEE008B	Lay wiring/cabling and	UEUNEEE008A	Unit Deleted from	UEENEEE005B & UEENEEE0	2	80	Full

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Unit Imported to Replace **UEU Unit in UET09 Version 1**	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship to units in the former Training Package**	**Prerequisite requirements of Imported Unit**	**AQF**	**Weighting Points**	**Equivalent - Full, part or not**
	terminate accessories for extra-low voltage circuits		UET09 V1 and replaced by imported unit	07B			
UEENEEG001B	Solve problems in electromagnetic circuits	UEUNEEG001A	Unit Deleted from UET09 V1 and replaced by imported unit	Nil	3	Core	Full
UEENEEG002B	Solve problems in single and three phase low voltage circuits	UEUNEEG002A	Unit Deleted from UET09 V1 and replaced by imported unit	Nil	3	Core	Full
UEENEEG047B	Provide computational solutions to power engineering problems	UEUNEEG047A	Unit Deleted from UET09 V1 and replaced by imported unit	UEENEEG002B	4/5	Core	Full
UEENEEG048B	Solve problems in complex multiple path	UEUNEEG048A	Unit Deleted from UET09	UEENEEG047B	4/5	Core	Full

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Unit Imported to Replace **UEU Unit in UET09 Version 1**	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship to units in the former Training Package**	**Prerequisite requirements of Imported Unit**	**AQF**	**Weighting Points**	**Equivalent - Full, part or not**
	power circuits		V1 and replaced by imported unit				
UEENEEG049B	Solve problems in complex polyphase power circuits	UEUNEEG049A	Unit Deleted from UET09 V1 and replaced by imported unit	UEENEEG048B	5/6	Core	Full
UEENEEH002B	Carry out basic repairs to electronic apparatus by replacement of components	UEUNEEH002A	Unit Deleted from UET09 V1 and replaced by imported unit	UEENEEE002B	2/3	80	Full
		UEUNEEH011A	Unit Deleted from UET09 V1				
UEENEEH012B	Troubleshoot digital subsystems	UEUNEEH012A	Unit Deleted from UET09 V1 and replaced by imported	UEENEEH002B	3	120	Full

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Unit Imported to Replace **UEU Unit in UET09 Version 1**	**Unit Title**	**UET06 Version 1 Competency Standard Unit Code**	**Relationship to units in the former Training Package**	**Prerequisite requirements of Imported Unit**	**AQF**	**Weighting Points**	**Equivalent - Full, part or not**
			unit				
UEENEEH039B	Troubleshoot basic amplifiers	UEUNEEH039A	Unit Deleted from UET09 V1 and replaced by imported unit	UEENEEH002B & UEENEEH014B or UEENEEG002B	3	80	Full
		UEUNEEH070A	Unit Deleted from UET09 V1				

1.2.10.5 Table 5 Relationship between UET09 Version 2 Units and UET09 Version 1 Units

Table 5 Relationship between UET09 Version 2 Units and UET09 Version 1 Units

Full prerequisite chains for unit prerequisites are listed where applicable in italicised text.

All Other Disciplines in the UET09 Training Package

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UET09 Version 2 CSU Code	Unit Title	UET09 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
		All existing Units in all disciplines	No change in existing units. Please refer to the mapping for UET09 version 1 see Table 4 above.	No change in existing units. Please refer to the mapping for UET09 version 1 see table 4 above.	N/A		

Discipline - Refresher Training

UET09 Version 2 CSU Code	Unit Title	UET09 Version 1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
UETTDRRF01A	Apply ESI safety rules, codes of practice and procedures for work on or near electrical apparatus	New Unit	New Unit	Nil	N/A	No weighting points for this unit as it is only to be used for refresher	New Unit

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UET09 Version 2 CSU Code	**Unit Title**	**UET09 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
						training.	
UETTDRRF02A	Perform pole top rescue	New Unit	New Unit	Nil	N/A	No weighting points for this unit as it is only to be used for refresher training.	New Unit
UETTDRRF03A	Perform EWP rescue	New Unit	New Unit	HLTCPR201A	N/A	No weighting points for this unit as it is only to be used for refresher training.	New Unit
UETTDRRF04A	Perform tower rescue	New Unit	New Unit	Nil	N/A	No weighting points for this	New Unit

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UET09 Version 2 CSU Code	**Unit Title**	**UET09 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
						unit as it is only to be used for refresher training.	
UETTDRRF05A	Perform rescue from switchyard structures at heights	New Unit	New Unit	Nil	N/A	No weighting points for this unit as it is only to be used for refresher training.	New Unit
UETTDRRF06A	Perform rescue from a live LV panel	New Unit	New Unit	HLTCPR201A	N/A	No weighting points for this unit as it is only to be used for refresher training.	New Unit

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UET09 Version 2 CSU Code	**Unit Title**	**UET09 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
UETTDRRF07A	Perform cable pit/trench/excavation rescue	New Unit	New Unit	HLTCPR201A	N/A	No weighting points for this unit as it is only to be used for refresher training.	New Unit
UETTDRRF08A	Perform EWP controlled descent escape	New Unit	New Unit	Nil	N/A	No weighting points for this unit as it is only to be used for refresher training.	New Unit
UETTDRRF09A	Apply access procedures to work on or near electrical network infrastructure	New Unit	New Unit	Nil	N/A	No weighting points for this unit as it is only to be used for	New Unit

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UET09 Version 2 CSU Code	**Unit Title**	**UET09 Version 1 Competency Standard Unit Code**	**Relationship and comments to units in the former Training Package**	**Prerequisite requirements** (for relevant pre-requisite or co-requisite refer respective unit)	**AQF.**	**Weighting Points**	**Equivalent - Full, part or not**
						refresher training.	
UETTDRRF10A	Provide first aid in an ESI environment	New Unit	New Unit	Nil	N/A	No weighting points for this unit as it is only to be used for refresher training.	New Unit

1.2.10.6 Table 6 Relationship between UET09 Version 2.1 Units and UET09 Version 2.0 Units

Table 6 Relationship between UET09 Version 2.1 Units and UET09 Version 2.0 Units

Full prerequisite chains for unit prerequisites are listed where applicable in italicised text.

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UET09 Version 2.1 CSU Code	Unit Title	UET09 Version 2.0 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
		All existing Units in all disciplines	No change in existing units. Please refer to the mapping Tables 4 and 5 above.	No change in existing units. Please refer to the mapping Tables 4 and 5 above..			

1.2.10.7 Table 7 Relationship between UET09 Version 3 Units and UET09 Version 2.1 Units

Table 7 Relationship between UET09 Version 3 Units and UET09 Version 2.1 Units

Full prerequisite chains for unit prerequisites are listed where applicable in italicised text.

UET09 Version 3 CSU Code	Unit Title	UET09 Version 2.1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
UETTDRIS81A	Install and maintain telecommunications infrastructure on electricity supply industry	New Unit	New Unit	UETTDREL04B; UEENEEE001B; UEENEEE002B;	2	80	New Unit

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UET09 Version 3 CSU Code	Unit Title	UET09 Version 2.1 Competency Standard Unit Code	Relationship and comments to units in the former Training Package	Prerequisite requirements (for relevant pre-requisite or co-requisite refer respective unit)	AQF.	Weighting Points	Equivalent - Full, part or not
	assets			UEENEEE005B			

1.2.10.8 Table 8 - List of Imported Competency Standard Units

Table 8 — List of Imported Competency Standard Units

Imported Competency Standard Units in the Electricity Supply Industry — Transmission, Distribution and Rail sector Training Package.

Code	Title	Origin	Points
BSBCUS501B	Manage quality customer service	Innovation and Business Services. ISC — IBSA	140
BSBFIM501A	Manage budgets and financial plans	Innovation and Business Services. ISC — IBSA	140
BSBFLM303C	Contribute to effective workplace relationships	Innovation and Business Services. ISC — IBSA	80
BSBFLM305C	Support operational plan	Innovation and Business Services. ISC — IBSA	80
BSBFLM306C	Provide workplace information and resourcing plans	Innovation and Business Services. ISC — IBSA	80
BSBFLM309C	Support continuous improvement systems and processes	Innovation and Business Services. ISC — IBSA	80

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Code	Title	Origin	Points
BSBFLM311C	Support a workplace learning environment	Innovation and Business Services. ISC — IBSA	80
BSBFLM312B	Contribute to team effectiveness	Innovation and Business Services. ISC — IBSA	80
BSBINM401A	Implement workplace information system	Innovation and Business Services. ISC — IBSA	110
BSBINM501A	Manage an information or knowledge management system	Innovation and Business Services. ISC — IBSA	140
BSBINN502A	Build and sustain an innovative work environment	Innovation and Business Services. ISC — IBSA	140
BSBLED501A	Develop a workplace learning environment	Innovation and Business Services. ISC — IBSA	140
BSBMGT402A	Implement operational plan	Innovation and Business Services. ISC — IBSA	110
BSBMGT403A	Implement continuous improvement	Innovation and Business Services. ISC — IBSA	110
BSBMGT502B	Manage people performance	Innovation and Business Services. ISC — IBSA	140
BSBMGT515A	Manage operational plan	Innovation and Business Services. ISC — IBSA	140
BSBMGT516B	Facilitate continuous improvement	Innovation and Business Services. ISC — IBSA	140
BSBSUS501A	Develop workplace policy and procedures for sustainability	Innovation and Business Services. ISC — IBSA	140
BSBWOR401A	Establish effective workplace relationships	Innovation and Business Services. ISC — IBSA	110
BSBWOR402A	Promote team effectiveness	Innovation and Business Services. ISC — IBSA	110

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Code	Title	Origin	Points
BSBWOR501B	Manage personal work priorities and professional development	Innovation and Business Services. ISC — IBSA	140
BSBWOR502B	Ensure team effectiveness	Innovation and Business Services. ISC — IBSA	140
HLTCPR201A	Perform CPR	Community Services and Health ISC	80
ICTCBL3013A	Perform cable and system test on customer premises	Innovation and Business Services. ISC — IBSA	80
ICTCBL2064A	Haul underground cable	Innovation and Business Services. ISC — IBSA	80
ICTCBL2065A	Splice and terminate optical fibre cable for carriers and service providers	Innovation and Business Services. ISC — IBSA	80
ICTCBL2066A	Joint and terminate coaxial cable	Innovation and Business Services. ISC — IBSA	80
ICTCBL2068A	Install a telecommunications service to a building	Innovation and Business Services. ISC — IBSA	80
ICTCBL3069A	Install network cable equipment	Innovation and Business Services. ISC — IBSA	80
ICTTEN3104A	Maintain an electronic system	Innovation and Business Services. ISC — IBSA	80
ICTWOR3127A	Supervise worksite activities	Innovation and Business Services. ISC — IBSA	80
ICTCBL2131A	Install an above ground equipment enclosure	Innovation and Business Services. ISC — IBSA	80
ICTCBL2133A	Construct underground telecommunications infrastructure	Innovation and Business Services. ISC — IBSA	80

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Code	Title	Origin	Points
ICTCBL2134A	Fix aerial cable	Innovation and Business Services. ISC — IBSA	80
ICTCBL2135A	Joint metallic conductor cable in access network	Innovation and Business Services. ISC — IBSA	80
UEENEED004B	Use engineering application software	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	Core
UEENEEC001B	Maintain documentation	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	20
UEENEEC008B	Receive and store materials and equipment for electrotechnology work	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	20
UEENEEC010B	Deliver a service to customers	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	20
UEENEED017B	Install and configure internetworking systems	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	160
UEENEED027B	Develop structured programs to control external devices	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	80
UEENEED028B	Develop and test code for microcontroller devices	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	100
UEENEEE001B	Apply OHS practices in the workplace	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	Core
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	Core
UEENEEE003B	Solve problems in extra-low voltage, single path circuits	EE-Oz Training Standards ISC – Electrotechnology	Core

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Code	Title	Origin	Points
		Training Package UEE07	
UEENEEE004B	Solve problems in multiple path DC circuits	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	Core
UEENEEE005B	Fix and secure equipment	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	Core
UEENEEE007B	Use drawings, diagrams, schedules and manuals	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	Core
UEENEEE008B	Lay wiring and terminate accessories for extra-low voltage circuits	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	80
UEENEEE024B	Compile and produce an electrotechnology report	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	Core
UEENEEE037B	Document occupational hazards and risks in electrotechnology	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	40
UEENEEE051B	Transport apparatus and materials	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	60
UEENEEF006B	Solve problems in data and voice communications circuits	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	40
UEENEEF007B	Set up the wireless capabilities of communications and data storage devices	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	40
UEENEEG001B	Solve problems in electromagnetic circuits	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	Core
UEENEEG002B	Solve problems in single and three phase low voltage	EE-Oz Training Standards ISC – Electrotechnology	Core

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Code	Title	Origin	Points
	circuits	Training Package UEE07	
UEENEEG047B	Provide computational solutions to power engineering problems	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	Core
UEENEEG048B	Solve problems in complex multiple path power circuits	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	Core
UEENEEG049B	Solve problems in complex polyphase power circuits	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	Core
UEENEEH002B	Carry out basic repairs to electronic apparatus by replacement of components	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	80
UEENEEH012B	Troubleshoot digital subsystems	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	120
UEENEEH039B	Troubleshoot basic amplifiers	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	80
UEENEEK042A	Participate in environmentally sustainable work practices	EE-Oz Training Standards ISC – Electrotechnology Training Package UEE07	Core
CPCCCM2007A	Use explosive power tools	Construction and Property Sevices ISC - Construction, Plumbing and Services Integrated Framework CPC08	15
CPCCOHS1001A	Work safely in the construction industry	Construction and Property Sevices ISC - Construction, Plumbing and Services Integrated Framework CPC08	10
RIIOHS202A	Enter and work in confined spaces	Skills DMC ISC - Resources and Infrastructure Industry Training Package	30

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Code	Title	Origin	Points
		RII09	
RIIOHS204A	Work safely at heights	Skills DMC ISC - Resources and Infrastructure Industry Training Package RII09	20
RIIOHS205A	Control traffic with stop-slow bat	Skills DMC ISC - Resources and Infrastructure Industry Training Package RII09	10
TLID3507C	Operate a boom type elevating work platform	Transport and Logistics ISC - Transport and Logistics Training Package (TLI07)	30
TLILIC508A	Licence to operate a boom-type elevating work platform (boom length 11 metres or more)	Transport and Logistics ISC - Transport and Logistics Training Package (TLI07)	30

1.3.00 Assessment Guidelines

Volume 1 Part 3

Assessment Guidelines

1.3.01 Introduction

3.1 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 is consistent with the Australian Quality Training Framework (AQTF 2007). Assessments against the Competency Standard Units in this Training Package must be carried out in accordance with these Assessment Guidelines.

Note:

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- 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

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 2007 requirements; licensing/registration requirements; and assessment pathways. By way of supporting, and reinforcing, both the concept of competency and the Competency Standard Unit, the Electricity Supply Industry – Transmission, Distribution and Rail Sector 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 Sets).
- All persons have the right to have relevant competencies recognised through the most expeditious assessment system and method.

Benchmarks for Assessment

Assessment within the National Skills Framework is the process of collecting evidence and making judgements about whether competency has been achieved. Competency is something that is inferred rather than proven. The purpose of assessment is to confirm through evidence whether an individual can perform to the standards expected in the Electricity Supply Industry – Transmission, Distribution and Rail Sector workplace, as expressed in the relevant endorsed Competency Standard Unit.

In the areas of work covered by this Training Package the competency standard units are the benchmarks for assessment in the Electricity Supply Industry – Transmission, Distribution and Rail 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:

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- National Electricity Supply Industry – Transmission, Distribution and Rail Sector (UET) Competency Standards, Edition 1, 2005 and subsequent endorsed revisions.
- Imported Competency Standard Units from other endorsed Training Packages that have been valued by the Electricity Supply Industry – Transmission, Distribution and Rail Sector Competency Advisory Council (ESI-TD&R CAC) for inclusion in Qualifications in this Training Package.

An index of the developed Competency Standard Units is contained in Volume 1 Part 2.

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 requirement of the AQTF as expressed in the AQTF 2007 *Essential Standards for Registration.*

The AQTF 2007 *Essential Standards for Registration* can be downloaded from www.training.com.au/aqtf2007. The following points summarise 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 AQTF 2007 *Essential Standards for Registration*. The RTO must have the specific Competency Standard Units and/or AQF qualifications on its scope of registration.

The Registered Training Organisation 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

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Each RTO must provide quality training and assessment across all its operations. See AQTF 2007 *Essential Standards for Registration,* Standard 1.

Assessor Competency Requirements

Each person involved in training, assessment or client service must be competent for the functions they perform. See the AQTF 2007 *Essential Standards for Registration* Standard 1, for assessor (trainer) competency requirements.

Assessment Requirements

The RTOs assessments, including RPL, must meet the requirements of the relevant endorsed Training Package. See AQTF 2007 *Essential Standards for Registration* Standard 1.

Assessment Strategies

Each RTO must strategies that meet the requirements of the relevant Training Package or accredited course and are developed in consultation with industry stakeholders. See the AQTF 2007 *Essential Standards for Registration,* Standard 1.

National Recognition

Each RTO must recognise the AQF qualifications and Statements of Attainment issued by any other RTO. See the AQTF 2007 *Essential Standards for Registration,* Condition of Registration 7: Recognition of qualifications issued by other RTOs.

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

Access and Equity and Client Outcomes

Each RTO must adhere to the principles of access and equity and maximise outcomes for its clients. See AQTF 2007 *Essential Standards for Registration,* Standard 2.

Partnership Arrangements

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

Recording Assessment Outcomes

Each RTO must manage records to ensure their accuracy and integrity. See the AQTF 2007 *Essential Standards for Registration, Standard 3.*

Issuing AQF Qualifications and Statements of Attainment

Each RTO must issue AQF qualifications and Statements of Attainment that meet the requirements of the *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 where the individual has completed one or more units of competency from nationally recognised qualification(s)/course(s). See the AQTF2007 and the 2007 edition of the AQF Implementation Handbook - available on the AQFAB website www.aqf.edu.au.

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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.

The latest information on licensing/registration requirements may be obtained by visiting the Industry Skills Council/Training Package Developer's website. In the case of this Training Package it is EE-Oz Training Standards. Refer to the following website for more information: www.ee-oz.com.au

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 any additionally and prevailing regulatory authority requirements typically called up in these Guidelines into their quality assurance arrangements.

In some instances, in order to conduct assessments for statutory licensing or other industry registration requirements, assessors must also meet any additional requirements that may also be 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 requirements. Assessors are to liaise with respective agencies to ensure respective requirements are followed and met.

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 advised by the RTOs to individuals prior to the delivery of the Training Package outcomes.

Pathways

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

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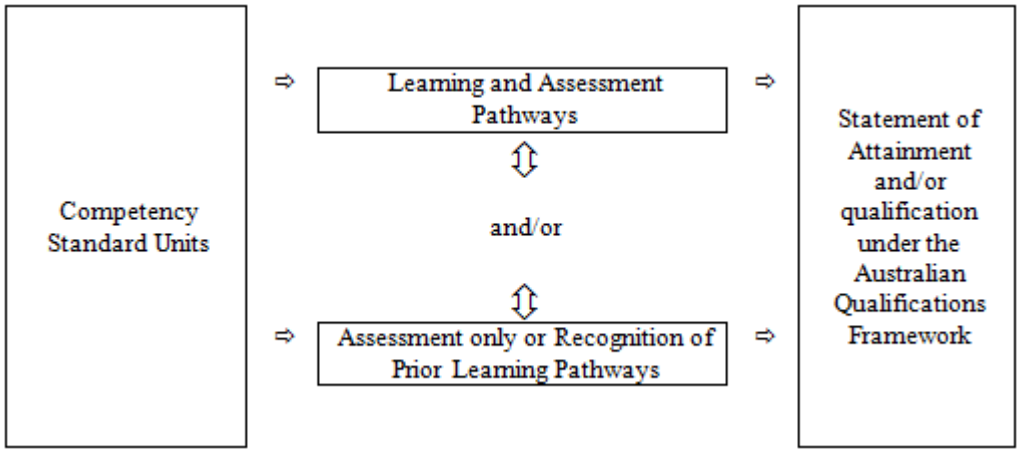
- formal or informal education and training
- experiences in the workplace
- general life experience, and/or
- any combination of the above.

Assessment under this Training Packages leading to an AQF qualification or Statement of Attainment may follow a learning and assessment pathway, an assessment-only or recognition pathway, or a combination of the two as illustrated below.



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 Assessment Guidelines of the Training Package and the AQTF 2007.

Learning and Assessment Pathways

Usually, learning and assessment are integrated, with assessment evidence being collected and feedback provided to the candidate at anytime throughout the 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/or involve practice and experience in the workplace.

Learning and assessment pathways to suit Australian Apprenticeships have a mix of formal structured training and structured workplace experience with formative assessment activities through which candidates can acquire and demonstrate skills and knowledge from the relevant units of competency.

Assessment-only Pathway or Recognition of Prior Learning Pathway

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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 an assessment-only or Recognition of Prior Learning (RPL) pathway, the candidate provides current, quality evidence of their competency. This process may be directed by the candidate and verified by the assessor, such as in the compilation of portfolios; or directed by the assessor, such as through observation of workplace performance and skills application, and oral and/or written assessment. Where the outcomes of this process indicate that the candidate is competent, structured training is not required. The RPL requirements of the AQTF 2007 must be met (Standard 1).

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(s). 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), and
- 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).

An assessment-only or recognition of prior learning pathway is likely to be most appropriate in the following scenarios:

- 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, and
- people with existing competencies from allied industry Training Packages.

Combination of 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.

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In such situations, the candidate may undertake an initial assessment to determine their current competence. Once current competence is identified, a structured training and assessment program ensures that the candidate acquires the required additional competencies identified as gaps. These would be achieved through a 'training and assessment pathway'.**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.

Assessor Competencies

The AQTF 2007 specifies mandatory competency requirements for assessors. For information, Standard 1, Element 1.4 from the AQTF 2007 *Essential Standardsfor Registration* follows:

"1.4 Training and assessment is delivered by trainers and assessors who:

a) have the necessary training and assessment competencies as determined by the National Quality Council or its successors

b) have the relevant vocational competencies at least to the level being delivered or assessed

continue developing their vocational and training and assessment competencies to support continuous improvements in the delivery of the RTO's services."

7.3 a The RTO must ensure that assessments are conducted by a person who has:

i the following competencies1 from the Training Package for Assessment

and Workplace Training, or demonstrated equivalent competencies:

a TAAASS401A Plan and organise assessment;

b TAAASS402A Assess competence;

c TAAASS404A Participate in assessment validation;

ii relevant vocational competencies, at least to the level being assessed.

b However, if a person does not have all of the competencies in Standards 7.3 a (i) and the vocational competencies as defined in 7.3 a (ii), one person with the competencies listed in Standard 7.3 a (i), and one or more persons who have the competencies listed in Standard 7.3 a (ii) may work together to conduct assessments.

Designing Assessment Tools

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This section provides an overview on the use and development of assessment tools.

Use of Assessment Tools

Assessment tools provide a means of collecting the evidence that assessors use in making judgements about whether candidates have achieved competency.

There is no set format or process for the design, production or development of assessment tools. Assessors may use prepared assessment tools, such as those specifically developed to support this Training Package, or they may develop their own.

Using Prepared Assessment Tools

If using prepared assessment tools, assessors should ensure that these tools 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 National Training Information Service (http://www.ntis.gov.au) or EE-Oz Training Standards (www.ee-oz.com.au). Materials on the list have been noted by the National Quality Council (NQC), as meeting the quality criteria for Training Packages support materials.

Developing Assessment Tools

When developing assessment tools, assessors must ensure that they:

- are benchmarked against the relevant competency standard unit(s)
- are benchmarked against the industry-preferred competency assessment model
- are reviewed as part of the continuous improvement of assessment strategies as required under Standard 1 of the AQTF 2007.
- meet the assessment requirements expressed in Standard 1 of the AQTF 2007.

A key reference for assessors developing assessment tools is TAA04 Training and Assessment Training Package and the unit of competency TAAASS403A *Develop assessment tools.* There is no set format or process for the design, production or development of assessment materials.

Conducting Assessment

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

Mandatory Assessment Requirements

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Assessments must meet the criteria set out in the AQTF 2007 Essential Standards for Registration.

For information, the mandatory assessment requirements from Standard 1 from the AQTF 2007 *Essential Standards for Registration* are as follows:

"1.5 Assessment, including Recognition of Prior Learning:

a) meets the requirements of the relevant Training Package or accredited course,

b) is conducted in accordance with the principles of assessment and the rules of evidence, and

c) meets workplace and, where relevant, regulatory requirements."

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8. RTO Assessments

The RTO's assessments meet the requirements of the endorsed components of Training Packages and the outcomes specified in accredited courses within the scope of its registration.

8.1. The RTO must ensure that assessments (including RPL):

i. comply with the assessment guidelines included in the applicable nationally endorsed Training Packages or the assessment requirements specified in accredited courses;

ii. lead to the issuing of a statement of attainment or qualification under the AQF when a person is assessed as competent against nationally endorsed unit(s) of competency in the applicable Training Package or modules specified in the applicable accredited course;

iii. are valid, reliable, fair and flexible;

iv. provide for applicants to be informed of the context and purpose of the assessment and the assessment process;

v. where relevant, focus on the application of knowledge and skill to the standard of performance required in the workplace and cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills;

vi. involve the evaluation of sufficient evidence to enable judgements to be made about whether competency has been attained;

vii. provide for feedback to the applicant about the outcomes of the assessment process and guidance on future options in relation to those outcomes;

viii. are equitable for all persons, taking account of individual needs relevant to the assessment; and

ix. provide for reassessment on appeal.

8.2. a The RTO must ensure RPL is offered to all applicants on enrolment.

b The RTO must have an RPL process that:

i. is structured to minimise the time and cost to applicants; and

ii. provides adequate information, support and opportunities for participants to engage in the RPL process.

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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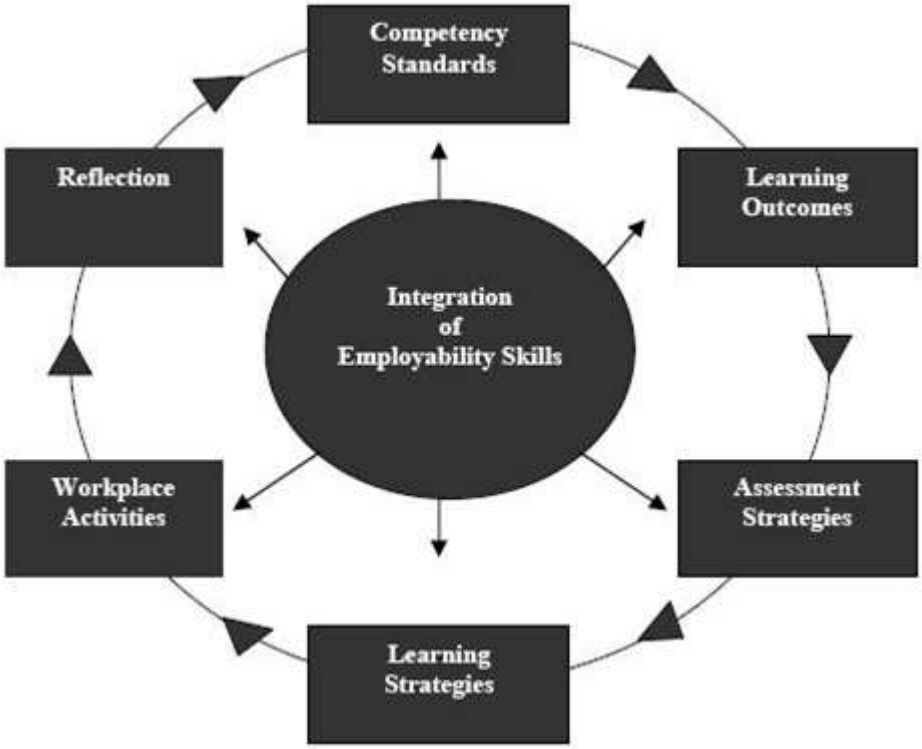

Employability Skills are embedded and explicit within each unit of competency. Training providers must use Employability Skills information in order to design valid and reliable training and assessment strategies. This analysis could include:

- 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.

For more information on Employability Skills in the ElectroComms and Energy Utilities Training Packages go to the EE-Oz website at www.ee-oz.com.au

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: training and assessment must be bias-free.

Under the rules for their development, Training Packages must reflect and cater for the increasing diversity of Australia's VET clients and Australia's current and future workforce. The flexibilities offered by Training Packages should enhance opportunities and potential outcomes for all people so that we can all benefit from a wider national skills base and a shared contribution to Australia's economic development and social and cultural life.

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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.

See Part 4, Chapter 2 of the *Training Package Development Handbook* (DEST, September 2007) for more information on reasonable adjustment, including examples of adjustments.

3.12 Further Sources of Information

The section provides a listing of useful contacts and resources to assist assessors in planning, designing, conducting and reviewing of assessments against this Training Package.

Contacts:

Unit 6-7, Downer Business Park

2 Bradfield Street

Downer, ACT, 2602

PO Box 1202

Dickson, ACT, 2602

Ph: 02 6241 2155

Fax: 02 6241 2177

Email: ee-oz@ee-oz.com.au

Web: www.ee-oz.com.au

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Technical and Vocational Education and Training (TVET) Australia Limited

Level 21, 390 St Kilda Road, Melbourne VIC 3150

PO Box 12211, A'Beckett Street Post Office

MELBOURNE VICTORIA 8006

Ph: +61 3 9832 8100

Fax: +61 3 9832 8198

Email: sales@tvetaustralia.com.au

Web: www.tvetaustralia.com.au

For information on the TAA04 Training and Assessment Training Package contact:

Innovation & Business Skills Australia

Level 2, Building B, 192 Burwood Road

HAWTHORN VIC 3122

Telephone: (03) 9815 7000

Facsimile: (03) 9815 7001

Web: www.ibsa.org.au

Email: virtual@ibsa.org.au

General Resources

Refer to http://antapubs.dest.gov.au/publications/search.asp to locate the following publications.

AQF Implementation Handbook, third Edition. Australian Qualifications Framework Advisory Board, 2002, www.aqf.edu.au

Australian Quality Training Framework 2007 (AQTF 2007) - for information and resources go to <www.training.com.au/aqtf2007>

AQTF 2007 Essential Standards for Registration. Training organisations must meet these standards in order to deliver and assess nationally recognised training and issue nationally recognised qualifications. They include three standards, a requirement for registered training organisations to gather information on their performance against three quality indicators, and nine conditions of registration

AQTF 2007 User's Guide to the Essential Standards for Registration. A Users' Guide for training organisations who must meet these standards in order to deliver and assess nationally recognised training and issue nationally recognised qualifications.

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AQTF 2007 Standards for Accredited Courses. State and Territory accrediting bodies are responsible for accrediting courses. This standard provides a national operating framework and template for the accreditation of courses.

TAA04 Training and Assessment Training Package. This is available from the Innovation and Innovation & Business Skills Australia (IBSA) Industry Skills Council and can be viewed, and components downloaded, from the National Training Information Service (NTIS).

National Training Information Service, an electronic database providing comprehensive information about RTOs, Training Packages and accredited courses - www.ntis.gov.au

Training Package Development Handbook (DEST, August 2007). Can be downloaded from www.deewr.gov.au

Assessment Resources

Training Package Assessment Guides - is a range of resources to assist RTOs in developing Training Package assessment materials developed by ANTA/DEEWR with funding from the DEEWR (formerly Department of Education, Science and Training), made up of 10 separate titles, as described at www.deewr.gov.au/project/tpAssessment/. Go to www.resourcegenerator.gov.au/loadpage.asp?TPOAG.htm

Printed and/or CD ROM versions of the Guides can be purchased from Australian Training Products (ATP). The resource includes the following guides:

1. Training Package Assessment Materials Kit
2. Assessing Competencies in Higher Qualifications
3. Recognition Resource
4. Kit to Support Assessor Training
5. Candidate's Kit: Guide to Assessment in Australian Apprenticeships
6. Assessment Approaches for Small Workplaces
7. Assessment Using Partnership Arrangements
8. Strategies for ensuring Consistency in Assessment
9. Networking for Assessors
10. Quality Assurance Guide for Assessment

An additional guide "Delivery and Assessment Strategies" has been developed to complement these resources.

Assessment Tool Design and Conducting Assessment

VETASSESS & Western Australian Department of Training and Employment 2000, *Designing Tests – Guidelines for designing knowledge based tests for Training Packages*.

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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.

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

Assessor Training

Australian Committee on Training Curriculum (ACTRAC), 1994, Assessor training program - learning materials, Australian Training products, Melbourne.

Australian National Training Authority, A Guide for Professional Development, ANTA, Brisbane or its replacement – contact DEEWR for more information on www.deewr.gov.au

Australian National Training Authority, Facilitator Packs for Certificate IV in Training and Assessment or its replacement – contact DEEWR for more information on www.deewr.gov.au

Australian National Training Authority, Facilitator's Pack for Train Small Groups and Assessment or its replacement – contact DEEWR for more information on www.deewr.gov.au

Australian Training Products Ltd *Assessment and Workplace Training, Training Package - Toolbox*, ATPL Melbourne (available from TVET).

Green, M., Moritz, R., Moyle, K. and Vale, K., 1997, *Key competencies professional development Package*, Department for Education and Children's Services, South Australia.

Victorian TAFE Association, 2000, *The professional development CD: A learning tool*, VTA, Melbourne.

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1.3.03 ESI - Transmission, Distribution & Rail, Learning and Assessment pathways

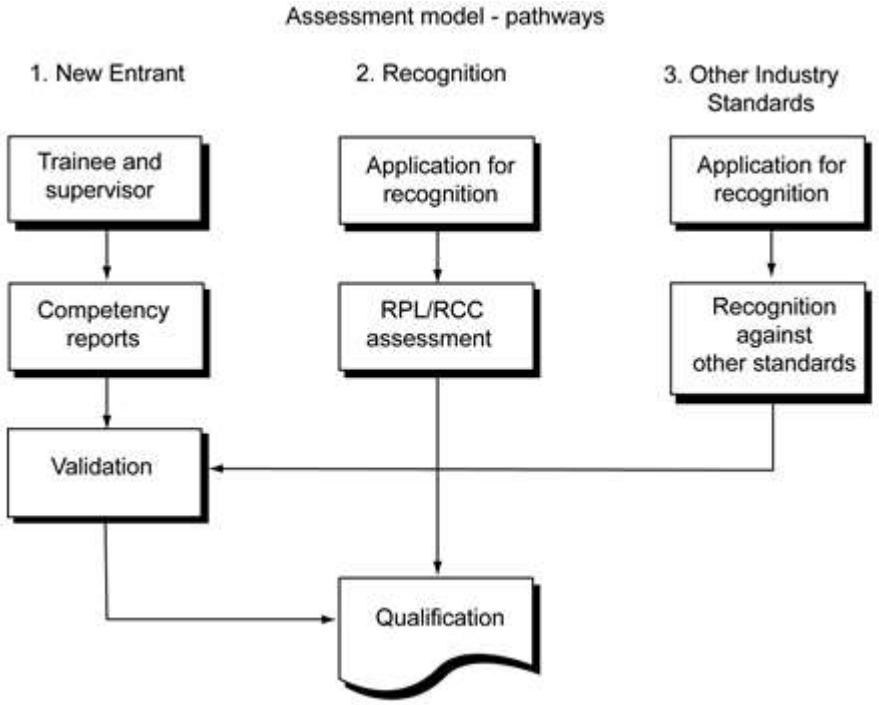
3.3 ESI – Transmission, Distribution & Rail, Learning and Assessment pathways

Within the general Training Package Pathways continuum framework, referred to in the previous section, three distinct Assessment Pathways have been identified for use within the Electricity Supply Industry – Transmission, Distribution and Rail Sector. 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 be combined to satisfy the requirements of a National Qualification.

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)



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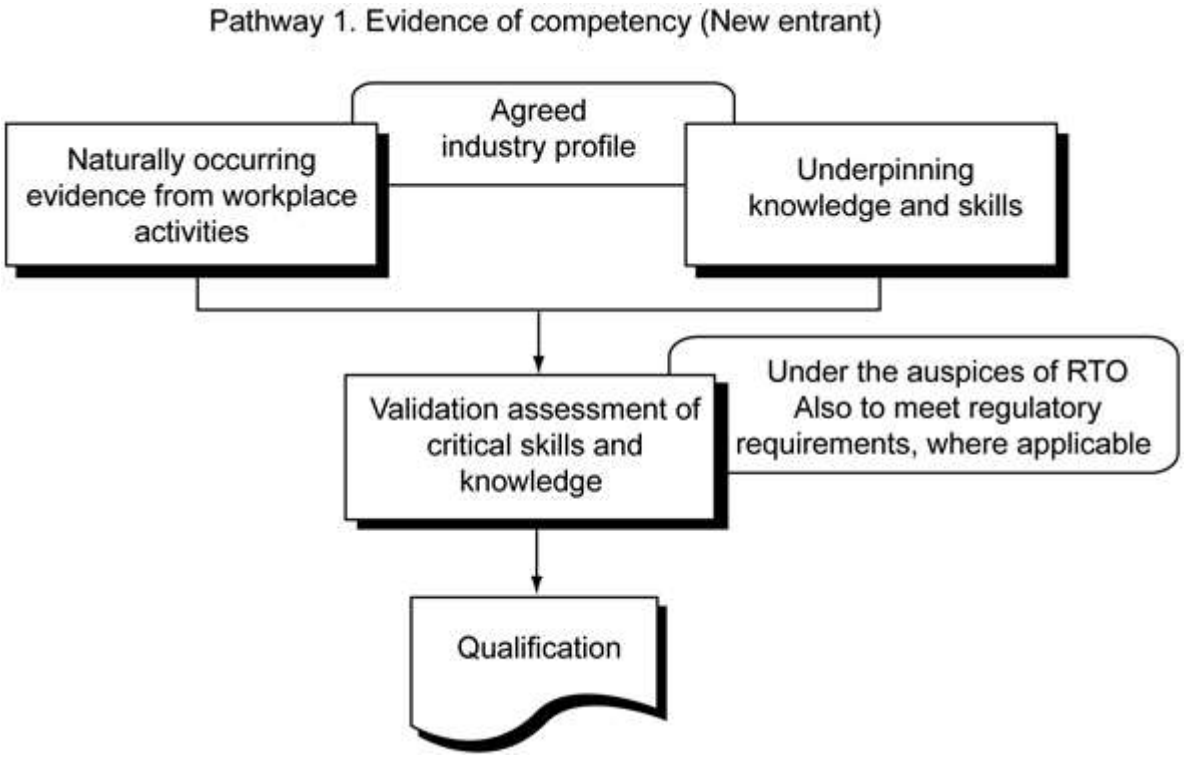
Pathway 1: New Entrant Competency Development

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.

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 **3.4 Assessment principles within the Electricity Supply Industry – Transmission, Distribution and Rail Sector** contained herein. The evidence however, must be sufficient in quality, quantity and type and be gathered in an on-going basis 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.



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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 is through the Tradesmens' Rights Regulation Act, which is administered by Trades Recognition Australia (TRA), which is 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 of migrants, which have been developed by structured training and or work experience in overseas countries. However, 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:

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, 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.

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.

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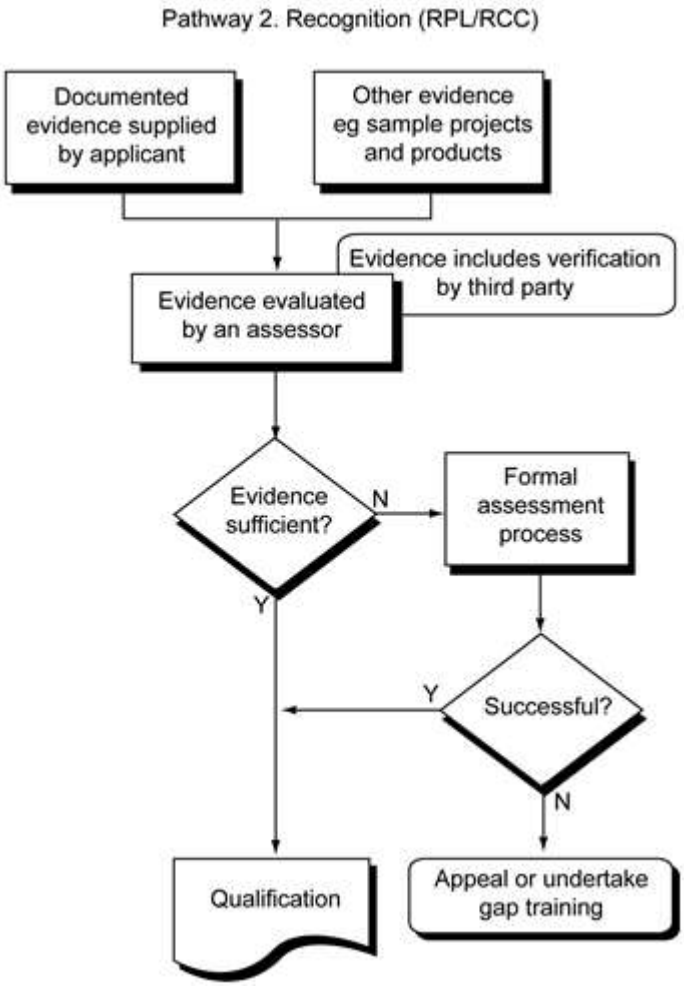

Pathway 3: Recognition of Other Industry/Enterprise Standards

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 are 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 any mapping agreements are in place by contacting the relevant Industry Skills Councils.

Evidence of Competency

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

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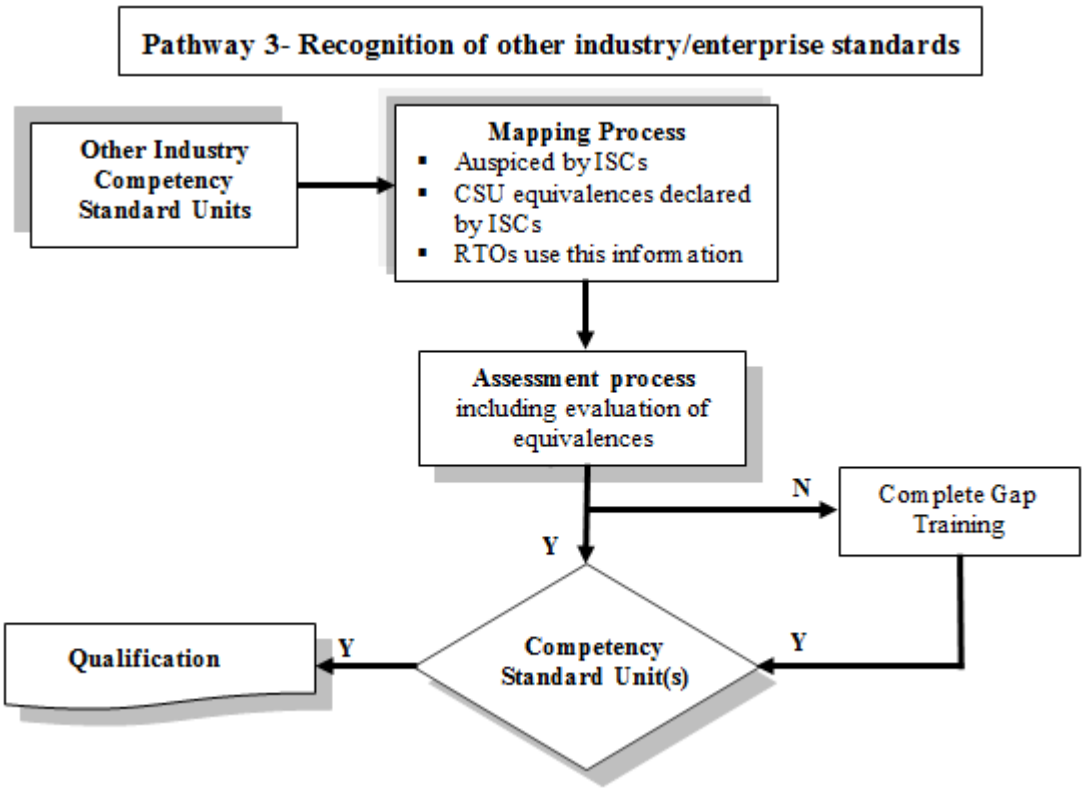
The applicant would be required to supply details of the unit(s) held including any currency, and the unit(s) sought in consultation with the RTO, including submitting any assessment reports to the RTO for a determination. This equivalence evidence will be reviewed against the mapping advice obtained 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, advised 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 within the Electricity Supply Industry - Transmission, Distribution and Rail Sector

3.4 Assessment Principles within the Electricity Supply Industry – Transmission, Distribution and Rail Sector

These assessment practices must satisfy the principles of assessment:

Assessment Principles

Validity

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The assessment instruments and tasks must be designed, implemented and administered in a manner which ensures they measure the intended the 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

Assessment practices should be in accord with *AQTF Standard 9.2* and undergo constant monitoring and review to ensure consistency in the application of process and interpretation of evidence.

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

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

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.

Currency

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

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

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

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, e.g., 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 Judgments

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.

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 pre-requisites and/or co requisites have been appropriately achieved.

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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 pre-requisite Competency Standard Units. However, they cannot be attributed the Competency Standard Unit until they have acquired the pre-requisite.

3. For more detailed information refer to Section 3.9 Guide to Assessment Methods and Items.

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
- **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.

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.

- 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 – Transmission, Distribution and Rail 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.

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- 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, has 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.

1.3.05 Assessment Processes

3.5 Assessment Processes

Within the Electricity Supply Industry – Transmission, Distribution and Rail 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. Profiling, however, is the Industry-preferred model for new entrant contracted entry-level employment, e.g. apprenticeships. Therefore, 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.

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.

2. Profiling

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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 as to 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.

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 Electricity Supply Industry – Transmission, Distribution and Rail Sector, industry practices, and the job or role against which performance is being assessed;

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- 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. The Assessor is required to hold formal recognition of competence in the relevant units in the Training Package for Training and Assessment.

In addition, it is recommended that the assessor is able to:

- demonstrate current knowledge and skill in assessing against this Training Package which contains the vocational standards for industry in a range of contexts;
- demonstrate capability to assess with a technical expert;
- demonstrate the interpersonal and communications skills required in the assessment process.

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 which contains the vocational standards for industry, 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.

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An assessor is required to:

- hold formal recognition of competence in training and assessment in the relevant units in the Training and Assessment Training Package
- make the assessment decision.

In addition, it is recommended that the assessor is able to:

- demonstrate current knowledge and skill in assessing against this Training Package in a range of contexts
- demonstrate a capability to assess using a Workplace Supervisor as a valid and reliable source of evidence collaboration
- demonstrate the interpersonal and communication skills required in the assessment process
- 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 working 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 use team/panel members with current technical competence in requisite units;

In addition, it is recommended that members of the team/panel involved in the assessment are able to:

- at least one member be currently competent in the specific competency standards units under assessment
- demonstrate current knowledge of the industry, industry practices, and the job or role against which performance is being assessed

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- demonstrate current knowledge and skill in assessing against this Training Package in a range of contexts
- demonstrate 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

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 Electricity Supply Industry – Transmission, Distribution and Rail Sector Training Package UET06, available from EE-Oz Training Standards. Visit the website: (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 Electricity Supply Industry – Transmission, Distribution and Rail 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 National Training Information Service (http://www.ntis.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 the 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

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- are reviewed as part of the validation of assessment strategies as required under AQTF Standard 9.2i of the *Standards for Registered Training Organisations*
- meet the assessment requirements expressed in the *Standards for Registered Training Organisations,* particularly AQTF Standards 8 and 9.

A key reference for assessors engaged in developing assessment materials is the Training Package for Training and Assessment [TAA04] and Develop assessment tools [TAAASS403A].

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, at minimum, the criteria set out in Standard 8 from the *Standards for Registered Training Organisations* which is reproduced below.

8 **RTO Assessments**

The RTOs assessments meet the requirements of the endorsed components of Training Package and the outcomes specified in accredited courses within the scope of its registration.

8.1 The RTO must ensure that assessments, regardless of whether through a training and assessment pathway or an assessment-only pathway:

i comply with the Assessment Guidelines included in the applicable nationally endorsed Training Package or the assessment requirements specified in accredited courses;

ii lead to the issuing of a Statement of Attainment or qualification under the AQF when a person is assessed as competent against nationally endorsed Competency Standard Units in the applicable Training Package or any additional information related to knowledge and skills specifications (e.g. modules) prescribed in the applicable accredited course;

iii comply with the principles of validity, reliability, fairness and flexibility;

iv provide for applicants to be informed of the context and purpose of the assessment and the assessment process;

v where relevant, focus on the application of knowledge and skill to the standard of performance required in the workplace and cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills, and include transferable knowledge and skills to new situations and environments;

vi involve the evaluation of sufficient evidence to enable judgements to be made about whether competency has been attained;

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vii identify issues related to techniques, OHS, language and literacy, cultural diversity, under-represented groups, and employability skills.

viii provide for feedback to the applicant about the outcomes of the assessment process and guidance on future options;

ix are equitable for all persons, taking account of cultural and linguistic needs; and

x provide for reassessment on appeal.

8.2 a The RTO must ensure that RPL is offered to all applicants on enrolment.

b The RTO must have a RPL process that:

i is structured to minimise the time and cost to applicants; and

ii provides adequate information and support to enable applicants to gather reliable evidence to support their claim for recognition of competencies currently held, regardless of how, when or where the learning occurred.

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.

1.3.08 Guidelines for Designing Assessment Materials

3.8 Guidelines for Designing Assessment Materials

Assessment Materials are developed, designed and implemented by appropriately authorised and competent assessors. The materials may range from relatively straight forward questions/answers and task tests to quite elaborate simulations for assessing concepts and values. Assessment materials for the Electricity Supply Industry – Transmission, Distribution and Rail Sector need to facilitate the process of assessment by:

- detailing the personnel and material preparations required to support the **assessment** process.

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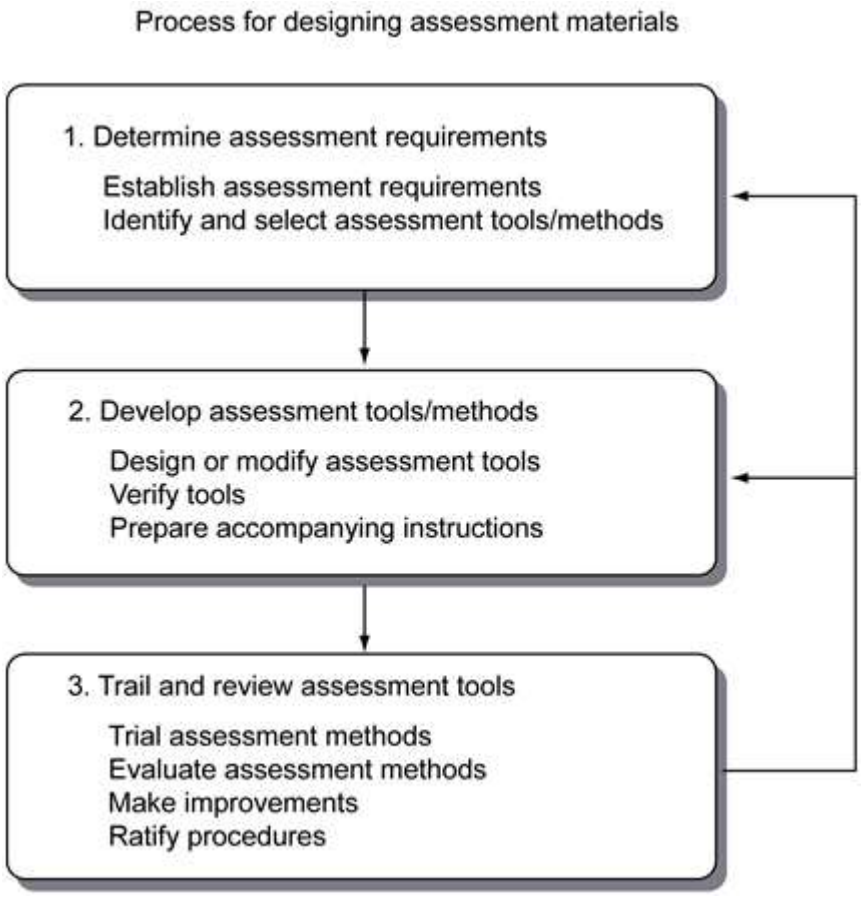
- establishing and/or confirming the circumstances under which the assessment is to take place.
- detailing the evidence to be collected and the method(s) to be used to do this.
- providing for the systematic review/analysis of the evidence and for the making of logical and supportable judgments.
- providing 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.
- identify specialist technical advice related to such things as OHS, LLN, **environmental** and equity matters.

Assessment Material Design Process



a) Determine assessment requirements

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Establish assessment requirements. In the development of tools and methods of assessment, 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:

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

2. Do you always need to assess real work?

3. How is the **critical** evidence specified?

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

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

6. Are there any skills that the candidate should have or can develop before they are assessed for the Unit?

Identify and select assessment tools/methods. The assessor will be required to identify and select the assessment methods consistent with Electricity Supply Industry – Transmission, Distribution and Rail Sector assessment guidelines and procedures.

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.

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.

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Ratify procedures. The assessor ratifies, with relevant people in the Electricity Supply Industry – Transmission, Distribution and Rail 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. Outcomes 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.

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 individual 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.

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Third party reports. Information provided from 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. 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 on which to base a 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.

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 outlined above, to collect 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).

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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 may not be present for the total duration of the workplace job activity and/or the learner/candidate works as part of a team.

More information is also contained in section 3.10 Guide to assessment methods and items.

1.3.09 Sample assessment instruments to support training and assessment material design

3.9 Sample assessment instruments to support training and assessment material design

Information related to 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.

1.3.10 Guide to Assessment Methods and Items

3.10 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:

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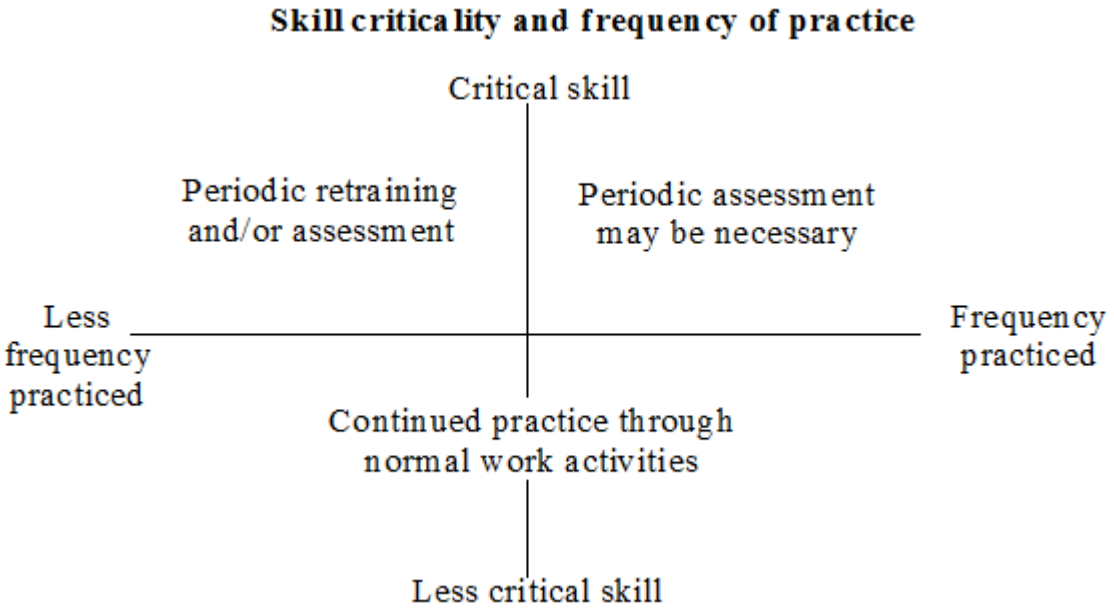

Irrespective of these considerations the assessment methods and instruments used should satisfy the conditions associated with sufficiency, currency, authenticity, validity, reliability, and be holistic in nature.

The following *Table F.1 – Guide to Assessment Methods and Items* provides a summary of assessment methods in common use and the situations in which they may apply.

Table F.1 Guide to Assessment Methods and Items

Assessment method	Appropriate instruments	Valid purposes or use	Conditions and numbers	Time constraints	Repeat assessments possible
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	Calculations	Assessing use of	Test	Moderate	Many

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responses, short and extended answers	Definitions, explanations Essays	information Application of knowledge General ideas and solutions Research, organization and expression of concepts or ideas	condition as above or Minimal supervision, and assistance		
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 practical exercises Fault finding exercises	Checking mastery or competence of a practical task, technical skill, or subset of performance in a simulated work setting	Controlled laboratory or field setting High level supervision 10 to 15	Low	Several
Practical projects	Research task or investigation Product or process development Individual	Assessing integration and application of a number of work related skills to solve a given	Access to laboratory, workshop or workplace Little supervision	Low	Several

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	learning contract	problem Assessing individual approaches, innovation, creativity Assessing interaction with others	10 to 15		
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 assessment	Oral exposition or lecture Seminar, presentation and group	Confirming understanding of principles underpinning performance	Moderate level of control High level of	Low	Several

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	discussion Oral/aural tests Interviews	Supplement to other assessment methods Verification of learner's submitted work.	supervision One to one		
Profiling[1]	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.	[2]Real work conditions under workplace supervision. Off-job assessment events Any number	Low / Medium	On going

[1]A valid profile is based on periodic collection of relevant data over the duration of a competency development training program.

[2]A complete profile is constructed from all required evidence of competency, however where a profile of only workplace performance is used it must be supplemented with other methods such as those outlined in this table.

1.3.11 Guidelines for Conducting Assessments

3.11 Guidelines for Conducting Assessments

The following describes 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 Electricity Supply Industry – Transmission, Distribution and Rail Sector is to be carried out by a Qualified Assessor who will have been trained in the conduct of assessment. The main issues to be satisfied during the conduct of assessment include the following:

- 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.

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- 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.
- 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.
- Feedbak 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 Electricity Supply Industry – Transmission, Distribution and Rail 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:

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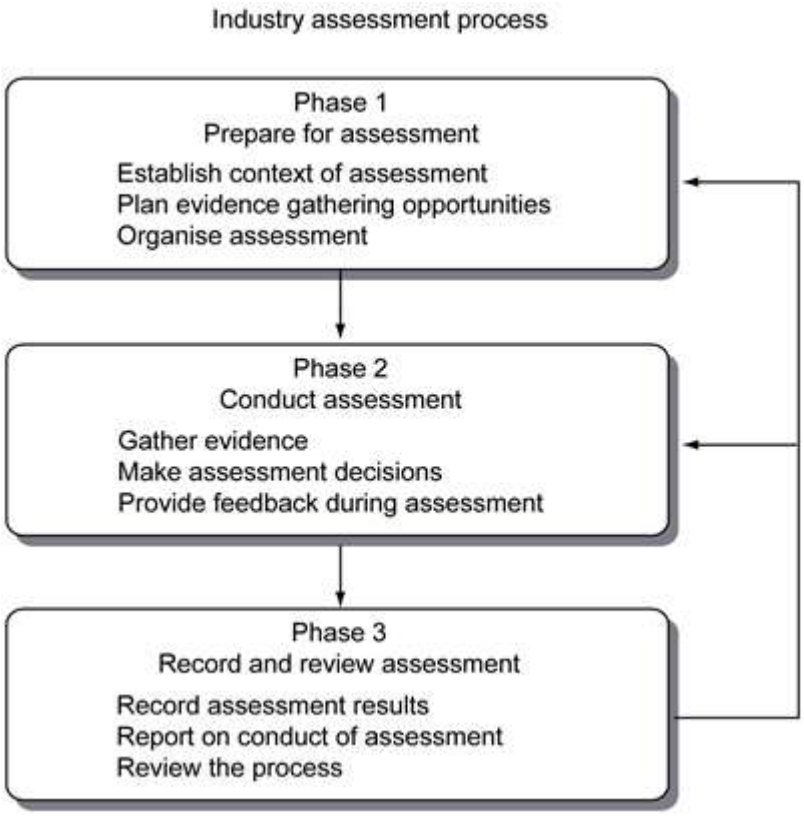
Prepare for Assessment



The assessor:

- establishes the context and purpose of the assessment
- 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 NTQC 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 and employability skills.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

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- 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.
- discusses the Electricity Supply Industry – Transmission, Distribution and Rail Sector and enterprise assessment policy with the candidate (they need to understand 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)
- 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; and
- considers issues related to techniques, OHS, language and literacy, cultural diversity, under-represented groups and employability skills..

Collect the Evidence and Make Assessment Decisions

The assessor must:

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- 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
- 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.

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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.

1.3.12 Maintenance of Assessment Guidelines

3.12 Maintenance of Assessment Guidelines

The Electricity Supply Industry – Transmission, Distribution and Rail Sector Assessment Guidelines were developed by, and is 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.

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
- Suggestions and proposals for changes from all parties are welcome. These should be documented and submitted to EE-Oz Training Standards the DEEWR declared Industry Skills Council for the ElectroComms and EnergyUtilities Industry.

1.3.13 General Resources

3.13 General Resources

AQF Implementation Handbook, Third Edition. Australian Qualifications Framework Advisory Board, 2002 http://www.aqf.edu.au

Australian Quality Training Framework (AQTF) – for general information go to: http://www.DEEWR.gov.au/aqtfWhat.asp

Australian Quality Training Framework (AQTF) – for resources and information go to: (http://www.DEEWR.gov.au/pubBundle.asp?qsID=10)

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Australian Quality Training Framework *Standards for* Registered *Training Organisations*, Australian National Training Authority, Melbourne, 2001. Available in hard copy from DEEWR or can be downloaded from http://www.DEEWR.gov.au/pubBundle.asp?qsID=10

BSZ98 *Training Package for Training and Assessment*. This is available from the following organisations and can be viewed, and components downloaded, from the National Training Information Service (NTIS). National Training Information Service, an electronic database providing comprehensive information about RTOs, Training Packages and accredited courses. (http://www.ntis.gov.au/)

Training Package Development Handbook, Australian National Training Authority, Melbourne, 2001. Available in hard copy from DEEWR or can be downloaded from http://www.DEEWR.gov.au/publication.asp?qsID=213

Style Manual for Training Package Endorsed Components, Australian National Training Authority, Melbourne, December, 2003. Available in hard copy from DEEWR or can be downloaded from http://www.DEEWR.gov.au

Assessment Resources

Training Package Assessment Guides a range of resources to assist RTOs in developing Training Package assessment materials developed by DEEWR with funding from the Department of Education, Training and Youth Affairs. It is made up of 10 separate titles, as described at www.DEEWR.gov.au/project/tpAssessment/. Go to www.resourcegenerator.gov.au/loadpage.asp?TPOAG.htm

Printed and / or CD ROM versions of the Guides can be purchased from Australian Training Products (ATP). The resource includes the following guides:

1. Training Package Assessment Materials Kit
2. Assessing Competencies in Higher Qualifications
3. Recognition Resource
4. Kit to Support Assessor Training
5. Candidate's Kit: Guide to Assessment in Australian Apprenticeships
6. Assessment Approaches for Small Workplaces
7. Assessment Using Partnership Arrangements
8. Strategies for ensuring Consistency in Assessment
9. Networking for Assessors
10. Quality Assurance Guide for Assessment
11. Delivery and Assessment Strategies.

Assessment Tool Design and Conducting Assessment

VETASSESS and Western Australian Department of Training and Employment, 2000, Designing Tests - Guidelines for designing knowledge based tests for Training Packages.

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 Committee on Training Curriculum (ACTRAC), 1994, Assessor training program - learning materials, Australian Training products, Melbourne.

Australian National Training Authority, A Guide for Professional Development, DEEWR, Brisbane.

Australian National Training Authority, Facilitator Packs for Certificate IV in Training and Assessment.

Australian National Training Authority, Facilitator's Pack for Train Small Groups and Assessment.

Australian Training Products Ltd, Training and Assessment, Training Package — Toolbox.

Green, M., Moritz, R., Moyle, K. and Vale, K., 1997, Key competencies professional development Package, Department for Education and Children's Services, South Australia.

Victorian TAFE Association, 2000, The professional development CD: A learning tool, VTA, Melbourne.

Conducting Assessments

Bloch, B. and Thomson, P., 1994, *Working Towards Best Practice in Assessment: A case study approach to some issues concerning competency-based assessment in the vocational education and training sector*, NCVER, Adelaide.

Docking, R., 1991, *An A-Z of Assessment Myths and Assessment in the Workplace, Competence assessment briefing series*, No. 4, Employment Department, Perth, Western Australia.

Hawke, Geoff, 1996, Integrating Assessment of Learning Outcomes, Assessment Centre for Vocational Education, Sydney.

Hawke, Geoff, 1995, *Work-based Learning: Advice From Literature*, Assessment Centre for Vocational Education, Sydney.

National Assessors and Workplace Trainers Body, *Putting it into practice* [Training Package implementation Guide].

Parsloe, E., 1992, *Coaching, Mentoring and Assessing: A practical guide to developing competence*, Kogan Page, London.

Rumsey, David, 1993, "*Practical issues in Workplace Assessment*" in National Assessment Research Forum: A forum for research into competency-based assessment. [VEETAC Competency Based Training Working party Assessment Steering Group], NSW TAFE Commission, Sydney.

Rumsey, David, 1994, *Assessment Practical Guide*, Australian Government Publishing Service, Canberra.

Evidence-Gathering Methods

Australian National Training Authority, 1998, *A new assessment tool*, DEEWR, Melbourne.

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Gonczi, A. (ed.), 1992, *Developing a competent workforce: adult learning strategies for vocational education and training*, TAFE National Centre for Research and Development, Adelaide.

Kearney, Paul, 1992, *Collaborative assessment techniques*, Artemis, Tasmania.

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.

OTFE, 1998, *Demonstrating best practice in VET project - assessment systems and processes*, Victoria.

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.

1.3.14 Further Sources of Information

3.14 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.

Contact	Details
National Industry Skills	**EE-OZ Training Standards**

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Contact	Details
Council (ISC) for the ElectroComms and EnergyUtilities Industry	PO Box 1202 DICKSON ACT 2602 Telephone: 02 6241 2155 Fax: 02 6241 2177 Email: ee-oz@ee-oz.com.au Website: www.ee-oz.com.au

Contact	Details
Western Australia ITC	**WA IEU ITC Inc** PO Box 597 BALCATTA WA 6021 Tel: 08 9240 2688 Fax: 08 9240 2930 E-mail: info@ieu.com.aumailto:
New South Wales ITAB	**NSW U&E ITAB** PO Box 615 DARLINGHURST NSW 1300 Tel: 02 9266 0001 Fax: 02 9261 5511 Email: mailto:naomi@uensw.com.au
Victoria	**EPIC Industry Training** 29 Drummond St CARLTON VIC 3053 Tel: 03 9654 1299 Fax: 03 9654 3299 Email: epicitb@epicitb.com

Contact	Details
South Australia	**Electrical, Electrotechnology, Energy & Water**

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Skills Board
PO Box 2584
REGENCY PARK SA 5010
Tel: (08) 8347-4008
Fax: (08) 8219-0015
Email: admin@eeewsb.com.au

Queensland

Energy Skills Queensland
PO Box 273
SALISBURY QLD 4107
Tel: 07 3277 1333
Fax: 07 3276 8252
Email: energyskillsqld@energyskillsqld.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
PO Box 1202
DICKSON ACT 2602
Telephone: 02 6241 2155 Fax: 02 6241 2177
Email: ee-oz@ee-oz.com.au
Website: www.ee-oz.com.au

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Australian Training Products Ltd

Level 25, 150 Lonsdale Street

MELBOURNE VIC 3000

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

1.3.15 Appendix A - Australian Apprenticeships

Appendix A — Australian Apprenticeships

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, Australian Apprenticeships involve a commitment from:

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

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[1] For more information on RTOs see DEST's 2005 Australian Quality Training Framework Standards for Registered Training Organisations, effective from 1 July 2005 publication.

In the Electricity Supply Industry - Transmission, Distribution and Rail Sector, Australian Apprenticeships are available for all the qualifications outlined in this Training Package. Australian 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.[2]

[2] TAFE Institutions, Universities with TAFE sectors, Skills Centres and similar enterprises that can deliver vocational training are eligible to become RTOs.

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

Entry Requirement

Under Australian Apprenticeships, the employer is able to determine the relevant employment criteria for recruiting a new entrant into the Electricity Supply Industry. 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 Australian Apprentices. Some of the more common ones are:

- Any person aged 15 years or more can apply for a Australian 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 Australian 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.

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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.

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 Australian 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**

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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.

Typical duration — Australian 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 NTQC 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.

1.3.16 Appendix B - Sample Assessment Instruments

Appendix B — Sample Assessment Instruments

These instruments are designed 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.

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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.

A number of terms used refer to aspects of implementing the Training Package. A Glossary of Terms (*see* Appendix A) 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

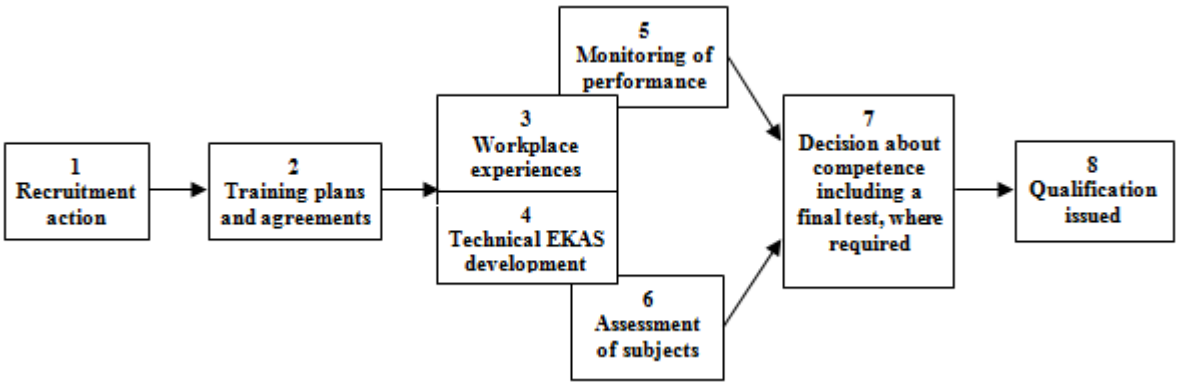
This section shows how the Training Package and associated resources relate to recruitment, training, assessment and recognition activities which may be undertaken by Industry, enterprises and/or Registered Training Organisations.

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.



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Competency Development Model

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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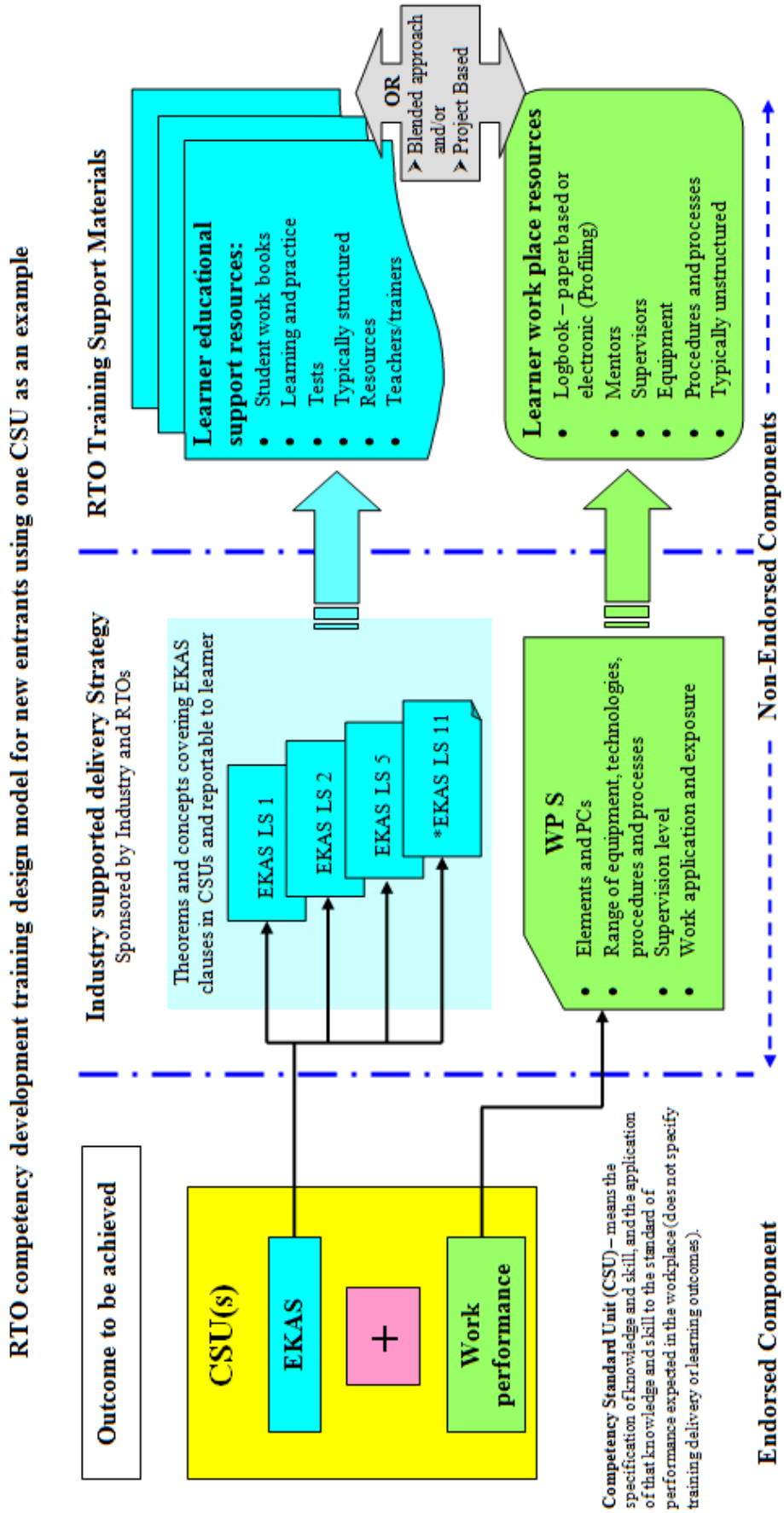

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EKAS LS – Essential Knowledge and Associated Skills Learning Specifications = where EKAS LS 1 — may cover many units, EKAS LS 2 — may cover a number of units, EKAS LS 5 — may cover several units, and/or EKAS LS 11 – may be unique to the unit (refer to Volume 1 Part 2 and Volume 2 Part 2 for more detail)

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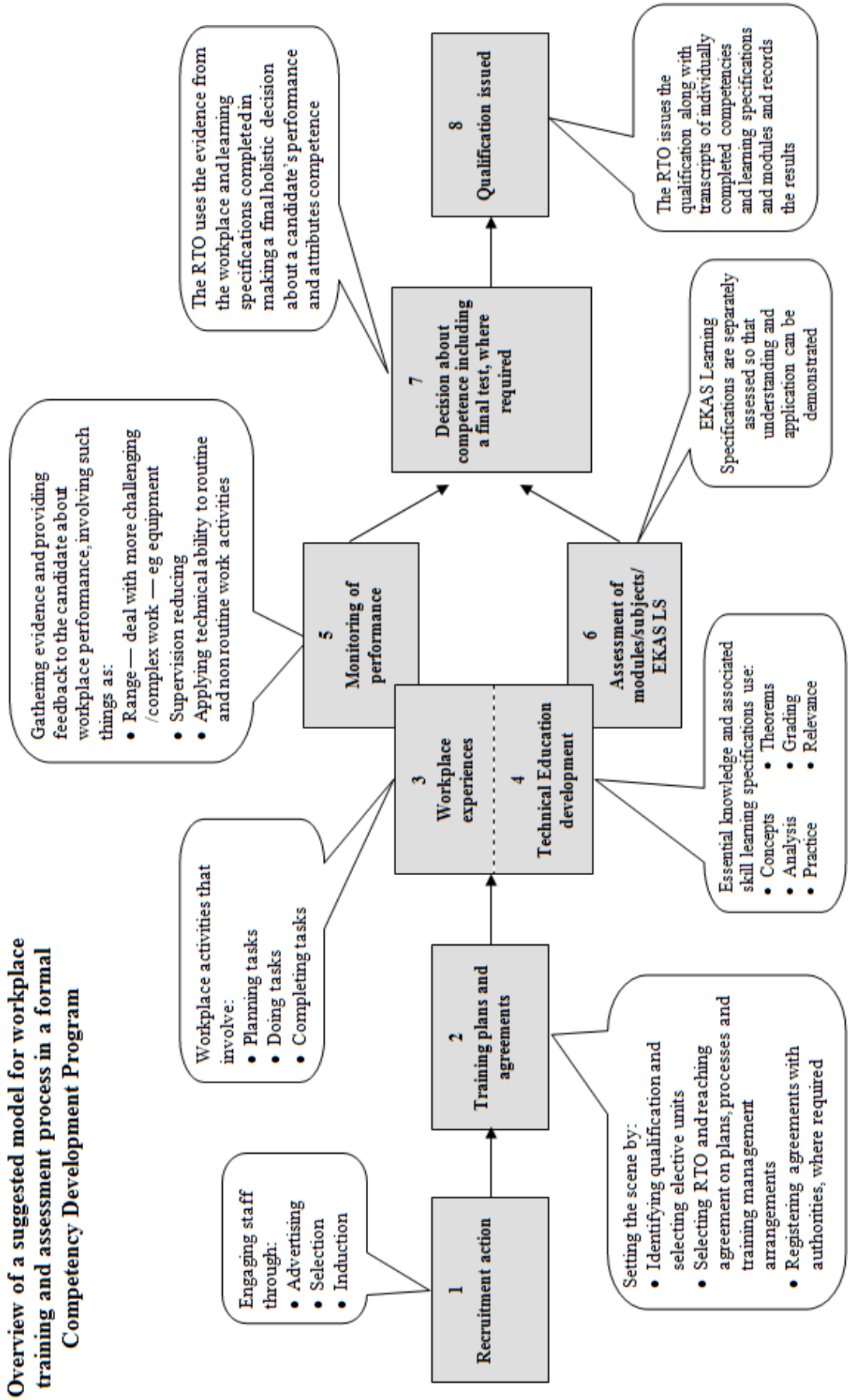

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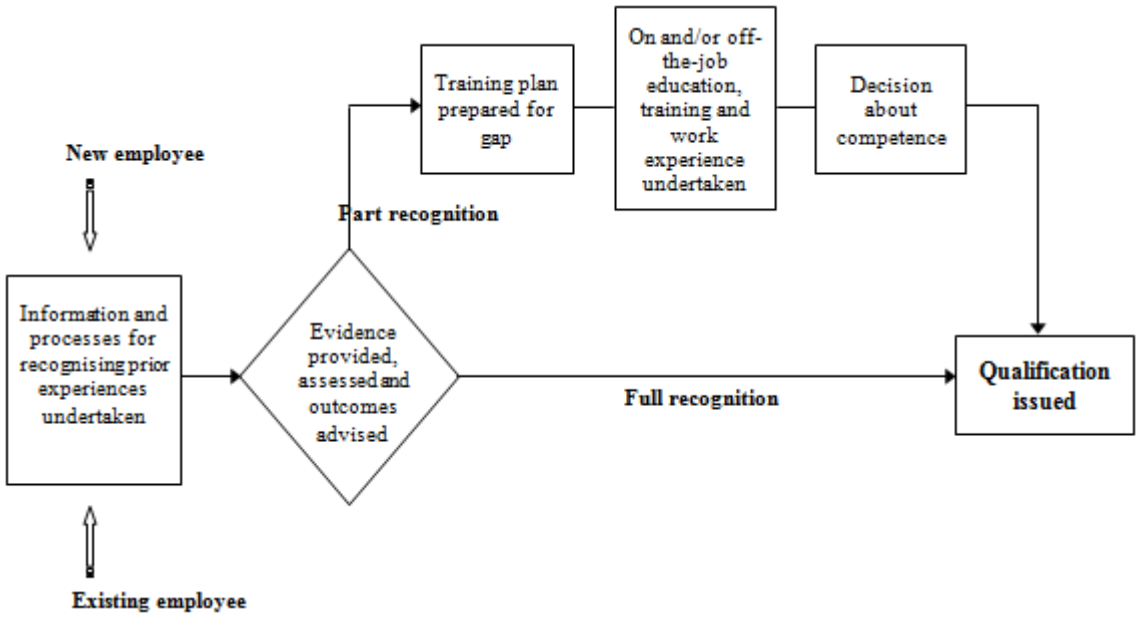
Recognition of Prior Learning/Experience Model

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

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.

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

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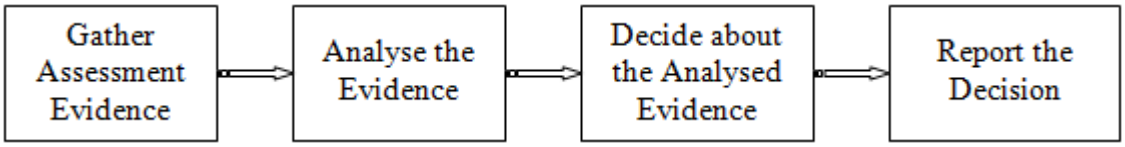
- establishing suitable assessment methods
- developing assessment tools appropriate to a specific assessment context
- trialling assessment procedure.

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

Pathway 3 can be incorporated within the Pathway 2 processes and activities.

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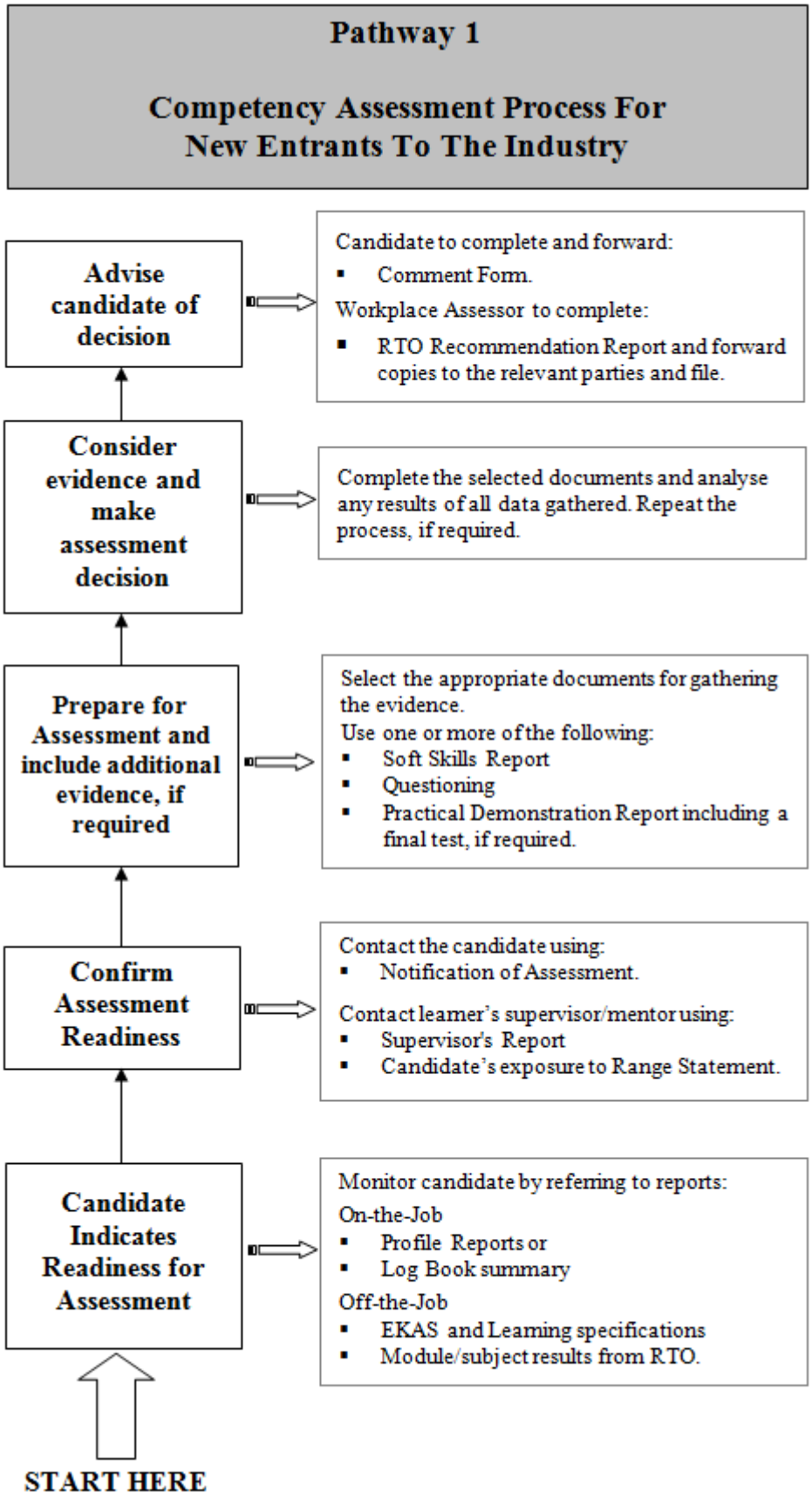

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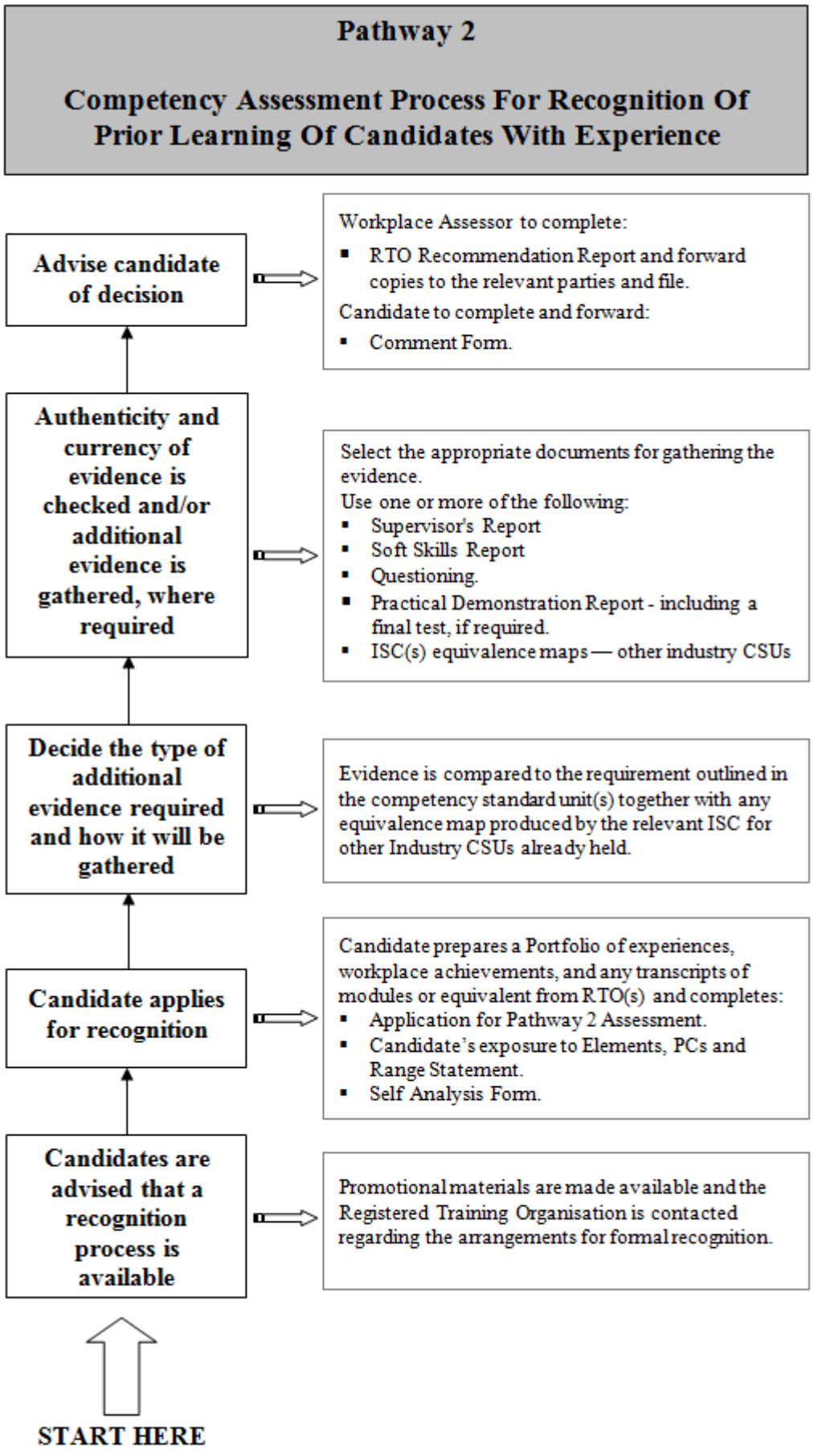

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Establishing the Evidence Requirements

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 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 – UET09'. 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 this unit to such an extent that the learner's performance outcome is reported on the preferred approach; namely a percentile graded result.

Demonstrate an appropriate level of employability skills.

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: (Example shown)

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. '**Items'** of evidence that industry has deemed critical and that also relate directly to the Performance Criteria and Range Statements could include:

- 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.

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- 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

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 A
- forms for administrating the process — samples included as Enclosure B in Appendix A
- assessment design materials Glossary of Terms — included Enclosure C in Appendix A.

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.

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- 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.

1.3.17 Enclosures

Enclosures

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**
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.

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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

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.

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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 if competence is sought in the Competency Standard Unit(s). 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.

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

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This form allows the candidate to summarise their vocational experiences in relation to a particular Competency Standard Unit or a group of Competency Standard 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

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

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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 _____)

	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			

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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 skills	Basic technical knowledge and skills	Analytical technical knowledge and skills	People and customer skills
1				
2				
3				
4				

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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.

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	

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	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	
	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	

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	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 — Candidates Exposure to Range Statement

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(s) 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 units Title and Unit Number
- Candidate’s Name
- Date

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- Range Statement - Item Group:
  Please 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:
  Please 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*).

The candidate is to 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** Identify the items you have worked on
***Range Statement Item Group**	***Range Statement Items Involved**	
A Personal protective equipment	**Goggles**	4
	Gas mask	4
	Boots	
	Gloves	4
B Wiring types	**Aluminium**	
	Copper	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	**Range Statement Items Involved**	Candidate to Complete

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Statement Item Group		**Identify the items you have worked on**
A		
B		
C		
D		

Declaration by Candidate

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All the information provided is entirely factual:

Name: ……

Signed ……..…. Date: ……..

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 (e.g. 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 Electricity Supply Industry – Transmission, Distribution and Rail Sector 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): _____ _____	

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Responses made by supervisors/mentors are for the purpose of providing information to a workplace assessor. The supervisor is **not** 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**		
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

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‘Supporting Skills’ refer to non-technical skills, candidates must demonstrate this as part of their competency assessment.

They include, for example:

- 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.
- 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.

Any Supporting Skills Report may be completed by an assessor, the candidate’s supervisor or another third party. Following on this page is a brief description of what the various aspects of Supporting Skills cover.

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 the use 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 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.

Familiar with the enterprise, equal employment opportunity policies, ethical practices and principles and awareness of cultural diversity.

Enterprise vehicles

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Vehicle log book details are completed 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.

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 using technical literature, exploring theories, performing calculations and by making enquiries.

Personal well being

Maintain and promote personal well being in the workplace through fitness and by avoiding excessive use of alcohol, tobacco and other substances.

Time management

Being punctual, the timely completion of work activities, and the sequencing of 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

Participates in the training of others by sharing ideas, explanation of operating systems and detailing the working arrangements of components and equipment.

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Instructions for Completing the Supporting Skills Report

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.

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

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Candidate'sname		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 of two.
Workers providing other services		
Clients and land owners		
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

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Personal well being		minimum of two.
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'.

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

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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.
- 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)

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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.
- 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

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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:

Performance checks:

- Checking that all guards & covers removed during the activities are replaced & 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:

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Element 3 – Completing job/task functions (L2)
• 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 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.

Questions

<table>
<tr><td colspan="7">Unit Title:
No.</td></tr>
<tr><td colspan="7">Candidate's name:
Assessors name:</td></tr>
<tr><td rowspan="2">Main Question for the 'Planning Work' Element
What are the main things you would</td><td colspan="3">Expected Response Level</td><td colspan="2">Not used</td></tr>
<tr><td>(circle)</td><td>1</td><td>2</td><td>(tick)</td><td></td></tr>
<tr><td colspan="6">consider when you are planning and preparing for work?</td></tr>
<tr><td colspan="5">Issues to be cover in response to the main question – and –</td><td>Coverage</td></tr>
</table>

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Unit Title: **No.**						
Candidate's name: **Assessors name:**						
Follow up questions, if required					**(Y or N)**	
What occupational health and safety 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**	**Expected Response Level**				**Not used**	
	(circle)	**1**	**2**		**(tick)**	
to ensure the work you carry out is done productively?						
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 this work function?						
What are the main engineering tasks involved in carrying out 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?						

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Unit Title: (Cont.) **No.**						
Main Question for the '*Completing Work*' Element **What are the main things you will do** **What are the main things you will do**	**Expected Response Level**				**Not used**	
	(circle)	**1**	**2**		**(tick)**	
What needs to be done to finalise the job?						
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?						

Enclosure A9 — Practical Demonstration

As part of evidence provided to demonstrate competence against detailed competency standards, you, the assessor, may need to observe the candidate demonstrating practical tasks. The Engineering Practical Skills Form is provided here to help assessors record these work-based observations. The notes taken are analysed and from this a rating is given for the candidates 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

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Enter the title of the Competency Standard Unit and the 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.

- 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.

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 ……

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Enclosure A10 — Final/Challenge Test

A test may be required if the assessment process does no 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 — Sample assessment instruments that support a profiling model

In relation to the industry preferred assessment model for contract entry-level competency development programs (Australian Apprenticeships), longitudinal approaches to assessment activities are considered more efficient and effective. This is best achieved by implementing a process of frequently gathering reliable data from the workplace by the learner and having 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 (e.g. 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 leaner. Assessors use this information in a holistic way to identify and analyse trends and anomalies against the predefined industry norms.

The advantagege 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 — in this way reducing the demand for an array of workplace assessors.

To gain an appreciation of what a data card and a report may look like a sample of each is included over the page.

Sample Data Card and Quarterly Report– Provided over the page

Note: details of fields determined by Industry to accommodate enterprise requirements

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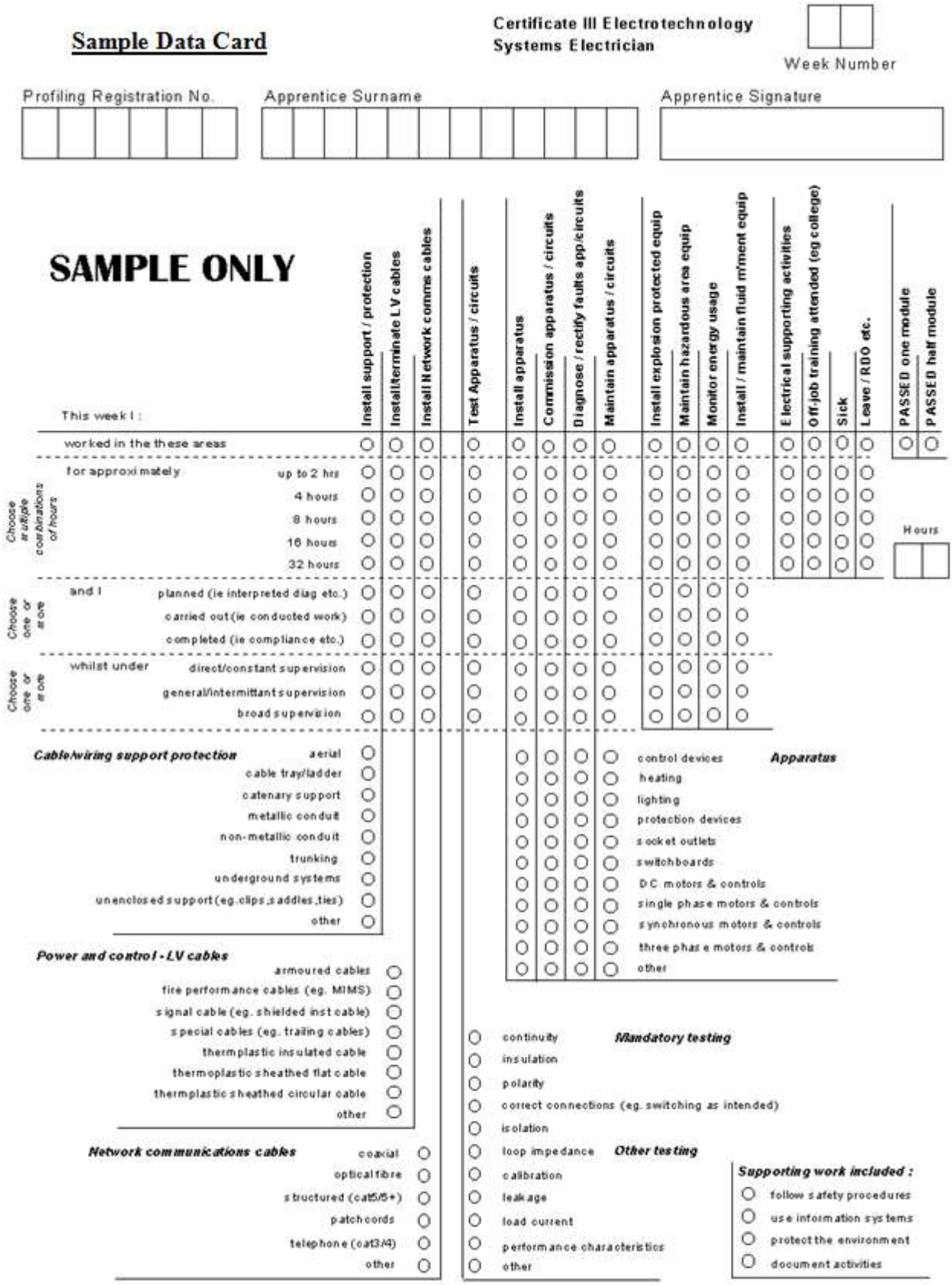

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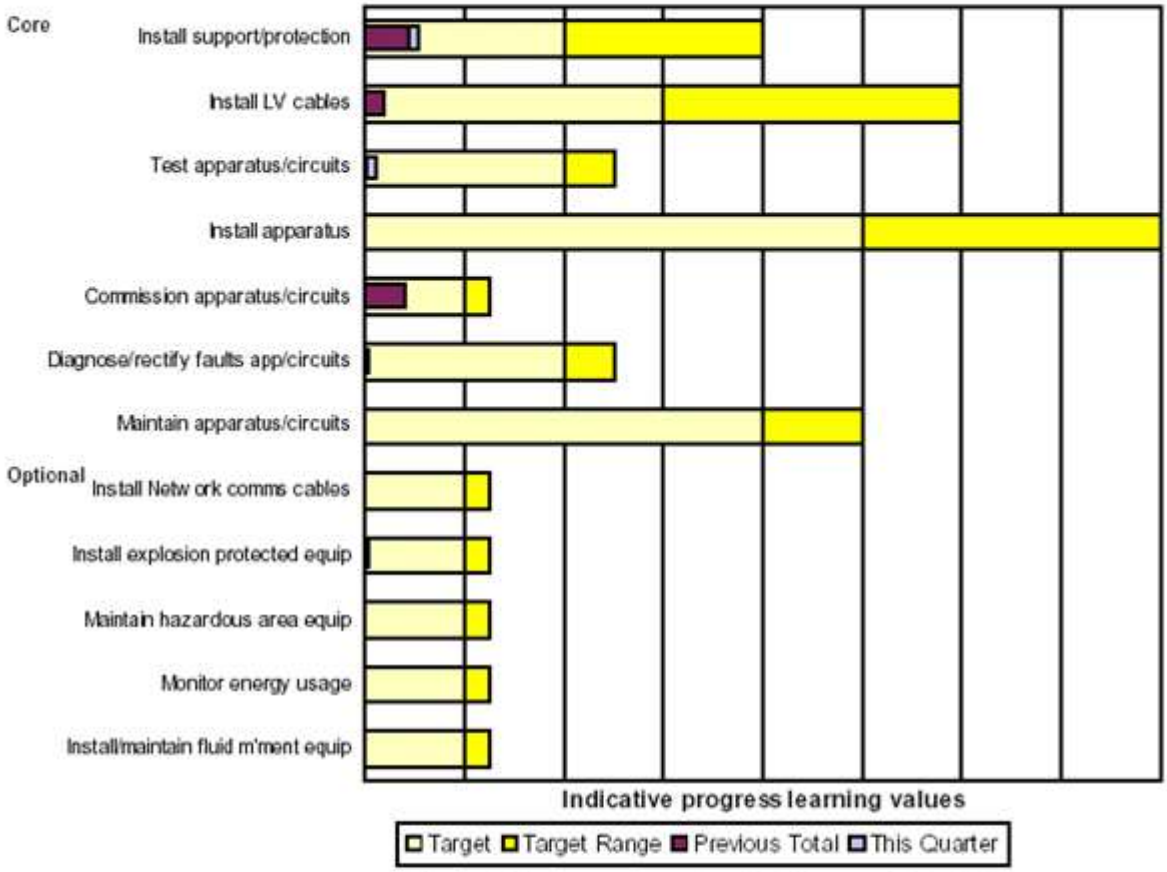
Sample Profiling Report

First Zzsample (999999)

Apprentice On Job Experience Profile - Progressive and Benchmarks Points

Systems Electrician - Quarterly Report, May 2002



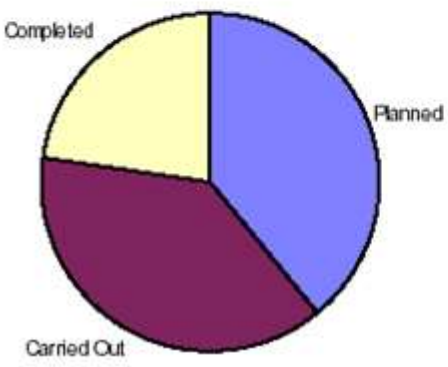
* indicates Optional competency selected by the learner in Schedule C

Apprentice Signature ..... Date .....

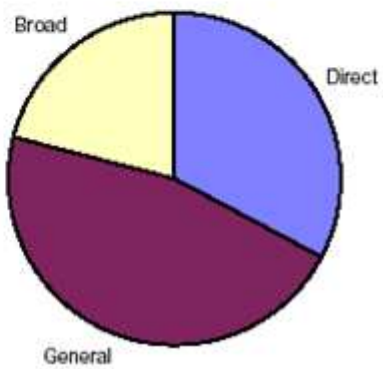
Employer Signature ..... Date .....

Host Signature (if applicable) ..... Date .....

Apprentice role



Supervision level



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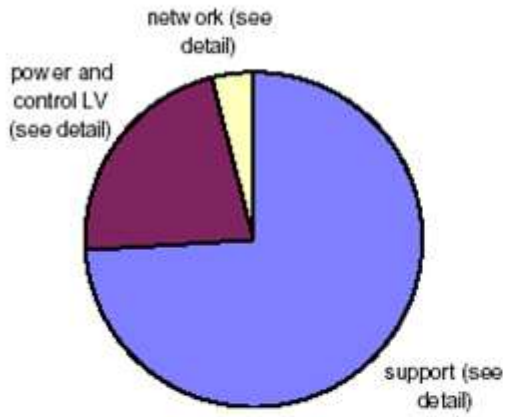
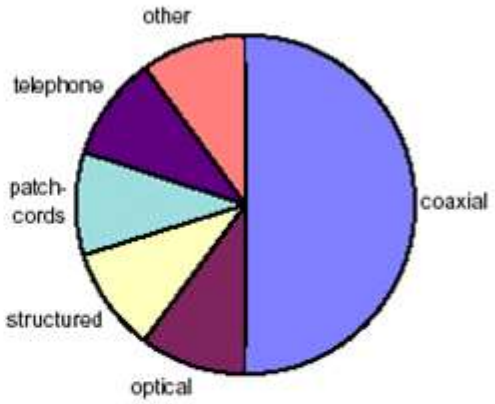
Sample Profiling Report (cont.)

First Zzsample (999999)

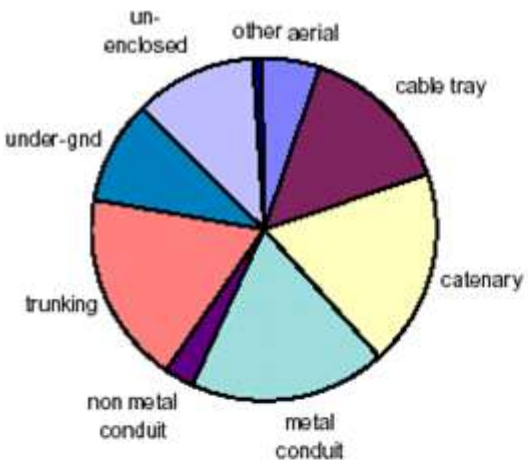
Electrical wiring system type



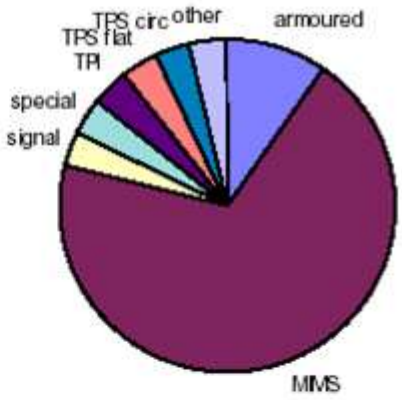
Electrical wiring detail: Network communications



Electrical wiring detail: Support and protection



Electrical wiring detail: Power & control - LV



Testing techniques used

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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 Registered Training Organisation**

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 — Candidates 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

Learners Name: _____ Date of notification: / /

Assessors Name: _____ Tel: _____

Qualification Title: _____

The workplace assessment will be carried out on the following Competency standard units		**For the following reason (tick)**	
Unit No.	**Unit Title**	**Advice**	**Completion**

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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			
9	**Practical Demonstration** - a demonstration of your ability to perform tasks in a actual or simulated situation			

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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

Type	**Tick if Attached**
Certificates	

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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 ☐

or

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Disagree with the outcome ☐

Comments:

_____

_____

_____

_____

_____

_____

_____

_____

Candidate's Signature: _____ **Date:** _____/_____/_____

Enclosure B4 — Candidates 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**	**Assessors 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:** / /

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Enclosure C: Glossary of Terms

Definitions of all terms used in this section are set out 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

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Term	Definition/Explanation
	• any combination of the above.
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 (e.g. 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 A — 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 3.4.1 Assessment Principles
Flexibility	See section 3.4.1 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).
Australian 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.
Profiling	See section 3.5 Assessment Processes in the Electrotechnology

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Term	Definition/Explanation
	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 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

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Term	Definition/Explanation
	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 3.4.1 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 3.4.3 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.
Training Agreement	An agreement outlining the training and assessment which forms part of a Australian Apprenticeship Training Contract and is registered with the relevant State or Territory Training Authority.

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Term	Definition/Explanation
Training Plan	Training Plan means a program of training and assessment which forms part of a Australian 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 3.4.1 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.

2.1 Preliminary Information and Glossaries

Preliminary Information

Qualifications and Competency Standard Units in this Training Package are found within Volume 1 and Volume 2. The parts however must all be read in conjunction with each other for the purposes of developing learning and assessment resources. Users should refer to Volume 1, Part 1 for Qualification Frameworks and structures.

The Competency Standard Units for the Electricity Supply Industry (ESI) Transmission, Distribution and Rail sectors are found in Volume 2, Part 2. To fully apply the Competency Standard Units, other relevant parts of the Training Package must be applied as well. These are the:

- Glossary of ESI Terms (Volume 2, Part 1)
- Essential Knowledge and Associated Skills (Volume 2, Part 2)

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The Definitions/Glossary of Terms is a major section of the Electricity Supply Industry (ESI) Training Package and is to be used in conjunction with the Competency Standard Units. Section 7 of each Competency Standard Unit lists a range of variables — the Range Statement. These, as well as other Electricity Supply Industry (ESI) terms, are explained in the Glossary of Terms.

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.

Volume 2, Part 2 contains Competency Standard Units and the Essential Knowledge and Associated Skills (EKAS). The Competency Standard Units refer to the Knowledge and Associated Skills in the respective section of each Competency Standard Unit. As with the Definitions/Glossary, users should apply the requirements found in the Essential Knowledge and Associated Skills section for an outline of what is defined.

The Essential Knowledge and Associated Skills are detailed separately from the Competency Standard Units make the package easier to interpret and apply. Each Competency Standard Unit has listed within its Essential Knowledge and Associated Skills section a unique clause number and title. Further specific information to be covered is elaborated in Volume 2, Part 2.2.1. This separate Essential Knowledge and Associated Skills forms an integral part of each Competency Standard Unit, and all assessment evidence activities and reporting processes are to incorporate this specification.

1.1 Definitions/Glossary

Scope

The Competency Standard Unit described in this Part of the Training Package covers Competency Standard Units for the ESI – Transmission, Distribution and Rail sector. The terms are not to be considered a definitive list but should give a clearer understanding of the meaning of the term and the range of a Unit of Competency in which the term is contained. These terminologies do not necessarily reside in States/Territories and can vary between States/Territories.

Application

The information contained in each Competency Standard Unit includes the intended use of the unit for assessment and a training program(s).

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

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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.

Definitions of ESI – Transmission, Distribution and Rail Sector Terms

The definitions of terms form an integral part of respective parts of this Training Package.

Term	Definition/Explanation
Analyse	To examine and investigate data on information
Anchor	Rail traction specific term. Has the catenary and/or contact wire/trolley wire anchored to it, which is secured by guys or specially designed to withstand the load of the wires.
Anchor arrangement	Rail traction specific term. Equipment used to terminate and tension conductors. Includes anchor guy arrangements.
Appropriate and relevant persons (see Personnel)	Organisation employees, contractors, consultants, maintenance persons, appropriately experienced and qualified persons, drivers, cleaners, grounds and site security persons, other managers, other supervisors, inter-company departments, other utilities, council representatives, producers, transporters/shippers, consultants, government bodies/agencies, refinery persons, customers, land owners.
Access Authority	Means any form of authorisation, which allows access to work on or near, or for the testing of, apparatus. Refer to NENS 03-2003
Appropriate authorities	May include local councils; road authority; sewage and stormwater authorities; providers of service such as electricity, water and telephones.
Appropriate work platform	Work may be performed from elevating work platform, ladder, portable pole platform, ground or structures.
AQF	Australian Qualifications Framework which describes qualifications in terms of levels characterised by the outcomes of vocational education and training.
Arrangements for dealing with emergency situations	Procedures for dealing with emergency or hazardous situations include evacuation, chemical containment and first

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Term	Definition/Explanation
	aid procedures. Hazardous events include accidents, fire and emergencies such as chemical spills or bomb scares.
Assessing risk	Determining the likelihood and severity of adverse consequences from hazards by means of OHS audits; workplace inspections; maintenance of plant and equipment; purchasing of materials and equipment; planning or implementing alterations to site, operations or work systems; and analysis of relevant records and reports, eg injuries and incidents, hazardous substances inventories/registers, audit and environmental monitoring reports and OHS committee records. It also includes hazard and incident reports; workplace inspections; consulting work team members; housekeeping; daily informal team consultation and regular formal team meetings; internal and external audits; industry information such as journal, newsletters and networking.
Assessment	Refers to the process of collecting evidence and making judgements on the extent and nature of progress towards the performance requirements set out in a standard and at the appropriate point making the judgement whether competency has been achieved.
Authorisation	Responsibility assigned for the application of relevant management practices to approve measures according to company policies, procedures and processes, legislative and/or regulatory requirements.
Auxiliary feeder/Side Feeder	Rail traction specific term. Feeder conductors that provide for additional current carrying capacity to the overhead wiring.
Cable	A single cable core, or two or more cable cores laid up together, either with or without filings, reinforcements, or protective coverings. Refer to AS/NZS 3000:2000
Cantilever	Rail traction specific term. Rectangular or triangular shaped frames/assemblies consisting of tubes, chains and other hardware to support and register the catenary and contact wires.
Cantilever mast	Rail traction specific term. A mast which supports the tubes, chains and other cantilever components.
Cardiopulmonary Resuscitation (CPR)	CPR (cardiopulmonary resuscitation0 — an emergency life-support procedure using a combination of expired air

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Term	Definition/Explanation
	resuscitation and external cardiac compression.
Catenary wire	Rail traction specific term. Multi-stranded copper/steel/aluminium conductor located above the contact wire. It supports the contact wire(s) via droppers.
Circuit breaker	A switch suitable for opening a circuit automatically, as a result of predetermined conditions, such as those of overcurrent or undervoltage, or by some form of external control. Refer to AS/NZS 3000:2000
Communication equipment.	Equipment may include: Fixed radio; Mobile radio; Satellite; SACS controllers; Computer hardware and software; Programmable controllers; Modems; Digital line drivers (low and high speed); Fibre optic line drivers (low and high speed); Radio links including voice link and digital bearer; Wave trap.
Competency Standard Unit(s) see also Unit(s) of competency	Competency standards are made up of a number of Competency Standard Units. These units describe a key function or role in a particular job function or 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 Occupational Health and Safety requirements. A competency standard unit is usually linked to one or more AQF qualifications.
Complex testing	Complex testing refers to dielectric dissipation factors tests, partial discharge, applied and induced HV tests, CT and VT accuracy tests (calibration), watts loss, ratio confirmation tests, tests on interconnected equipment, sf6 tests.
Compound catenary system	Rail traction specific term. A system which consists of a main catenary, an auxiliary catenary, and a contact wire.
Computerised test equipment work	Computerised test equipment work may include, for example: Secondary injection test sets, primary test sets, insulation test sets, timing test sets, Circuit beaker test sets, magnetic test sets.
Conductor	A wire or other form of conducting material suitable for carrying current, but not including wire or other metallic parts directly employed in converting electrical energy into another form. Refer to AS/NZS 3000:2000

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Term	Definition/Explanation
Contact /Trolley wire	Rail traction specific term. A grooved solid copper or copper alloy conductor. Its functions are: To carry current to the vehicle pantographs To provide a mechanically continuous path for pantograph running and current collection.
Contact/Trolley wire only system	Rail traction specific term. A system which consists of a single contact/trolley wire with no catenary wire.
Contributions to OHS	Includes listening to the ideas and opinions of others in the team; sharing opinions, views, knowledge and skills; identifying and reporting risks and hazards; using equipment according to guidelines and operating manuals; behaviour that contributes to a safe working environment which includes following OHS procedures.
Controlling risks	Assessing the OHS consequences of materials, plant or equipment prior to purchase; obtaining expert advice; appropriate application of measures according to the hierarchy of control, and eliminating risk by means of: engineering and administrative controls and personal protective equipment; designing safe operations and systems of work; including new OHS information into procedures; and checking enterprise compliance with regulatory requirements.
Control measures	May include elimination of hazards, work procedures, Standard Operating Procedures, personal protective equipment, fire safety, plant and equipment isolation, training and supervision of appropriate persons, communications with appropriate persons.
Crossing Pan	Tram traction (including heritage) specific term and relates to gunmetal device used to direct a tram collector shoe at locations of crossing trolley wire, and can range from 15-90 degrees.
Current collector shoe	Tram traction (including heritage) specific term and relates to current collecting device fitted to a pole on top of a tram vehicle
De-energised	Means not connected to any source of energy but not necessarily isolated Refer to NENS 03-2003

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Term	Definition/Explanation
Diagnostic, testing and restoration	May involve appropriate documentation relating to the protection device; voltage, current and resistance measuring instruments; microprocessor based diagnostic test equipment; laptop computer and diagnostic software; loop control test instruments.
Documenting detail work events, record keeping and or storage of information	All forms of documenting information including, paper based, and electronic (computer) based Related to tasks includes time sheets; requisitions; work sheet/job cards; organisational forms/electronic templates. May include standard operating procedures; OHS and environmental legislative requirements; manufacturer's specifications; Australian Standards; maintenance records; standard operating procedures; OHS and environmental legislative requirements; manufacturers' specifications; codes. May also include coordinated maintenance plans and/or strategies, maintenance scheduling documents, budgets, reports, submissions, cost benefit risk assessments and work plans and/or other developments
Down Track	Rail traction specific term. This is the track on which the normal train/tram running is away from a specified datum station or location.
Drawings and specifications	May include instrument electrical drawings; circuit diagrams; component charts; wiring diagrams; site layout drawings.
Droppers	Rail traction specific term. Support the contact/trolley wire(s) from the catenary at set intervals
Ear	Tram traction (including heritage) specific term and relates to support the trolley wire at a span and allows the collector shoe to pass unhindered.
Earthed	Means connected to the general mass of earth by a conductor to ensure and maintain the effective dissipation of electrical energy. Refer to NENS 03-2003
Elastic/Resilient fitting	Tram traction (including heritage) specific term and relates to trolley wire support fittings designed to provide a resilient passage to the collector shoe or pantograph and can be single or double pendulums, steady arms, delta suspension or similar.

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Term	Definition/Explanation
Electrical equipment	Wiring systems, switchgear, controlgear, accessories, appliances, luminaries and fittings used for such purposes as generation, conversion, storage, transmission or utilisation of electrical energy. Refer to AS/NZS 3000:2000
Electrical infrastructure	Equipment and systems for supplying and distributing electricity.
Electrical operating work	Means work involving the operation of switching devices, links, fuses or other connections intended for ready removal or replacement, proving electrical conductors de-energised, earthing and short-circuiting, locking and tagging of electrical apparatus and erection of barriers and signs. Refer to NENS 03-2003
Energised	Means connected to any source of energy. Refer to NENS 03-2003
ERAC	Electrical Regulatory Authorities Council ERAC is the council responsible for the liaison between the technical and safety electrical regulatory authorities of eight Australian States/Territories and New Zealand. Website http://www.erac.gov.au/
Environmental and Sustainable Energy Procedures	Environmental and Sustainable Energy procedures as laid out in the appropriate environmental legislation and 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, eg land care agreements. Sustainable Energy Practice refers to workplace actions that contribute to the reduction of greenhouse gases. Sustainable Energy Practice is closely related to the 'environment'. Sustainable energy practice aims to reduce the amount of wastage in electricity and other forms of energy that lead to the production of greenhouse gases. Many of the principles and practices that apply in the workplace also apply in the home and the general environment. These include: • examining work practices that may use excessive electrical energy; • reducing energy by using energy efficient machines and

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Term	Definition/Explanation
	appliances (eg. star ratings); • switching off devices such as lights, machines and computers when not in use; • using power-save devices, such as those incorporated in photocopiers, business machines; • replacing incandescent lamps with compact fluorescent lamps; • using natural light to replace artificial light; • regularly cleaning air conditioner filters; • closing windows and doors when climate control units are used; • insulating dwellings, offices and workplaces and preventing draughts; • using reflective curtains to control heat; using natural or artificial shade to control sunlight; • using solar water heating; • using automatic processes to manage energy usage; • reusing materials used in construction, engineering and manufacturing; • recycling waste materials; • driving motor vehicles and other machines with care; • using natural gas for heating rather than oil or coal based fuels; • using devices to reduce water usage; • checking for leakage in hot water system pressure relief valves and elsewhere in plumbing systems; • sharing information about energy conservation with other workers.
Environmental legislation	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 (eg. land care agreements)
Environmental management documentation	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

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Term	Definition/Explanation
	emergency preparedness and response; records of significant environmental impacts; audit results; management reviews
Equipotential bonding	Special electrical connections intended to bring exposed conductive parts or extraneous conductive parts to the same or approximately the same potential, but not intended to carry current in normal service. Refer to AS/NZS 3000:2000
Established procedures	May include formal arrangements of an organisation, enterprise or statutory authority of how work and safe systems of work are to be done. These may include quality assurance systems such as manufacturers' manual/specifications, requirements and procedures, work orders/instructions reporting procedures; improvement mechanisms; technical standards; compliance requirements; safety management. Work clearance systems such as work permits and/or access authorisation permits; monitoring and clearance procedures; isolation procedures; authorisation; OHS practices and emergency response and evacuation procedures; Procedures for operating safety systems, operating plant and equipment and reporting work activities; Maintenance, modification or supply of relevant schematic drawings and technical data; Arrangements for dealing with emergency situations.
Essential knowledge and associated skills (EKAS) learning specification (LS)	Provide specific advice in facilitating consistency and reliability in resource development and delivery. The learning specifications are premised on the separate content of the essential knowledge and associated skills section of the expanded Volume 2 - Essential Knowledge and Associated Skills clauses, which are referred to in each Competency Standard 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

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Term	Definition/Explanation
	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 relationship to the overall educational program
Exposed conductor	Means an electrical conductor, approach to which is not prevented by a barrier of rigid material or by insulation that is adequate under a relevant Australian Standard specification for the voltage concerned. Refer to NENS 03-2003
Fall Prevention	Safe Work Practices that effectively control all access to, egress from, transfer between structures and working at height where the fall potential is greater than 2 metres either above or below ground level. Assurance that the risk of someone failing from a height is controlled by at least one of the following measures: scaffolding (securely fenced work platform) physical barriers such as perimeter screens or fencing physical restraints such as catch platforms or safety nets fall arrest devices. Assurance that objects do not fall on people. An employer must provide a safe way of raising and lowering debris, materials and plant. Secure physical barriers must be used to prevent objects failing from buildings or structures. If it is not possible to provide a secure physical barrier, the employer must provide something which arrests the fall of an object. Safety helmets must be provided if there is no secure physical barrier. Assurance that scaffolding is erected and dismantled in accordance with Australian Standard AS 1576.1 - 1995. Access must be prevented if the scaffold is incomplete or unattended. If a person could fall more than 4 metres from a scaffold, an employer must ensure that a competent person inspects the scaffold before it is used. Unsafe scaffold must be repaired or altered before use. The scaffold must be reinspected every 30 days, or whenever it has been repaired, or whenever there are changes that may affect the scaffold - such as severe storms. These provisions are based on the

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Term	Definition/Explanation
	National Standard for Plant. Assurance that a person working in a lift well is protected from objects and movement of the lift car. This includes providing a safe working platform, adequate protection decking and a suitable means of access to the work. These provisions are based on the National Standard for Plant. An employer must ensure that permanent walkways are provided on brittle or fragile roofs to protect someone from failing. If this is not possible, they must provide temporary walkways or other methods of fall prevention. Assurance that people maintaining buildings, including when cleaning windows, are protected from fails. This includes providing safe access and appropriate fall arrest devices.
Feeder	Rail traction specific term. Provide traction supply from substations and section huts/tie stations.
First Aid	Initial care or treatment of an injured or sick person, given as an emergency measure until the services of medically qualified personnel can be obtained. First aid measures are designed to preserve life, promote recovery and prevent the injury or illness from becoming worse. Occupational Health and Safety legislation usually covers first aid requirements in employment. For the purpose of the Electricity Supply Industry, First Aid includes cardiopulmonary resuscitation or CPR.
Floating	Rail traction specific term. Insulated from earth, rail and all sources of supply but where failure of such insulation may result in becoming live.
Frog	Tram traction (including heritage) specific term and relates to gunmetal device used to direct a tram collector shoe at locations of diverging trolley wire at track turnouts
Frog leg	Tram traction (including heritage) specific term and relates to span or leg used to provide tension to the trolley wire anchoring at the frog. Also provides registration and alignment for the frog
Hanger	Tram traction (including heritage) specific term and relates to supports the trolley wire ear to the span wire
Height measuring stick	Insulated stick, approved & tested, for measuring the height of aerial conductors or equipment. They are usually telescopic

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Term	Definition/Explanation
	with the lower section being hollow.
Hazards	Something with the potential to cause injury and disease to persons, property or disruption to productivity. Hazards arise from workplace environment; use of equipment; poor work design; inappropriate systems, procedures and or human behaviour. May include confined spaces, electricity, gas, manual handling, noise, plant and equipment, infected blood, chemicals, temperature extremes, lightning and radiation. Making inventories of, and inspecting, high risk operations; and inspecting systems and operations associated with potentially hazardous events, for example, emergency communications, links to emergency services, fire fighting, chemical spill containment, bomb alerts and first aid services. Confined spaces, gas, electricity, manual handling, noise, plant and equipment, infected blood, chemicals, temperature, lighting, radiation.
Identifying hazards	Workplace inspections, including plant and equipment; audits; maintaining and analysing Occupational Health and Safety records, including environmental monitoring and health surveillance reports; maintenance of plant and equipment; reviews of materials and equipment purchases, including manufacturers and suppliers information; and employee reporting of Occupational Health and Safety issues.
Impedance bond	Rail traction specific term. May be found in the train electrified rail system in both single or double rail arrangements and is there to provide DC traction return current path around insulated rail joints of the signalling track circuits.
Incidents of environmental impact	Incidents of environmental impact may include emissions to air; releases to/of water; releases to land; disposal of waste; contamination of land; impact on communities; destruction of habitat; use of energy sources; waste generation processes and technologies; extraction of water; changes to water temperature; changes to water salinity; regulation of flow; land use; and may involve the implementation of emergency responses
Inspan Feeder	Rail traction specific term. Carry current between the catenary and contact wires and minimise the current flow in droppers by providing a low resistance path between the wires.

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Term	Definition/Explanation
Inspect	To examine or check a system, assembly, component or part by visual or physical means, for the purpose of identifying defects or limits
Insulated	Separated from adjacent conducting material by a non-conducting substance or airspace permanently providing resistance to the passage of current, or to disrupt discharge through or over the surface of the substance or space, to obviate danger of shock or injurious leakage current. Refer to AS/NZS 3000:2000
Isolated	Means disconnected from all possible sources of energy by means that prevent unintentional energisation of the apparatus of the apparatus and that are assessed as a suitable step in the process of making safe for access purposes. Refer to NENS 03-2003
Learning Specification (LS)	See Essential knowledge and associated skills (EKAS) learning specification (LS)
Jumpers	Provide electrical connection between two wires.
Knuckles	OHW components to positively locate or position two adjacent conductors relative to each other.
Legislation	Includes relevant sections of Federal and State OHS and Environmental Protection Acts. Government acts and regulations; Australian Standards and Codes of Practice; environmental legislative requirements. May also include; State or Territory acts and regulations; workers compensation legislation; employee code of conduct; anti discrimination legislation; equal employment opportunity legislation; disability legislation; trade practices legislation; native title legislation; related regulations; common law.
Life Plan evaluations	Life Plan evaluations usually relate to systems involving: Manufacturer’s recommendations; reliability performance profiles; knowledge of local history and experience; consultation with other Authorities; environmental influences; present practices.
Live	Means energised or subjected to hazardous induced or capacitive voltages. Refer to NENS 03-2003

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Term	Definition/Explanation
Live work	Means all work performed on components of electrical apparatus, not isolated, proved de-energised and earthed. Refer to NENS 03-2003
MSDS	Material Safety Data Sheets Information and handling of chemicals/flammable liquids are involved.
Maintenance and or modification procedures	Maintenance is performed at defined intervals to retain a system, component or part in a serviceable condition by systematic inspection, detection, replacement of worn-out items, adjustment, calibration or cleaning, etc Maintenance may include: Warranty inspections and repairs; routine inspections/examinations; preventative maintenance; condition monitoring processes and procedures; minor/major overhauls requirements; retirement/scrapping evaluations; diagnosis and repair of faults. Maintenance tasks will generally be carried out under access permits and in proximity to energised HV and LV conductors and equipment.
Management of projects	Projects may include: the modification to existing equipment and associated circuits, for example: existing secondary circuits and or installation/replacement of primary and secondary apparatus
Mast Labels	Used to identify overhead wiring structures by showing an alpha &/or numeric code which indicates the location of the structure. It can indicate the Line and the distance of the structure from a nominated datum point.
Mast/Pole	Rail traction specific term. A vertical structure that supports the overhead traction wiring. They are normally galvanised rolled steel section, but can be fabricated steel, concrete or timber.
Near	Means a situation where there is a reasonable possibility of a person, either directly or through any conducting medium, coming within the relevant safe approach distances. Refer to NENS 03-2003
Negative bus	A metal bar, insulated from earth, for the termination of

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Term	Definition/Explanation
	negative cables.
Notification	Notification (Notified) may include verbal, written, electronic or recorded information during or at the completion of work, which may be required to be completed in accordance with established procedures.
OHS practices	In accordance with all relevant OHS legislation, particularly: general duty of care; requirements for 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; health and safety representatives and OHS committees; issue resolution.
OHS issues	That could be raised by workers or designated persons include hazards identified; problems encountered in managing risks associated with hazards; clarification on understanding of OHS policies and procedures; communication and consultation processes; follow up to reports and feedback; effectiveness of risk controls; training needs. Issues can also be raised at Occupational Health and Safety committees and other committees, for example, consultative, planning and purchasing; health and safety representatives; employee and supervisor involvement in Occupational Health and Safety management activities, for example, Occupational Health and Safety inspections, audits, environmental monitoring, risk assessment and risk control; procedures for reporting hazards, risks and Occupational Health and Safety issues by managers and employees; and inclusion of Occupational Health and Safety in consultative or other meetings and processes.
OHW rail connection stick	Rail traction specific term. A specific type of operating stick used for rail connecting, testing and bridging both live and isolated traction overhead wiring conductors or equipment. With regards to trams this item would possibly be associated with Contract/Trolley – Rail Short-circuit using standard clamps and operating sticks.
Operational environment.	An operational environment may include the area where work is carried out or an area remote from the plant and equipment; Operation may be assisted by remote indicators of plant and apparatus status; Operation may be affected by inclement or otherwise harsh weather conditions and/or during night periods.

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Term	Definition/Explanation
Operating Stick (Rod)	An insulated stick, approved & tested, used for operating or working on live high voltage conductors, traction conductors or equipment.
Out of Commission	Means the condition of electrical apparatus which is not electrically connected and declared to be so in writing to the operating authority responsible for the electrical apparatus.
Overhead line (or aerial line)	Means any aerial conductor or conductors with associated supports, insulators and other apparatus erected, or in the course of erection, for the purpose of the conveyance of electrical energy. Refer to NENS 03-2003
Overhead wiring (OHW)	Rail traction specific term. All traction overhead wires and associated equipment that normally conducts, isolates or may be energised including contact/trolley wires, catenary, feeders and switching, tensioning and support equipment.
Overlap arrangements/air gaps	Rail traction specific term. The OHW arrangement between two anchor structures, where two adjoining OHW runs overlap and terminate.
Over-run protection	Rail traction specific term. Arrangements for minimising damage to pantographs when a train/tram enters an unwired section from a wired section.
Pantograph	Rail traction specific term. An apparatus fixed to the roof of electrical traction vehicles to draw current from the overhead supply. In Victoria heritage trams have pole and current collector shoe for the same purpose.
Pennant insulator	Rail traction specific term. Installed in catenary and contact wires in out-of-running locations between wires of different sections. This term is not used in all States/Territories.
Permits and/or permits to work	The permit to work is an authorisation for an individual to work to a schedule or in required activities and functions associated with the Electricity Supply Industry. Include any documents or forms approved for use by enterprise safety rules and permit to work procedures. Permits include electrical access permits, vicinity authorities, contractors' authorities, clearances and testing authorities, trip isolation sheets, statement of condition of equipment and

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Term	Definition/Explanation
	plant (SCAP), permit to work and work plans.
Personnel	May include individuals with responsibilities for coordination, design, installation, maintenance, production or servicing activities such as: site managers, project managers, engineers and technicians, technical experts, line managers/supervisors, regulatory personnel, team leaders, other personnel designated by an organisation or enterprise.
Personal protective equipment	Means protective clothing, equipment or a combination thereof that is worn by a person for protection against electrical hazards. Refer to NENS 09 - 2004
Pre-commissioning	Refers to the installation, maintenance, fault finding and/or repair to a new or existing electricity network equipment, where a new section is being added and is de-energised, or has been de-energised by appropriate personnel for augmentation to an existing Network, to be undertaken in accordance with requirements and established procedures. It includes the checking and testing of the equipment or circuits for integrity and performance at the completion of the work before it is handed over for re-energisation/energisation. Conducting full commissioning or return to service procedures of the equipment or circuits to the Network must be undertaken by appropriate personnel, authorised to undertake this function according to requirements and established procedures.
Primary equipment	Primary equipment may include: transformers, switchgear, secondary circuits, SCADA remote terminals, Programmable Logic Controllers (PLC), electrical control and meter/alarm circuits, protection control equipment, secondary electronic equipment and communication systems.
Procedures for operating safety systems, operating plant and equipment and reporting work activities.	In accordance with workplace procedures for: risk assessment and management; inspection; housekeeping; consultation processes, either general or specific to OHS training and assessment; specific hazard policies and procedures; OHS information; OHS record keeping; maintenance of plant and equipment; purchasing of supplies and equipment counselling/disciplinary processes.
Pull Off arrangements	Rail traction specific term. Arrangements that hold the catenary and contact wires in their horizontal position, but are not intended to support the weight of wires.

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Term	Definition/Explanation
Pull Off Mast	Rail traction specific term. Does not support the wiring, but pulls the wires to the correct location with respect to the track.
Quality assurance systems	Examples: specifications, requirements and procedures, work orders/instructions, reporting procedures, improvement mechanisms, compliance requirements and or safety management.
Rail bond	Rail traction specific term. A cable fixed across a break or joint in one rail, or between two rails &/or tracks to provide a path for traction return current or track circuits.
Rail connected or rail connection	Rail traction specific term. An approved connection of the traction OHW to the negative return rail (traction rail), to ensure the immediate effective discharge of electrical energy from the traction OHW equipment to rail in the event of equipment concerned being, or becoming, live.
Refresher Training	A competency confirmation event which may include training, the purpose of which is to compensate for or prevent deterioration in a previously achieved standard of performance.
Relevant switching programs	May include operations where HV and LV isolations are required to isolate a work area, operations where switching involves multiple and interconnecting network feeders, commissioning isolating/parallelling zone and/or terminal substation equipment, transmission and/or distribution systems, bus sections, and transformers.
Requirements	Requirements relate to that to which equipment and procedures and their outcomes must conform and include statutory obligations and regulations and standards called-up by legislation or regulations. Requirements may also include: statutory regulations, codes of practice, job specifications, transport documentation, standards called-up in specifications be they Australian/New Zealand or International, procedures and work instructions, quality assurance systems, manufacturers' specifications, maintenance manuals, schedules and specifications/standards for network distribution systems, substation schedules, switching schedules, circuit/cable schedules, design specifications including resource estimating models, customer/client requirements, and specifications, specified essential knowledge and skills as stated under clause 6.1 in a

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Term	Definition/Explanation
	unit's Evidence Guide, street survey plans and relevant maps.
Safe approach distance	Means the minimum separation in air from an exposed conductor that shall be maintained by a person, or any object (other than insulated objects designed for contact with live conductors) held by or in contact with that person. Refer to NENS 03-2003
Safety observer	Means a person competent for the task and specifically assigned the duty of observing and warning against unsafe approach to electrical apparatus or other unsafe conditions. Refer to NENS 03-2003
Safe Design Principles	Safe Design principles encompassing: • Safe Design Duty related information • This information provides the legal motivation for engagement in the safe design process. Some examples include legislative obligations of 'designers', application of relevant national standards and codes of practice for ESI, upstream obligation bearer prosecution cases, and common law cases. • Safe Design Process (or problem specific) related information This information should include material that provides guidance about how generally to go about the safe design process. It is expected that some examples will be available from workplace safety including some specific industries. Parallel examples might be available on other fields such as product safety. • Safe Design evaluations From a preliminary review of industry stakeholder, client and customer feedback, evaluations of safe design initiatives are likely to be important in order to provide justification for safe design. This material may also provide examples of financial effects, cost benefit analysis etc of safe design.
	Note: A useful resource in this area will be the proposed *NOHSC Safe Design Guide* due out in late 2004.'
Section hut or tie station (also known as track	Rail traction specific term. A building generally located between substations containing circuit breakers providing

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Term	Definition/Explanation
section cabin)	protection and sectioning of the overhead traction supply system and, on multiple tracks, for improving voltage regulation.
Section insulator	Rail traction specific term. Separates two electrical sections in a contact/trolley wire run, while maintaining smooth and secure passage of vehicle pantographs.
Short-circuit, short-circuited	The connection by a low resistance path between two or more points in an electrical circuit. In the DC traction system a connection by an approved device between the positive conductor of traction voltage apparatus to rail or rail-connected negative conductor of the apparatus.
Simple catenary system	Rail traction specific term. A system which consists of one or two catenary wire(s) supporting one or two contact wire(s).
Span/Span network	Tram traction (including heritage) specific term and relates to steel or insulated rope (parafil) support wire or wire network to provide support and registration for the trolley wire
Specialist tools	LV detectors, LV polarity testers and LV phase rotation indicators, HV phasing sticks, HV link sticks, HV line clamp operating sticks, HV ground transformer isolating handles and associated earths, HV operating earths, HV detectors and voltmeters.
Substation	Means a switchyard, terminal station or place at which high voltage supply is switched, converted or transformed. Substations include the following – traction substations, transformer rooms, switch rooms, section huts, pole-mounted or pad-mounted transformers which contain high-voltage electrical equipment Refer to NENS 03-2003
Superelevation (or cant)	Rail traction specific term. Where curves occur on the track the rail on the outside of the curve may be higher than the inside rail to counteract the centrifugal force of the vehicle on the bend. This difference in the rail height is called superelevation. The amount of superelevation depends on the radius of the curve and the usual speed of the vehicles and constraints such as road profiles for street based rail systems.
Support and registration	Equipment that supports and holds the conductors in their

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Term	Definition/Explanation
arrangements	designed positions.
Support structures/spans or networks	Structures/spans or networks on which the support and registration arrangements are mounted.
Surge arresters/diverters or Lightening arresters	Equipment for suppressing electrical surges travelling along the OHW conductors.
Switchgear	Equipment for controlling the distribution of electrical energy or for controlling or protecting circuits, machines, transformers, or other equipment. Includes: HV/LV fuses, LV links and bridges; HV reclosers, ring main units, circuit breakers, isolators, earth switches, sectionalisers, HV links, air break switches, capacitor banks, transformer tap changes (on and off load) metering and protection equipment and data communication systems, voltage regulators, reclosers. Refer to AS/NZS 3000:2000
Tension regulator	An arrangement for maintaining constant tension in the overhead wiring conductors. It can do this by attaching the conductor, via a galvanised wire rope through a pulley system, to a track of steel or concrete weights at the end of the wire run. Tension regulation can also be achieved using spring systems.
Testing and recording equipment	Testing and recording equipment could include: Digital bearer test equipment; Voice frequency analysers; RF mounting equipment; RF spectrum equipment; Multimeters; Communication testers; Transmission measuring sets; Directional couplers; Laptop computers. Or Infrascan equipment; Phasing equipment; Recording meters; Trend monitoring equipment; Condition monitoring equipment; Diagnostic testing devices using computer hardware and software; Taplon sticks; Insulation and continuity test instruments; Voltage, resistance and current testers; Ductors; Ratio meters; Earth systems testing devices; Capacitor bridge meters; Doble Test sets devices; High voltage alternating current test sets; Scope meters; Clip on ammeters; Test plans for automatic relay testing SCADA systems used for developing and evaluating voltage regulation systems, circuit breaker reclosing systems, VAR's monitoring and similar computer controlled diagnostic testing and recording. Or AC/DC test sets; IR testers; earth resistance meters; cable fault location equipment; circuit breaker timers;

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Term	Definition/Explanation
	recording equipment; devices utilising computer hardware and software; oil dielectric strength equipment; trend monitoring equipment; infrared thermographic equipment; schering bridge; partial discharge test equipment; double insulation test set; primary injection test sets; CT and VT calibration equipment and SF6 leakage testers.
Testing procedures	Tests may include: DC/AC measurements, error, continuity, noise level, return loss, spectrum analysis, radio on receiver sensibility, surveys - mobile phones/pager, end to end, line levels both in and out, transmitter power, transmitter frequency, transmitter deviation, receiver frequency and sensitivity, level and quality of demodulated output - audio/bit error rate, antenna sweep measurements, power and environmental conditions including emergency power plant.
Terminal insulator	Installed between a catenary or contact wire and an anchor structure.
Traction rail/Power rail	Rail traction specific term. Rail that conducts the traction return current. May include multiple rails or may be just one rail, depending on the type of signalling system used in the section and the number of tracks.
Traction return current	Rail traction specific term. The electric current returning from the overhead traction supply to substations.
Transmission medium	Transmission medium may be: Copper cables; Coaxial cables; Optical fibre cables; Radio; Satellite; Microwave.
Unit(s) of competency	See competency standard unit(s).
Up Track	Rail traction specific term. The normal train/tram running towards a specified datum station or location.
Voltage	Differences of potential normally existing between conductors and between conductors and earth as follows: Extra-low voltage: Not exceeding 50V ac or 120V ripple-free dc. Low voltage: Exceeding extra-low voltage, but not exceeding 1000V ac or 1500V dc. High voltage: Exceeding low voltage. Refer to AS/NZS 3000:2000
Vicinity	Means a situation where it is unlikely that a person will, either

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Term	Definition/Explanation
	directly or through any conducting medium (e.g. via mobile plant) come within the relevant safe approach distances.
Work clearance systems	Example: work permits monitoring and clearance procedures and or isolation procedures.
Working earth	Means approved earthing and short-circuiting equipment applied to electrical apparatus, additional to access authority earths, following the issue of an access authority. Refer to NENS 03-2003

1.2 Glossary of Terms Related 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 work place 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 Standard Unit 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.

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As in many technical areas, OHS has its own language. OHS affects 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.

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.

NOHSC term	Definition/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.
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.

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NOHSC term	Definition/Explanation
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.
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 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. They include: • performance checklists • sets of questions to be asked • descriptions of required characteristics to be checked • limitations 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)

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NOHSC term	Definition/Explanation
	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	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: - have an atmosphere which contains potentially harmful levels of contaminant - not have a safe oxygen level or - cause engulfment - 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 their head (i.e. 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). References: AS/NZS 2865:2001 *Safe working in a confined space* Handbook – *HB 213:2003 Guidelines for safe working in a confined spa*ce
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

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NOHSC term	Definition/Explanation
	• 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. When developing consultative arrangements, consider: • language • shift work and rostering arrangements • timing of information and data provision • literacy and numeracy levels • workers with special needs • workplace organisational structures (for example, size of organisation, geographic, hierarchical) • cultural diversity • management approach • workplace culture and approach to OHS by managers, supervisors and employees.
Controls See also Hierarchy of control	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 which: • should be applied when the most probable outcome is death or serious injury • 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

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NOHSC term	Definition/Explanation
	reduce exposure to workplace hazards.
Crisis management plan	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 • incorporates dealing with external agencies and support • addresses planning for recovery before crisis occurs. Documentation for 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 • crisis risk management documentation, such as risk management team lists, communications strategies, identification of issues, risk assessments/evaluations, vulnerability profiles, risk registers and treatment strategies. The term *emergency management* may also apply but *crisis management* infers a more holistic approach encompassing the full range of business affairs.
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.

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NOHSC term	Definition/Explanation
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 designed-product. It also includes any subsequent alteration (redesign or retrofit).
Design process	There are two stages of the design process: • The concept design phase considers preliminary design options, which are assessed against product specifications to determine the best preliminary design to be developed. This phase includes concept design, research and development, feasibility and risk management (including OHS risks). • The detailed design phase develops the selected design to its final state. It 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	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,

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NOHSC term	Definition/Explanation
including OHSMSs	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 • hazardous substance and chemical spills • explosion and bomb alerts • security emergencies — armed robberies, intruders • 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 as a *hazardous event*.
Emergency agency	Includes fire, police, ambulance, relevant government departments, hazardous materials response teams (HAZMAT) and OHS authorities.
Emergency control organisation (ECO)	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.

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NOHSC term	Definition/Explanation
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.
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

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NOHSC term	Definition/Explanation
	• logistics • HR, IR and personnel management, including payroll • engineering and maintenance • information, data and records management • finance and auditing • environmental management • quality management.
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.

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NOHSC term	Definition/Explanation
	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; monitoring and measurement.
Hazard identification tools and processes	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(s)	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

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NOHSC term	Definition/Explanation
	strategies.
Health and safety representative	An employee, elected by the workgroup, who represents the OHS 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. Includes work with welders, 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)	May be **internal** and include:

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NOHSC term	Definition/Explanation
Information	• hazard, incident and investigation reports • 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 • employees including questionnaire results • OHS advisors • manufacturers' manuals and specifications.
(Sources of OHS) Information	May be **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

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NOHSC term	Definition/Explanation
	• the flow of steam, electricity, gases or liquids • the use of faulty or unsafe plant and equipment • 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 or 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.
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.

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NOHSC term	Definition/Explanation
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 • 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

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NOHSC term	Definition/Explanation
	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	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. May also be referred to as *consultative arrangements*, however *participation* implies a higher level of involvement.
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 • 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.

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NOHSC term	Definition/Explanation
Personal protective equipment (PPE)	Equipment designed to be worn to provide protection from hazards, and may include: • head protection • face and eye protection • respiratory protection • hearing protection • hand protection • clothing and footwear. • PPE 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.
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

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NOHSC term	Definition/Explanation
	• 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	That risk that is unable to be designed out of a product or process.
Risk	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. Refer also to *Consequence* and *Likelihood*.
Risk analysis	Analysing the risk to: • identify factors influencing the risk and the range of potential consequences • 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 the risk may be associated with: • equipment • work environment/organisation • task • the individual/operator • frequency and duration of exposure • number of people exposed/involved.

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NOHSC term	Definition/Explanation
Risk assessment	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. Refer also to *Risk Analysis* and *Risk 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	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; • possible control measures and dates for implementation. May also be referred to as *Hazard Register*.
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:

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NOHSC term	Definition/Explanation
	• 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 • is reviewed regularly • has OHS performance indicators (i.e. 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 • 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

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NOHSC term	Definition/Explanation
	• 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

2.1 Competency Standards Units

Volume 2 Part 2

2.1 Competency Standards Units

Accessing the Competency Standard Units from this Industry Training Package

This section of the national Electricity Supplied Industry Transmission, Distribution and Rail sector Training Package UET09 outlines the industry Competency Standard Units. Approximately 216 Competency Standard Units have been arranged into twelve (12) discipline categories for ease of presentation and to facilitate quick access and referencing for users.

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Competency Standard Components

All Competency Standard Units found in this National Electricity Supply Industry Transmission, Distribution and Rail sector Training Package UET09 have been developed in accordance with DEEWR requirements with minor enhancements. All Parts in Volume 2 of this Training Package form an integrated component of each Competency Standard Unit and must be included when developing learning strategies and assessment processes.

Each Competency Standard Unit is interrelated and linked with the Definitions/Glossary and Essential Knowledge and Associated Skills sections of the Volume. It should be noted that the essential knowledge and associated skills have been separated from the Competency Standard Units to facilitate user-friendliness, applicability and future maintenance. This separate essential knowledge and associated skills forms an integral part of each Competency Standard Unit, and all assessment evidence activities and reporting processes will include and confirm achievement of this specification.

No Competency Standard Unit is to be used in isolation or exported without these interrelated components.

Structure of the Competency Standard Units

Section 1 provides the unit title and scope.

Section 2 provides for all of the pre-requisite and co-requisite standard units that are required for each individual competency standard unit, as well as a section on Literacy and Numeracy entry requirements.

Section 3 has further information in relation to the application of the units and any licence to practice advice for those assessing the Competency Standard Units with the potential licensing requirements that underpin the carrying out of work performed in the Competency Standard Unit.

Section 4 covers the competency field or discipline applying and section 5 the elements.

Section 6 provides detailed information on the required Essential Knowledge and Associated Skills (EKAS) to be delivered as a part of the competency standard. It includes the need to use and reference Volume 2 Part 2.2 of this Training Package for the required detail and specification of the essential knowledge and associated skills applying to the unit.

Section 7 relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. This Range Statement allows for different work environments and situations that will/may affect performance.

Section 8 covers the Evidence Guide that includes the overview of assessment; critical aspects of evidence required to demonstrate competency in the unit; context of assessment including resource implications; methods to be used in assessment of the learner and relationship to other competency standard units found in the Training Package.

For further information in relation to the competency standard units, users of this Training Package should refer to *Volume 1, Part 1 Qualifications* and *Volume 1, Part 2 Competency Standards.*

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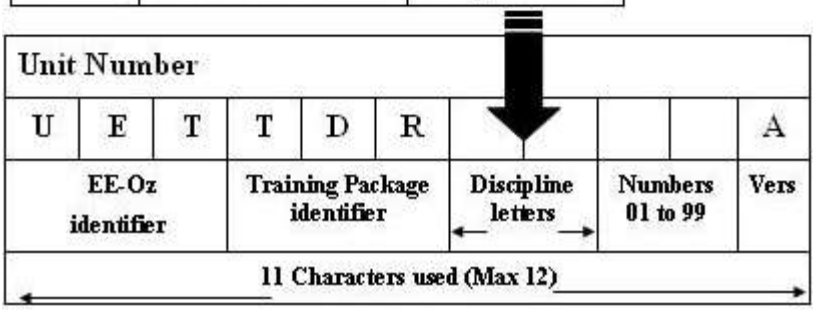
2.1 Competency standard units - Coding Structure

Part Number	Disciplines	Discipline Letters
2.1.1	**Cable Jointing**	CJ
2.1.2	**Distribution**	DP
2.1.3	**Design**	DS
2.1.4	**Entry Level - Cross Discipline**	EL
2.1.5	**Industry Specific - Cross Discipline**	IS
2.1.6	**Rail Traction**	RT
2.1.7	**Substation**	SB
2.1.8	**System Operations**	SO
2.1.9	**Transmission**	TP
2.1.10	**Testing**	TS
2.1.11	**Vegetation**	VC
2.1.12	**Imported Units**	Using own code



Note:

2.1.14 Possible Skills Sets CSUs

2.1.1 Cable Jointing Competency Standard Units

The following units have been grouped into the Discipline of Cable Jointing. They can be found in Qualifications within this Training Package across a number of AQF levels. Reference should be made to the Qualification Structure of Volume 1 Part 1 Qualification Framework to determine the relevant unit(s) pertaining to the qualification(s) required.

The Cable Jointing Discipline contains the following units:

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UNIT CODE	UNIT TITLE
UETTDRCJ01B	Lay electrical cables
UETTDRCJ02B	Install and maintain de-energised LV underground paper insulated cables.
UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables.
UETTDRCJ04B	Joint and maintain energised LV underground paper insulated cables
UETTDRCJ05B	Perform straight through HV paper insulated to polymeric transition joint
UETTDRCJ06B	Install and maintain de-energised LV underground polymeric cables.
UETTDRCJ07B	Install and maintain de-energised HV underground polymeric cables.
UETTDRCJ08B	Joint and maintain energised LV underground polymeric cables
UETTDRCJ09B	Install oil and gas filled specialised underground cables
UETTDRCJ10B	Maintain oil and gas filled specialised underground cables
UETTDRCJ11B	Install and maintain polymeric specialised underground cables
UETTDRCJ12B	Install and maintain oil & gas pressure systems for specialised underground cables
UETTDRCJ13B	Install and maintain network infrastructure LV underground cables
UETTDRCJ14B	Install and maintain network infrastructure HV underground cables

2.1.2 Distribution Competency Standard Units

The following units have been grouped into the Discipline of Distribution. They can be found in Qualifications within this Training Package across a number of AQF levels. Reference should be made to the Qualification Structure of Volume 1 Part 1 Qualification Framework to determine the relevant unit(s) pertaining to the qualification(s) required.

The Distribution Discipline contains the following units:

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UNIT CODE	UNIT TITLE
UETTDRDP01B	Inspect overhead structures and electrical apparatus (poles /structures)
UETTDRDP02B	Maintain overhead energised LV conductors and cables
UETTDRDP03B	Maintain energised high voltage distribution overhead electrical apparatus (stick)
UETTDRDP04B	Maintain energised high voltage distribution overhead electrical apparatus (glove)
UETTDRDP05B	Inspect, maintain and restore energised LV overhead distribution network infrastructure

2.1.3 Design Competency Standard Units

The following units have been grouped into the Discipline of Design. They can be found in Qualifications within this Training Package across a number of AQF levels. Reference should be made to the Qualification Structure of Volume 1 Part 1 Qualification Framework to determine the relevant unit(s) pertaining to the qualification(s) required.

The Design Discipline contains the following units:

UNIT CODE	UNIT TITLE
UETTDRDS01B	Draft and layout an overhead distribution extension
UETTDRDS02B	Draft and layout an underground distribution extension
UETTDRDS03B	Draft and layout a street lighting system
UETTDRDS04B	Draft and layout a distribution substation minor upgrade
UETTDRDS05B	Design overhead distribution systems
UETTDRDS06B	Design underground distribution systems
UETTDRDS07B	Design distribution substations
UETTDRDS08B	Design public lighting systems
UETTDRDS09B	Prepare and manage detailed construction plans for electrical system infrastructure

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UNIT CODE	UNIT TITLE
UETTDRDS10B	Prepare and appraise financial impact statements
UETTDRDS11B	Manage electrical infrastructure projects
UETTDRDS12B	Investigate quality of supply issues
UETTDRDS13B	Develop HV and LV distribution protection systems
UETTDRDS14B	Design zone substations modifications
UETTDRDS15B	Organise and implement line and easement surveys
UETTDRDS16B	Develop planned outage strategies
UETTDRDS17B	Review asset management strategies
UETTDRDS18B	Analyse and appraise fault and outage data
UETTDRDS19B	Establish and manage geographical information systems data
UETTDRDS20B	Design customer substations
UETTDRDS21B	Manage transmission and sub-transmission design process
UETTDRDS22B	Design transmission, sub-transmission and zone substation buildings
UETTDRDS23B	Design transmission and sub-transmission substation primary plant
UETTDRDS24B	Design transmission and sub-transmission protection and control
UETTDRDS25B	Design transmission and sub-transmission substation earthing
UETTDRDS26B	Design transmission, sub-transmission and zone substation – civil and structural components
UETTDRDS27B	Design overhead transmission systems
UETTDRDS28B	Design underground transmission systems

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2.1.4 Cross Discipline Competency Standard Units

The following units have been grouped into the Discipline of Entry Level — Cross Discipline. They can be found in Qualifications within this Training Package across a number of AQF levels. Reference should be made to the Qualification Structure of Volume 1 Part 1 Qualification Framework to determine the relevant unit(s) pertaining to the qualification(s) required.

The Entry Level — Cross Discipline contains the following units:

UNIT CODE	UNIT TITLE
UETTDREL01B	Apply environmental and sustainable energy procedures
UETTDREL02B	Operate plant and equipment near live electrical conductors/apparatus
UETTDREL03B	Comply with environmental and incidental response procedures
UETTDREL04B	Working safely near live electrical apparatus as non electrical worker
UETTDREL05B	Respond to technical enquiries and requests

2.1.5 Industry Specific Cross Discipline Competency Standard Units

The following units have been grouped into the Discipline of Industry Specific — Cross Discipline. They can be found in Qualifications within this Training Package across a number of AQF levels. Reference should be made to the Qualification Structure of Volume 1 Part 1 Qualification Framework to determine the relevant unit(s) pertaining to the qualification(s) required.

The Industry Specific — Cross Discipline contains the following units:

UNIT CODE	UNIT TITLE
UETTDRIS01B	Install electrical equipment (network infrastructure).
UETTDRIS02B	Maintain electrical equipment (Network Infrastructure).
UETTDRIS03B	Perform LV field switching operation to a given schedule.
UETTDRIS04B	Perform high voltage field switching operation to a given schedule
UETTDRIS05B	Perform substation switching operation to a given schedule

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UNIT CODE	UNIT TITLE
UETTDRIS06B	Install and maintain network infrastructure electrical equipment
UETTDRIS07B	Sample, test, filter, and reinstate insulating oil
UETTDRIS08B	Develop HV switching schedule
UETTDRIS09B	Develop LV switching schedule
UETTDRIS10B	Coordinate permit procedures
UETTDRIS11B	Coordinate and direct switching schedules
UETTDRIS12B	Install and maintain poles/structures and associated hardware
UETTDRIS13B	Install and maintain public lighting systems
UETTDRIS14B	Install and maintain overhead conductors and cables (poles and structures)
UETTDRIS15B	Install and maintain low voltage services (underground)
UETTDRIS16B	Install and maintain low voltage services (overhead)
UETTDRIS17B	Conduct visual checking and treatment of poles and structures
UETTDRIS18B	Locate faults in underground power cables
UETTDRIS19B	Conduct high potential testing of underground power cables
UETTDRIS20B	Install and replace energy meters and associated equipment
UETTDRIS21B	Install mobile generation set for synchronised Genset LV
UETTDRIS22B	Implement and monitor the organisational OHS policies, procedures and programs
UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures
UETTDRIS24B	Install mobile generation set for synchronised genset HV
UETTDRIS25B	Contribute to coordinated high voltage live line work
UETTDRIS26B	Manage an electricity supply industry OHS management system
UETTDRIS27B	Install and maintain overhead distribution network infrastructure

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UNIT CODE	UNIT TITLE
UETTDRIS28A	Analyse and develop solutions for problems in extra-low voltage, single path circuits
UETTDRIS29A	Analyse and develop solutions for problems in multiple path d.c. circuits
UETTDRIS30A	Analyse and develop solutions for problems in electromagnetic circuits
UETTDRIS31A	Analyse and develop solutions for problems in single and three phase low voltage circuits
UETTDRIS81A	Install and maintain telecommunications infrastructure on electricity supply industry assets

2.1.6 Refresher Training Competency Standard Units

The following units have been grouped into the Discipline of Refresher Training. These units have been designed to meet the requirements for refresher training of skills essential for gaining and maintaining access to electricity supply industry networks.

These units are not included in any qualifications or elective schedules and are only to be accessed via the identified Skill Sets endorsed in this training package.

Reference should be made to the Section 1.2 List of Skill Sets in Volume 1 Part 1 Qualification Framework for the details of the Skill Sets.

The Refresher Training Discipline contains the following units:

UNIT CODE	UNIT TITLE
UETTDRRF01A	Apply ESI safety rules, codes of practice and procedures for work on or near electrical apparatus
UETTDRRF02A	Perform pole top rescue
UETTDRRF03A	Perform EWP rescue
UETTDRRF04A	Perform tower rescue
UETTDRRF05A	Perform rescue from switchyard structures at heights
UETTDRRF06A	Perform rescue from a live LV panel
UETTDRRF07A	Perform cable pit/trench/excavation rescue
UETTDRRF08A	Perform EWP controlled descent escape

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UNIT CODE	UNIT TITLE
UETTDRRF09A	Apply access procedures to work on or near electrical network infrastructure
UETTDRRF10A	Provide first aid in an ESI environment

2.1.7 Rail Traction Competency Standard Units

The following units have been grouped into the Discipline of Rail Traction. They can be found in Qualifications within this Training Package across a number of AQF levels. Reference should be made to the Qualification Structure of Volume 1 Part 1 Qualification Framework to determine the relevant unit(s) pertaining to the qualification(s) required.

The Rail Traction Discipline contains the following units:

UNIT CODE	UNIT TITLE
UETTDRRT01B	Install overhead traction wiring systems
UETTDRRT02B	Maintain overhead traction wiring systems
UETTDRRT03B	Install traction bonds
UETTDRRT04B	Maintain traction bonds
UETTDRRT05B	Install overhead traction configurations
UETTDRRT06B	Maintain overhead traction configurations
UETTDRRT07B	Install overhead traction equipment and components
UETTDRRT08B	Maintain overhead traction equipment and components
UETTDRRT09B	Operate road rail traction height access equipment.
UETTDRRT10B	Perform rail traction switching operations to a given schedule
UETTDRRT11B	Maintain energised direct current traction overhead wiring system
UETTDRRT12B	Maintain energised traction overhead electrical apparatus (stick)
UETTDRRT13B	Maintain energised traction overhead electrical apparatus (glove)
UETTDRRT14B	Install and maintain traction network wiring systems

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UNIT CODE	UNIT TITLE
UETTDRRT15B	Install and maintain traction network equipment and components

2.1.8 Substation Competency Standard Units

The following units have been grouped into the Discipline of Substation. They can be found in Qualifications within this Training Package across a number of AQF levels. Reference should be made to the Qualification Structure of Volume 1 Part 1 Qualification Framework to determine the relevant unit(s) pertaining to the qualification(s) required.

The Substation Discipline contains the following units:

UNIT CODE	UNIT TITLE
UETTDRSB01B	Diagnose and rectify faults in power system substation environment
UETTDRSB02B	Carry out substation inspection
UETTDRSB03B	Install and maintain substation DC systems
UETTDRSB04B	Maintain HV power system breakers
UETTDRSB05B	Maintain HV power system – transformers and instrument transformers
UETTDRSB06B	Install high current DC switchgear and equipment
UETTDRSB07B	Maintain high current DC switchgear and equipment
UETTDRSB09B	Maintain voltage regulating equipment – capacitor banks
UETTDRSB10B	Maintain HV power system static VAR compensators
UETTDRSB11B	Maintain HV power system synchronous condensers
UETTDRSB12B	Maintain voltage regulating equipment – on load tapchangers
UETTDRSB13B	Install HV plant and equipment
UETTDRSB14B	Carry out Thermovision surveys
UETTDRSB15B	Maintain discrete protection and control systems
UETTDRSB16B	Commission discrete protection and control systems

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UNIT CODE	UNIT TITLE
UETTDRSB17B	Maintain distribution field devices
UETTDRSB18B	Commission distribution field devices

2.1.9 System Operations Competency Standard Units

The following units have been grouped into the Discipline of System Operations. They can be found in Qualifications within this Training Package across a number of AQF levels. Reference should be made to the Qualification Structure of Volume 1 Part 1 Qualification Framework to determine the relevant unit(s) pertaining to the qualification(s) required.

The System Operations Discipline contains the following units:

UNIT CODE	UNIT TITLE
UETTDRSO02B	Manage network faults
UETTDRSO03B	Manage critical events
UETTDRSO04B	Control generating plant
UETTDRSO05B	Manage HV distribution and subtransmission network demand
UETTDRSO06B	Develop LV distribution switching programs
UETTDRSO07B	Develop HV distribution and subtransmission switching programs
UETTDRSO08B	Develop and evaluate transmission switching programs
UETTDRSO09B	Coordinate LV distribution networks
UETTDRSO10B	Coordinate HV distribution and subtransmission networks
UETTDRSO11B	Manage transmission networks
UETTDRSO12B	Manage transmission network demand
UETTDRSO13B	Coordinate LV distribution network demand
UETTDRSO14B	Develop crisis management plans
UETTDRSO15A	Operate and monitor system equipment (SCADA)
UETTDRSO16A	Monitor and control the activities of field staff

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UNIT CODE	UNIT TITLE
UETTDRSO17A	Coordinate HV transmission network
UETTDRSO18A	Respond to discrete/ interdependent protection operations
UETTDRSO19A	Coordinate system operations in a regulated energy market
UETTDRSO20A	Respond to complex protection operations
UETTDRSO21A	Manage network power flows

2.1.10 Transmission Competency Standard Units

The following units have been grouped into the Discipline of Transmission. They can be found in Qualifications within this Training Package across a number of AQF levels. Reference should be made to the Qualification Structure of Volume 1 Part 1 Qualification Framework to determine the relevant unit(s) pertaining to the qualification(s) required.

The Transmission Discipline contains the following units:

UNIT CODE	UNIT TITLE
UETTDRTP02B	Establish and reinstate a transmission tower work site
UETTDRTP03B	Erect transmission towers
UETTDRTP04B	Erect transmission tower hardware
UETTDRTP05B	Pre-tension stringing transmission overhead conductors and cables
UETTDRTP06B	Erect transmission towers and associated hardware
UETTDRTP07B	Maintain transmission towers and associated hardware
UETTDRTP08B	Transmission tower stub setting
UETTDRTP09B	Install and maintain overhead conductors and cables (towers)
UETTDRTP10B	Inspect overhead structures and electrical apparatus (towers)
UETTDRTP11B	Maintain energised lines (transmission) using live line stick technique
UETTDRTP12B	Maintain energised lines (transmission) using Barehand Technique

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UNIT CODE	UNIT TITLE
UETTDRTP13B	Maintain energised lines (transmission) using Barehand Technique on a helicopter platform
UETTDRTP14B	Install and maintain overhead transmission network infrastructure
UETTDRTP15B	Install and maintain transmission network infrastructure electrical equipment

2.1.11 Testing Competency Standard Units

The following units have been grouped into the Discipline of Testing. They can be found in Qualifications within this Training Package across a number of AQF levels. Reference should be made to the Qualification Structure of Volume 1 Part 1 Qualification Framework to determine the relevant unit(s) pertaining to the qualification(s) required.

The Testing Discipline contains the following units:

UNIT CODE	UNIT TITLE
UETTDRTS01B	Maintain network protection and control systems (interdependent)
UETTDRTS02B	Commission network protection and control systems (interdependent)
UETTDRTS03B	Conduct evaluation of power system faults within a substation
UETTDRTS04B	Design testing and commissioning procedures for substation and field devices
UETTDRTS05B	Test and maintain metering schemes
UETTDRTS06B	Commission metering schemes
UETTDRTS07B	Perform accuracy checks on instrument transformers
UETTDRTS08B	Test, repair and calibrate protection relays and meters
UETTDRTS09B	Develop secondary isolation instructional documents
UETTDRTS10B	Design secondary isolation instructional documents
UETTDRTS11B	Maintain, test and commission voltage regulating equipment

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UNIT CODE	UNIT TITLE
UETTDRTS12B	Conduct evaluation of primary plant
UETTDRTS13B	Undertake project management of substation augmentation and maintenance
UETTDRTS14B	Install and maintain power system communication equipment
UETTDRTS15B	Maintain network protection and control systems (Complex)
UETTDRTS16B	Commission network protection and control systems (complex)

2.1.12 Vegetation Competency Standard Units

The following units have been grouped into the Discipline of Vegetation. They can be found in Qualifications within this Training Package across a number of AQF levels. Reference should be made to the Qualification Structure of Volume 1 Part 1 Qualification Framework to determine the relevant unit(s) pertaining to the qualification(s) required.

The Vegetation Discipline contains the following units:

UNIT CODE	UNIT TITLE
UETTDRVC01B	Cut vegetation above ground outside live work zone near live electrical apparatus (climbing)
UETTDRVC02B	Operate vegetation control plant, machinery and equipment near live electrical apparatus
UETTDRVC03B	Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus
UETTDRVC04B	Assess vegetation and recommend control measures for work near live electrical apparatus
UETTDRVC05B	Cut vegetation above ground outside live work zone near live electrical apparatus (platform)
UETTDRVC06B	Cut vegetation at ground level outside ‘vegetation exclusion zone’ near live electrical apparatus
UETTDRVC07B	Monitor safety compliance for vegetation work near live electrical apparatus
UETTDRVC08B	Safe use of Elevating Work Platform (EWP) near live electrical

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UNIT CODE	UNIT TITLE
	apparatus
UETTDRVC09B	Control vegetation (linework)
UETTDRVC10B	Coordinate vegetation control work

2.1.13 Imported CSUs

The following have been grouped into the Discipline of Imported units. They can be found in Qualifications within this Training Package across a number of AQF levels. Reference should be made to the Qualification Structure of Volume 1 Part 1 Qualification Framework to determine the relevant unit(s) pertaining to the qualification(s) required. The units grouped into this Discipline use their own unit code and are placed into two areas. Those that are utilised in the Core and those that are available as Electives units in any of the qualifications pertaining to this Training Package.

Every effort has been made to supply the latest imported unit but it is the responsibility of the user to utilise the most up-to-date version of the unit(s) required. It is highly advisable that imported unit are periodically checked with the National Training Information Service (NTIS) via the following link: http://www.ntis.gov.au

Imported units used as in the qualifications as Cores units are supplied in this Training Package in their entirety.

The Imported Units used in the Core are as follows:

UNIT CODE	UNIT TITLE
UEENEED002B	Assemble, set-up and test personnel computers
UEENEED004B	Use engineering application software
UEENEEE001B	Apply OHS practices in the workplace
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE003B	Solve problems in extra-low voltage, single path circuits
UEENEEE004B	Solve problems in multiple path DC circuits
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals
UEENEEE024B	Compile and produce an electrotechnology report

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UNIT CODE	UNIT TITLE
UEENEEG001B	Solve problems in electromagnetic circuits
UEENEEG002B	Solve problems in single and three phase low voltage circuits
UEENEEG047B	Provide computational solutions to power engineering problems
UEENEEG048B	Solve problems in complex multiple path power circuits
UEENEEG049B	Solve problems in complex polyphase power circuits
UEENEEH002B	Carry out basic repairs to electronic apparatus by replacement of components
UEENEEH011B	Troubleshoot d.c. power supplies with single phase input

Imported units used available in the qualifications as Elective units are supplied in this Training Package in a reduced format.

The Imported Units available as Elective Units are as follows:

UNIT CODE	UNIT TITLE
BSBFLM303B	Contribute to effective workplace relationships
BSBFLM305B	Support operational plan
BSBFLM306B	Provide workplace information and resourcing plans
BSBFLM309B	Support continuous improvement systems and processes
BSBFLM311B	Support a workplace learning environment
BSBFLM312A	Contribute to team effectiveness
BSBFLM403B	Manage effective workplace relationships
BSBFLM405B	Implement operational plan
BSBFLM406B	Implement workplace information system
BSBFLM409B	Implement continuous improvement
BSBFLM412A	Promote team effectiveness
BSBFLM501B	Manage personal work priorities and professional development

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UNIT CODE	UNIT TITLE
BSBFLM503B	Manage effective workplace relationships
BSBFLM505B	Manage operational plan
BSBFLM506B	Manage workplace information systems
BSBFLM507A	Manage quality customer service
BSBFLM509B	Facilitate continuous improvement
BSBFLM510B	Facilitate and capitalise on change and innovation
BSBFLM511B	Develop a workplace learning environment
BSBFLM512B	Ensure team effectiveness
BSBFLM513A	Manage finances
BSBFLM514A	Manage people
BSBMGT507A	Manage environmental performance
HLTCPR201A	Perform CPR
ICTTC013C	Perform accurate cable system test
ICTTC064C	Haul underground cable
ICTTC065C	Splice optic fibre cable
ICTTC066C	Joint and terminate co-axial cable
ICTTC068C	Install telecommunications service to a building
ICTTC069C	Install network cable equipment
ICTTC104C	Maintain an electronic system
ICTTC127C	Supervise work site activities
ICTTC131B	Install an above ground equipment enclosure
ICTTC133B	Construct underground enclosures
ICTTC134B	Fix aerial cable
ICTTC135B	Joint metallic cable

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UNIT CODE	UNIT TITLE
UEENEEH012B	Troubleshoot digital subsystems
UEENEEH039B	Troubleshoot basic amplifiers
UEENEED017B	Install and configure internetworking systems
UEENEED027B	Develop structured programs to control external devices
UEENEED028B	Develop and test code for microcontroller devices
UEENEEE008B	Lay wiring and terminate accessories for extra-low voltage circuits

2.1.14 Possible Skills Sets CSUs

The following Competency Standard Units may appear within a qualification in this Training Package. However they may be independent or 'orphaned' from qualifications in this Package in which case they can be delivered and assessed independently of any qualification.

Typically, they CSUs relate to work functions that are associated with regulatory or specialised functions. They may augment or be incidental to existing competencies held by individuals, or be required for workplace entry associated with OHS issues. All pre-requisite requirements must be met for each Competency Standard Unit.

The Competency Standard Units listed below are not physically included in this section. For a physical copy of the Competency Standard Units refer to the respective Discipline section.

UNIT CODE	UNIT TITLE
UETTDREL03A	Comply with environmental and incidence response procedures
UETTDREL04A	Working safely near live electrical apparatus as non electrical worker
UETTDREL05A	Respond to technical enquiries and requests

2.1.15 Identified Skill Sets

Note: Refresher Training Skill Sets

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The following Skill Sets have been developed to meet the requirements for refresher training of skills essential for gaining and maintaining access to electricity supply industry networks.

The Refresher Training units in these Skill Sets are not included in any qualifications or elective schedules and are only to be accessed via the identified Skill Sets included below.

Skill Set – Apply Access Procedures to Work On or Near Electrical Network Infrastructure

Skill Set – Apply ESI Safety Rules, Codes of Practice and Procedures for Work On or Near Electrical Apparatus

Skill Set – Perform Pole Top Rescue

Skill Set – Perform Tower Rescue

Skill Set – Perform Rescue from Switchyard Structures at Heights

Skill Set – Perform EWP Controlled Descent Escape

Skill Set – Provide First Aid in an ESI Environment

Skill Set – Perform CPR

Skill Set – Perform Pole Top Rescue and CPR

Skill Set – Perform EWP Rescue and CPR

Skill Set – Perform Tower Rescue and Provide First Aid

Skill Set – Perform Switchyard Rescue at Heights and Provide First Aid

Skill Set – Perform Rescue from a Live LV Panel and CPR

Skill Set – Perform Cable Pit/Trench/Excavation Rescue and CPR

Skill Set – Perform Cable Pit/Trench/Excavation Rescue

Skill Set – Perform Rescue from a Live LV Panel

Skill Set – Perform EWP Rescue

2.2.00 Essential Knowledge and Associated Skills (EKAS) - TD&R

Essential Knowledge and Associated Skills (EKAS) – TD&R

The following section of the Electricity Supply Industry (ESI) – Transmission, Distribution and Rail Training Package is the Transmission, Distribution and Rail Essential Knowledge and Associated Skills. The reference of these is found in each ESI – Transmission, Distribution and Rail Competency Standard Unit in section 6. The references in this section are expanded in this section of the Training Package. Users of the Training Package are to include the full array of the Essential Knowledge and Associated Skills clauses content contained herein when developing learning specifications and support materials to assure the content of theory and associated skills training aspect of the respective competency standard unit is met.

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The Electricity Supply Industry (ESI) – Transmission, Distribution and Rail Training Package Essential Knowledge and Associated Skills section of this Training Package is likely to change from time to time. Changes are periodically made to reflect the latest industry practices. In relation to this section, users are advised to check for any changes that may have been made to the aligned EKAS clauses and content by:

- checking the version identifier code of the version you currently have with the latest Training Package
- accessing the relevant National Training Package Developer website (www.ee-oz.com.au

2.2.01 Contextualisation

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 related to technical content principles, technology, equipment, or processes that may be used to cover the outcomes. The examples should be treated as information that adds clarity for the purposes of assisting in guidance of the depth and breadth that is to be covered.

As the type, form, process, or technique of technology and equipment may change it is therefore expected and encumbered on RTOs to continue to be current in the content of their delivery arrangements.

It is therefore appropriate for RTOs to use the notes in relation to technology and equipment references 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 units 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 the competency standard units from its intended outcome requires a new or varied competency standard unit. 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.

2.2.02 T2.1 Engineering Applications

T2.1 Engineering Applications

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T2.1.1 Engineering applications of mathematical principles

Evidence shall show an understanding of mathematics techniques to an extent indicated by the following aspects,

- Calculations involving fractions, decimals, ratios, proportions
- Calculations involving area, volume, mass and density
- Calculations involving transposition and substitution of formulae
- Calculations involving simple trigonometric problems

T2.1.2 Engineering applications of mechanical principles

Evidence shall show an understanding of engineering mechanics to an extent indicated by the following aspects:

- Identification of basic concepts, principles and applications

  Note: Application of velocity, acceleration, force, density, torque, and pressure
- Applications of the SI units
- The relationship between work, power and energy
- Behaviour of object under force

  Note: Examples include using a block and tackle under load, concept of mechanical advantage, determination of resultant forces and determining the sag in a catenary conductor and the force applied at each end
- Fundamentals of the basic laws of fluid mechanics

T2.1.3 Engineering applications of material properties

Evidence shall show an understanding of materials properties to an extent indicated by the following aspects:

- Identification and classification of engineering materials encompassing:

  Material properties
- Types and applications

  Note: Examples include properties of tensile strength, effects of temperature on the expansion of metals, ductibility, malleability, work hardening and annealing and the conditions that lead to corrosion and the properties of timbers

T2.1.4 Basic rigging techniques

Evidence shall show an understanding of basic rigging techniques to an extent indicated by the following aspects:

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- Standards, codes, legislation, supply authority regulations and or enterprise requirements associated with rigging including the operation of cranes, hoists and winches and relevant certification and licensing (if required)
- Requirements for the use of enterprise construction manuals, system diagrams/plans and drawings
- Safe use of rigging equipment, tools and associated equipment encompassing:
  - Types, techniques and application
  - Site inspection procedures encompassing:
  - Identifying hazards, assessing and controlling risks
  - Appropriate sequence of loading and unloading
- Determining the mass and dimensions of load
- Selection and inspection procedures encompassing:
  - Rigging equipment, materials and tools
  - Note: Examples include natural and synthetic fibre ropes and chains, fittings, winch and capstan
  - Ratings of wire ropes and slings
  - Removing, repairing and replacing of damage parts
- Techniques for assembling and erecting power winches and capstans
- Checking the integrity of support structure; visual inspection of load connections
- Techniques in moving, lifting, shifting, managing and placing loads encompassing:
  - Use of appropriate communication and signalling methods
  - Codes of practice/compliance
  - Enterprise and Commonwealth, State/Territory legislative requirements
  - Weather conditions
  - Erection of safety nets and lines
  - Methods of fixing and anchoring loads
  - Load stability

T2.1.5 Elevating work platform operational principles

Evidence shall show an understanding of the operation of elevating work platform (EWP) to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements associated with EWP including relevant certification and licensing encompassing:
  - Safe working clearances
  - Safe operation procedures and the mandatory wearing of harness/attachment requirements
  - Safety observers

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Inspection and testing procedures prior to use

Set-up, operate and shut down procedures for an EWP

- Emergency procedures for an EWP encompassing:

Escape procedures for an EWP

Rescuing procedures

Mechanical failure procedures

- Types of EWPs insulated/uninsulated

T2.1.6 Hydraulic and pneumatic portable equipment

Evidence shall show an understanding of the operation and maintenance of mobile plant, tools and equipment to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements associated with portable hydraulic equipment and portable pneumatic equipment, including relevant certification and licensing encompassing:

Safe working clearances

Safe operation procedures

Safety observers

- Inspection and testing procedures prior to use
- Set-up, operate and shut down procedures
- Permit to work systems and isolation procedures

T2.1.7 Enterprise vehicles

Evidence shall show an understanding of the requirements for the use of enterprise vehicles such as, trucks and four wheel drives to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements associated with safe use of enterprise vehicles including relevant certification and licensing such as encompassing:

Motor cars

Light and heavy commercial trucks

Heavy truck/trailer combination

Four wheel drive vehicles

- Compliance with regulations associated with the securing of loads prior for transportation

T2.1.8 Chain saw principles

Evidence shall show an understanding of the requirements for the use of chain saws

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including relevant certification and licensing (if required) to an extent indicated by the following aspects:

- Safety precautions, requirements and responsibilities
- Selection and use of appropriate personal protective equipment
- Chain saw operation encompassing:
  - Parts and function of components and ancillary equipment
  - Pre-operational checks
  - Starting procedures
  - Safe use of chain saw under load
  - Safe transporting and storage procedures

T2.1.9 Stores procedures

Evidence shall show an understanding of the procedure in providing store support to an extent indicated by the following aspects:

- Classification and identification of equipment, components and tools
- Procedures for purchasing/ordering items, removing/dispatching items, stocktaking, security, bookkeeping/record keeping
- Material handling encompassing:
  - Warehouse/depot storage techniques
  - Handling equipment
  - Pallet lift trucks
  - Forklifts
  - Cable drum handling equipment
- Safety procedures encompassing:
  - Storage and care of safety equipment
  - Handling hazardous materials
  - Storage of hazardous substances and dangerous goods
  - Depot safety procedures
  - Manufacturers and suppliers information including material safety data sheets (MSDS)

T2.1.10 Filtering and sampling of insulating oil

Evidence shall show an understanding of the requirements for the filtering and sampling of insulating oil to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements associated with filtering and sampling such as encompassing:
  - Safe handling procedures
  - Personal hygiene

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Storage and disposal procedures

Occupational Health and Safety hazards and precautions including use of appropriate personal protective equipment

Environmental procedures

Effects of contaminates

- Properties of insulating oil encompassing:

  Dielectric strength

  Moisture content

  Acidity

  Sludge
- Locations where insulating oil is used

  Note: Examples include transformer, switchgear and oil filled cable
- Filtering equipment encompassing:

  Types

  Cleaning procedures

  Method of use
- Techniques in filtering and sampling insulating oil encompassing:

  Methods of sampling

  Methods of filtering

  Testing procedures on site

  Analysing oil effectiveness

  Frequency of testing

T2.1.11 Testing of insulating oil

Evidence shall show an understanding of the requirements for the testing of insulating oil to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements associated with testing such as encompassing:

  Precautions during testing

  Types of testing equipment
- Techniques in testing insulating oil encompassing:

  Electric strength

  Water content

  Dielectric dissipation

  Resistivity

  Acidity
- Brief introduction to DGA (Dissolved Gas Analysis)

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2.2.03 T2.2 Power Systems

T2.2 Power Systems

T2.2.1 Generation power systems

Evidence shall show an understanding of generation systems to an extent indicated by the following aspects:

- Methods of generating electricity
  Note: Examples include types of power stations and reasons for their location, layout of thermal and hydroelectric power stations
- Relationship between power control and load requirements
  Note: Examples include operating speeds for thermal and hydroelectric generating sets, typical generator voltage levels and output ratings
- The purpose and features of typical types of co-generation systems

T2.2.2 Transmission, distribution and rail power systems

Evidence shall show an understanding of transmission, distribution and rail systems to an extent indicated by the following aspects:

- Relationship between the transmission, distribution and rail/tram system within an overall power system
  Note: Examples include 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
  Note: Examples include 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
  Note: Examples include advantages/disadvantages, applications and the basic steps for planning and installing an overhead and underground distribution system
- Single line drawings and layouts
  Note: Examples of drawings and layouts of transmission and distribution systems including, radial, parallel and ring main feeders and the HV equipment associated with substations

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T2.2.3 Substations, power transformers and reactors

Evidence shall show an understanding of substations and power transformers to an extent indicated by the following aspects:

- Relationship between the substations within an overall power system
  Note: Examples include purpose, location in relation to load centres, layout of HV equipment within the substation and auxiliary equipment
- Characteristics of a power transformer
  Note: Examples include basic construction of distribution transformers, operation under load/no load conditions, types and basic operation of tap changing switches including solid state types, efficiency and cooling
- Auxiliary equipment used on transformers encompassing:
  Function and basic operation
- Maintenance of a power transformer
  Note: Examples include basic connections, restrictions to parallel operation, problems and remedies associated with harmonics, testing and fault finding procedures
- Characteristics of a reactors encompassing:
  Description and purpose

T2.2.4 Powerline distribution installation

Evidence shall show an understanding of the installation of overhead distribution conductors to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to installing conductors and associated equipment
- Requirements for the use of overhead line construction manuals, system diagrams/plans and drawings, encompassing:
  Material lists
  Conductor size, type and route length
- Constructions types and structures for distribution and sub transmission lines
- Types, sizes and characterises of overhead conductors
- Resources for the stringing and maintenance of conductors, encompassing:
  Types of low and high voltage overhead electrical conductor connections
  Causes and effects of poor electrical connections
  Reasons for and methods used to maintain standard phase sequencing
  Removing, repairing and replacing of damage conductors
  Minimum clearances between overhead conductors and low and high voltage structures
- Techniques for conductor installation encompassing:
  Types and application of tools, equipment and hardware

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Methods of stringing, tensioning and termination of low and high voltage conductors

T2.2.5 Powerline installation safety

Evidence shall show an understanding of the safe working practices and procedures for the installation of overhead distribution conductors to an extent indicated by the following aspects:

- Limits of approach for personnel, vehicles, mobile plant and elevating work platforms (EWP)
- Requirements of persons prior to making bare hand contact with dead low voltage mains and apparatus
- Requirements of relevant electrical access permits necessary to allow work to be performed on low and high voltage apparatus
- Safe working practices encompassing:
  - Requirements to enable safe working on conductive poles
  - Procedure to attach an "on-site" earthing device to de-energised low and high voltage overhead circuit

T2.2.6 Pole and hardware installation and maintenance

Evidence shall show an understanding of the installation of poles and or structures and hardware to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to installing poles and associated hardware
- Requirements for the use of enterprise construction manuals, system diagrams/plans and drawings, encompassing:
  - Characteristics and applications of different types of poles and associated hardware
- Techniques for installing poles and associated hardware encompassing:
  - Types of installation equipment/tools
  - Excavation methods
  - Types of footings/foundations
  - Types of attachments
  - Earthing systems
  - Clearances between conductors
  - Safe methods of erecting and stabling poles and or structures and cross arms
- Techniques for maintenance of poles and associated hardware encompassing:
  - Stabilisation techniques for unstable poles
  - Methods of strengthen poles
  - Maintenance and replacement of high voltage insulators and cross arms

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T2.2.7 Low voltage electrical service installation

Evidence shall show an understanding of the installation of low voltage electrical services to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements
- Requirements for the use of enterprise construction manuals, system diagrams/plans and drawings, encompassing:
  - Types of low voltage overhead services
  - Methods of construction and installation
  - Minimum clearances for overhead services to assets and structures
  - Types of installation equipment/tools
- Characteristics and applications of different types of cables encompassing:
  - Cable cross-sectional area of conductors
  - Current rating and fuse type
- Techniques for maintenance of service installations encompassing:
  - Diagnosis and repair of faults
- Jointing and terminating methods encompassing:
  - Polymeric heat shrink materials
  - Polymeric tape materials
  - Energised and de-energised cables
  - Connections to fuse boxes and pole top boxes
- Testing and commissioning procedures encompassing:
  - Inspection
  - Polarity, voltage and phase sequence tests
- Construction types and structures for distribution and sub transmission lines
- Types, sizes and characteristics of overhead conductors
- Resources for the stringing and maintenance of conductors, encompassing:
  - Types of low and high voltage overhead electrical conductor connections
  - Causes and effects of poor electrical connections
  - Reasons for and methods used to maintain standard phase sequencing
  - Removing, repairing and replacing of damage conductors
  - Minimum clearances between overhead conductors and low and high voltage structures
- Techniques for conductor installation encompassing:
  - Types and application of tools, equipment and hardware
  - Methods of stringing, tensioning and termination of low and high voltage conductors

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T2.2.8 Poles and structures inspection principles

Evidence shall show an understanding of the inspection of poles and overhead lines to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements
- Characteristics of wood used for structures within the electrical distribution system encompassing:
  - Relationship between timber and water
  - Faults that occur that influence the integrity of the structure
  - Affects of fungal activity
  - Affects of termite and borer activity
  - Affects of dry rot
- Chemical treatment principles encompassing:
  - Types of chemical used to treat timber
  - Regulations and procedures in handling and transporting chemicals safely
  - Application procedures of chemicals to wood
- Deterioration prevention techniques encompassing:
  - Relationship between steel, concrete and wood
  - Inspection procedures for deterioration
  - Deterioration prevention procedures in steel, concrete and wood
  - Procedures for the repair of deterioration in steel, concrete and wood

T2.2.9 Powerline inspection principles

Evidence shall show an understanding of the inspection of poles and overhead lines to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements
- Ground line inspection procedures of electrical distribution structures encompassing:
  - Requirements for pole inspection on electrical distribution structures
  - Use of specific equipment and testing devices during testing/inspection
  - Methods of recording data
- Overhead line inspection procedures of electrical distribution structures encompassing:
  - Methods and requirements for overhead line inspection on electrical distribution structures
  - Clearances for overhead conductors, cables and structures
  - Use of specific equipment and testing devices during testing/inspection

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Methods of recording data

- Underground cable inspection procedures in the electrical distribution system encompassing:

  State industry policy and regulations

  Methods and requirements for line inspection on underground cable terminations

T2.2.10 Transmission structures and hardware

Evidence shall show an understanding of transmission structures and hardware to an extent indicated by the following aspects:

- Requirements for the use of enterprise construction manuals, system diagrams/plans and drawings
- Types of structures
- Types and function of associated hardware/equipment and insulators
- Types of conductors
- Location of transmissions structures
- Other equipment used on transmission structures, e.g. aircraft warning devices
- Voltages on transmission structures

T2.2.11 Routine maintenance on transmission structures

Evidence shall show an understanding of procedures for routine maintenance on transmission structures and hardware to an extent indicated by the following aspects:

- Procedures for gaining access permits
- Reasons for gaining access
- Types of maintenance procedures on transmission structures encompassing:

  Procedure to follow for inspection/patrols according to the Transmission Supply Authority
- Erecting and removing of transmission equipment and hardware from a tower encompassing:

  Climbing procedures

  Square rigging principles

  Calculation of forces at work within a given square rigging system

  Construction of a square rigging system
- Procedures for changing insulators

  Note: Examples include vertical angle suspension, strain insulator, post insulator (horizontal or vertical) and bridge insulator, calculation of conductor forces

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- Installation of temporary work platforms encompassing:
  - Types and function of installation tools and equipment
  - Precautions and work methods to follow
  - Procedures for installations of temporary work platforms
- Installation of conductor protective hardware encompassing:
  - Types and selection of common dampers, tools and equipment
  - Control of Aeolian vibration
  - Procedures for the installation of dampers onto conductors
- Dead line insulator washing encompassing:
  - Supply Authority regulations
  - Procedure for washing de-energised transmission lines

T2.2.12 Underground cable installation

Evidence shall show an understanding of the installation of underground cable to an extent indicated by the following aspects:

- Requirements for the use of enterprise construction manuals, system diagrams/plans and drawings
- Safety precautions specific to the installation of underground cable encompassing:
  - Excavation and trench safety regulations
  - Gas detection procedures
  - Working in confined spaces
  - Personal protective equipment
  - Hazards for the use of LPG equipment for jointing of underground cable
  - Gas bottle testing procedures
  - Permit to work systems and isolation procedures
- Trench excavation and reinstatement procedures
- Installation of underground cable procedures encompassing:
  - Types of tools and equipment
  - Methods of installing conduits
  - Methods of installing cables and sealing cable ends
  - Note: Examples include direct buried, ducts cleated and racked
  - Procedures for the safe use of LPG equipment for cable jointing

T2.2.13 Low voltage - energised working practices for substations

Evidence shall show an understanding of the safe working on energised low voltage equipment to an extent indicated by the following aspects:

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- Standards, codes, Commonwealth, State/Territory/local government legislation, supply authority regulations and or enterprise requirements
- Safety precautions specific to working on or near energised low voltage conductors encompassing::
  - Safe working practices and procedures
  - Identification of hazards, assessment and control of OHS risks
  - Types, selection, maintenance and use of personal protective equipment
- Work on or near energised LV conductors encompassing:
  - Types and function of specialised tools
  - Safe working practices when using specialised tools
  - Methods of using specialised tools
  - Safe procedures for work on panels and in cubicles on or near energised LV conductors
- Release and rescue procedures for work on or near exposed energised LV conductors

T2.2.14 Cable fault locations principles

Evidence shall show an understanding of the location of cable faults in underground power cables to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements
- Types of faults
- Methods of locating faults
  - Note: Examples include the Murray loop test, Fisher connection of Murray loop, modified Fisher connection, Varley loop test, time domain reflectometer (TDR), differential TDR radar, digital arc reflection, differential digital arc reflection, current impulse test, differential current impulse, decay, differential decay, pool of potential in earth (POPIE), radio detection, capacitance inductance test; pending faults (thermography and cable/joint temperature measurement); cable location devices/equipment and methods (signal generator/receiver, phasing methods using ‘megger’, current injection, cable stabbing techniques);cable identification
- Low voltage energised working practices: encompassing:
  - Regulations
  - Working methods
  - Insulating glove
  - Bare hand
  - Work procedures
  - Specialist equipment
- Safety precautions specific to working near conductors encompassing:

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Safe working practices and procedures

Working in confined spaces

Permit to work systems and isolation procedures

T2.2.15 Metering installations

Evidence shall show an understanding of the installation of metering and control equipment to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements pertaining to the installation and maintenance of energy meters and associated equipment
- Types of meters

  Note: Examples include kilowatt-hour meters single and polyphase, demand meters, recording meters and electronic recording metering systems summators
- Installation and removal methods encompassing:

  Direct connection and plug in method

  Enterprise specific
- Types of associated equipment and accessories

  Note: Examples include meter boards, service fuse, links, contactors, time switch, audio frequency injection relay
- Testing procedures encompassing:

  Safety testing

  Polarity testing

T2.2.16 Fundamentals of jointing LV polymeric cable

Evidence shall show an understanding of the types of cables, tools and equipment used in the jointing and termination of LV polymeric cable to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements pertaining to the jointing of LV polymeric cables
- Types of cables

  Note: Examples include single core, multi core and XLPE insulation
- Methods of cable handling encompassing:

  Direct laid cables

  Duct laid cables

  Solid laid cables

  Cables supported in cleats or hangers

  Corrosion protection

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Minimum bending radius of cables

- Methods of cable sealing encompassing:
  - Shorting of cables cores
  - Core of unterminated cables
  - Methods of protection from corrosion
  - Polymeric sheathed cables sealing with mastic lined
  - Heat shrink caps buried sealed ends
- Types of jointing tools
  - Note: Examples include general hand tools, compression tools
- Techniques in the use of LPG encompassing:
  - Safety precautions
  - Personal protective equipment
  - General maintenance and repair
- Safety precautions when cable jointing encompassing:
  - Working in confined spaces
  - Permit to work systems and isolation procedures
  - Emergency rescue/response including First Aid

T2.2.17 LV polymeric cable jointing principles

Evidence shall show an understanding of the jointing and termination of LV polymeric cable to an extent indicated by the following aspects:

- Techniques in jointing LV XLPE cables encompassing:
  - Straight through joint
  - Jointing different types of cable
  - Service and street light cable joints
- Techniques in terminating LV XLPE encompassing:
  - Pole top terminations
  - Substation terminations
  - Distribution pillar/column/cubicle terminations
  - Service and street light cable terminations
- Techniques in repairing LV XLPE cable encompassing:
  - Different types of damage
  - Repairs to sheath
  - Repairs to cores
- Methods of testing cable after jointing

T2.2.18 HV polymeric underground cable jointing principles

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Evidence shall show an understanding of the jointing and termination of HV polymeric cable to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements pertaining to the jointing of HV underground polymeric cables
- Requirements for the use of enterprise construction manuals, system diagrams/plans and drawings, encompassing:
  - Characteristics of different types of cables and components
  - Purpose of stress control
- Applications of various tools and equipment for HV jointing
- Procedure for isolating high voltage underground cables encompassing:
  - Method for proving safe to work
- Earthing procedures
- Techniques in jointing HV underground polymeric cable, encompassing:
  - Short circuit cores and seal cable
  - Straight through
  - Trifurcating
- Techniques in HV terminations encompassing:
  - Pole top termination
  - Substation/switchgear termination
  - ABC termination
  - Telcon termination
- Procedures for repairing HV underground cables encompassing:
  - Location of faults
  - Types of damage
  - Techniques to repairs to sheath
  - Techniques to repairs to core

T2.2.19 LV Paper lead cable jointing principles

Evidence shall show an understanding of the jointing LV paper lead/lead type cables to an extent indicated by the following aspects:

- Requirements for the use of enterprise manuals, system diagrams/plans and drawings
- Types of tools and equipment
- Types of LV cables
- Structure of LV PLY cables
- Techniques for lead wiping
- Technique for preparing and jointing LV lead sheathed paper insulated cables
- Installation methods of LV straight joint
- Inspection and repair procedures to outer sheath of lead sheathed LV cable

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- Techniques in terminating LV lead sheathed paper insulated cables
- Methods of testing cable after jointing

T2.2.20 HV paper lead cable jointing principles

Evidence shall show an understanding of the jointing HV paper lead/lead type cables to an extent indicated by the following aspects:

- Requirements for the use of enterprise manuals, system diagrams/plans and drawings
- Types of tools, equipment
- Types of HV cables
- Structure of HV cables
- Technique for the installation of transition joint between XLPE and lead sheathed, paper insulated cables
- Technique for the jointing, terminating and repairing of HV paper lead insulated cables
- Methods of testing cable after jointing

T2.2.21 Installation and maintenance on transmission lines and associated equipment

Evidence shall show an understanding of procedures for installation and maintenance on transmission lines, structures and hardware to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements pertaining to the installation and maintenance of transmission lines and associated equipment
- Requirements for the use of enterprise construction manuals, system diagrams/plans and drawings, encompassing:
  - Minimum construction clearances for transmission lines
  - Sag/tension requirements
- Construction types and structures used in transmission lines
- Types, sizes and characteristics of transmission conductors
  - Note: Examples include aluminium conductors steel reinforced and earthing conductors
- Types, sizes and characteristics of transmission conductors
  - Note: Examples include aluminium conductors steel reinforced and earthing conductors
- Types of electrical connections used to connect transmission conductors
  - Note: Examples include compression termination and bolted termination
- Causes and effects of poor electrical connections
- Types and application of specialised tools, equipment and hardware for the

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stringing of transmission conductors
- Techniques for stringing, tensioning and terminating transmission conductors
- Techniques for installation of associated hardware used on transmission towers
- Techniques for maintenance of damage transmission conductors encompassing:
  Repair and replacement

T2.2.22 Installation and maintenance of public lighting and associated equipment

Evidence shall show an understanding of procedures for installation and maintenance on public lighting structures and associated equipment to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations, local government and or enterprise requirements pertaining to the installation and maintenance of public lighting systems and associated equipment
- Safety precautions specific to working on street lighting encompassing:
  Safe working practices and procedures
  Safe clearances from LV and HV mains
  Working at heights
  Working in confined spaces
  Permit to work systems and isolation procedures
  Emergency response and rescue including First Aid etc
- Basic public lighting principles encompassing:
  Electromagnetic spectrum
  Principles of colour
  Behaviour of light
  Factors that affect illumination
- Requirements for the use of enterprise construction manuals, system diagrams/plans and drawings, encompassing:
  Street lighting circuits
  Earthing system
- Types of tools and equipment used for installation and maintenance
- Types and function of lanterns/Luminaires/lamps, control equipment, poles and associated hardware used for street lighting
  Note: Examples include hp mercury vapour, LP and HP sodium vapour, fluorescent, quartz-halogen, wood, concrete, steel, composite, choke boxes, photo-electric cells, time switches, contactor boxes
- Types of lighting systems encompassing:
  Overhead and underground street lighting systems
  Controlling and switching of lighting systems
- Techniques for the installation of street lighting systems

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- Techniques for the maintenance of street lighting systems
  Note: Examples include diagnosing of faults, removing, repairing, replacement and cleaning of public lighting and associated hardware
- Application of specific testing equipment
  Note: Examples include voltage detectors, insulation resistance testers, clamp-on ammeters, continuity testers, fault indictors
- Techniques for the inspection, testing and commissioning of street lighting systems

T2.2.23 Underground cable construction

Evidence shall show an understanding of the construction and types of underground cables to an extent indicated by the following aspects:

- Safety precautions specific to handling underground cables
- Requirements for the use of enterprise manuals, system diagrams/plans and drawings
- Types and applications of UC
- Construction types and structures of underground cables
- Characteristics of different types of underground cables
- Ratings

T2.2.24 Aluminium and lead cable sheathed — jointing procedures

Evidence shall show an understanding of the construction and types of underground cables to an extent indicated by the following aspects:

- Safety precautions specific to handling and jointing underground aluminium and lead cable including provision of OHS information such as material safety data sheets (MSDS)
- Requirements for the use of enterprise manuals, system diagrams/plans and drawings
- Construction and structure(s) of aluminium and lead cable underground cables
- Characteristics of aluminium and lead cable
- Ratings
- Techniques in the jointing of aluminium and lead sheathed cable
- Methods of testing cable after jointing

T2.2.25 Operation principles of a portable generator

Evidence shall show an understanding of the operating principles of portable generators to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise

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requirements pertaining to the operation of a portable generator encompassing:
  Pre-operational checks
  Precautions during operation
  Shut down procedures
- Safety precautions specific to the operation of a portable generator

T2.2.26 Installation of a mobile generator LV

Evidence shall show an understanding of the installation of a mobile generation to an extent indicated by the following aspects:

- Safety precautions specific to installing mobile generators encompassing:
  Safe working practices and procedures
  Techniques in connecting, operating and disconnecting generators
  Types of tools and equipment
  Safe use of tools and equipment
- Techniques in the installation of gensets encompassing:
  The connection of generator onto and off the network without interruption to supply
  Estimation of LV load
  Assessing the appropriateness of the generator

T2.2.27 Generator control systems — LV

Evidence shall show an understanding of the control of generator systems for synchronisation of a LV genset to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements pertaining to the operation of a portable generator encompassing:
- Safety precautions specific to the synchronisation of gensets encompassing:
  Safe working practices and procedures
  Synchronising procedures
- Techniques in the installation of gensets control systems encompassing:
  The synchronising of generator control systems onto and off the network without interruption to supply
  Estimation of LV load
  Assessing the appropriateness of the generator
- Operating a generator in parallel to a single LV job encompassing:
- Overhead systems
- Indoor systems
- Customer Installations
- Kiosk Substations

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- LV genset and control system to LV Distribution assets

T2.2.28 Towers and structures inspection principles

Evidence shall show an understanding of the inspection of towers and structures used for transmission lines to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements
- Characteristics of materials used for towers structures within the electrical transmission system encompassing:
  - Faults that occur that influence the integrity of the structure
- Deterioration prevention techniques encompassing:
  - Relationship between steel, and other materials
  - Inspection procedures for deterioration
  - Deterioration prevention procedures in steel
  - Procedures for the repair of deterioration in steel

T2.2.29 Transmission powerline inspection principles

Evidence shall show an understanding of the inspection of transmission lines to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements
- Clearances and safety procedures
- Ground line inspection procedures of electrical transmission lines encompassing:
  - Requirements for inspection of transmission lines and insulators
  - Use of specific equipment and testing devices during testing/inspection
  - Techniques in transmission line inspection
  - Methods of recording data
- Overhead line inspection procedures of electrical transmission lines encompassing:
  - Methods and requirements for overhead line inspection on electrical structures
  - Clearances for overhead conductors, cables and structures
  - Techniques used to obtain close inspection of transmission lines
  - Use of specific equipment and testing devices during testing/inspection
  - Methods of recording data

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T2.2.30 Powerline transmission installation safety

Evidence shall show an understanding of the safe working practices and procedures for the installation of overhead transmission conductors to an extent indicated by the following aspects:

- Limits of approach for personnel, vehicles, mobile plant and elevating work platforms (EWP)
- Requirements of persons prior to making bare hand contact with dead low voltage mains and apparatus
- Requirements of relevant electrical access permits necessary to allow work to be performed on low and high voltage apparatus
- Safe working practices encompassing:
  - Requirements to enable safe working on conductive poles
  - Procedure to attach an "on-site" earthing device to de-energised low and high voltage overhead circuit
  - Safe working practices when working with associated hardware/equipment and insulators
  - Precautions of voltages on transmission structures
  - Dangers when working at heights
  - Identification of hazards, assessing and controlling risks
  - Types, selection, maintenance and uses of personnel protective equipment
  - Permit to work systems and isolation procedures
  - Safe working practices when using specialised equipment
  - Emergency response and rescue including First Aid etc

T2.2.31 Distribution overhead line component fundamentals

Evidence shall show an understanding of the different types and function of distribution components to an extent indicated by the following aspects:

- Commonwealth/State/Territory and local government legislation, Standards, codes, Commonwealth, State/Territory and local government legislation, supply authority regulations and or enterprise requirements applicable to the use and application of distribution components
- Requirements for the use of overhead line construction manuals, system diagrams/plans and drawings
- Types, function and characteristics of distribution components
- Safety policies and procedures precautions related to the handling and installing distribution components

T2.2.32 Stringing transmission overhead conductors and cables

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Evidence shall show an understanding of stringing installation overhead transmission conductors and cables to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to stringing conductors and cables
- Requirements for the use of overhead line construction manuals, system diagrams/plans and drawings, encompassing:
  - Material lists
  - Conductor size, type and route length
- Constructions types and structures for transmission lines
- Types, sizes and characterises of overhead conductors
- Resources for the stringing of conductors, encompassing:
  - Personal protective equipment
  - Plant, tools and equipment
- Techniques in stringing conductors encompassing:
  - Safe working practices
  - Method of conductor support
  - Consideration for the environment
  - Location/positioning of the conductor/cable
  - Types and application of tools, equipment and hardware
  - Methods of stringing conductors

T2.2.33 Installation of a mobile generator – HV

Evidence shall show an understanding of the installation of a HV mobile generation to an extent indicated by the following aspects:

- Safety precautions specific to installing mobile generators encompassing:
  - Safe working policies, practices and procedures
  - Techniques in connecting, operating and disconnecting generators
  - Types of tools and equipment
  - Safe use of tools and equipment
- Techniques in the installation of generator sets encompassing:
  - The connection of generator onto and off the network without interruption to supply
  - Estimation of HV load
  - Assessing the appropriateness of the generator

T2.2.34 Generator control systems — HV

Evidence shall show an understanding of HV generator control systems to an extent

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indicated by the following aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and or enterprise requirements pertaining to the operation of a portable generator encompassing:
- Safety precautions specific to the synchronisation of generator sets encompassing:
  - Safe working policies, practices and procedures
  - Synchronising procedures
- Techniques in the installation of generator sets control systems encompassing:
  - The synchronising of generator control systems onto and off the network without interruption to supply
  - Estimation of HV load
  - Assessing the appropriateness of the generator
- Operating a generator in parallel to a single HV job encompassing:
  - Overhead systems
  - Indoor systems
  - Customer Installations
  - Kiosk Substations
  - HV generator set and control system to HV Distribution assets

T2.2.35 Live line working up to 132kV with hotstick

Evidence shall show an understanding of working on energised lines to 132 kV (poles) using live line hotstick techniques to an extent indicated by the following aspects:

- Commonwealth/State/Territory legislation, Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations and or enterprise requirements associated with working on energised lines to 132 kV (poles) using live line hotstick techniques
- Calculation of conductor loads
- Safety precautions working on energised lines to 132 kV (poles) using live line hotstick techniques encompassing:
  - Live line minimum approach distances for person and plant
  - Occupational Health and Safety hazards and precautions
  - Identification of OHS hazards, assessing and controlling risks
  - Types, selection, maintenance, storage and uses of personnel protective equipment
  - Live line access authority/permit system
  - Disabling auto-reclosing function
  - Ensuring functioning of fault current protective devices
  - Checking integrity of insulation prior to work commencement

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Types and function of specialised live line working equipment and tools inspection prior to use

Safe working policies, procedures and practices when using and operating specialised equipment and tools

Methods of using specialised equipment and tools

Work team communication

Use of safety observers

Emergency response and rescue including First Aid etc

- Policies and procedures dealing with general work practices encompassing:

  Definitions of terms used

  Responsibilities of personnel

  Types of structures from which hotstick methods can be performed

  Types of equipment and specialised tools, and their compliance with relevant standards

- Techniques for using hotsticks encompassing:

  Installing and/or replacing HV insulators

  Note: Examples include intermediate insulators, angle insulators, bridging insulators, strain insulators and suspension insulators

  Erecting and/or replacing HV cross-arms

  Note: Examples include intermediate and angle

  Connecting and/or disconnecting HV bridges connections

  Note: Examples include strain/"Tee" bridges, bypass bridges/connections, HV A. B. C. HV and similar/dissimilar metals

- Techniques in the installation and/or maintenance of electrical equipment

  Note: Examples include air break switches, gas switches, fuse assemblies, isolators, bird covers, surge diverters and fault indicators

- Techniques in the erection and/or replace poles
- Techniques in repairing and/or replacing HV armour rods and/or line guards
- Conversion methods of intermediate construction to strain construction
- Techniques in insulator washing encompassing:

  High pressure washing from an elevated work platform

T2.2.36 Live line work for voltages greater than 132kV and up to 500kV with hotstick

Evidence shall show an understanding of working on energised lines to 500 kV (poles) using live line hotstick techniques to an extent indicated by the following aspects:

- Commonwealth/State/Territory legislation, Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations and or enterprise requirements associated with working on energised lines to 500 kV

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(poles) using live line hotstick techniques

- Safety precautions working on energised lines to 500 kV structures using live line hotstick techniques encompassing:
  - Live line minimum approach distances persons and plant
  - Occupational Health and Safety hazards and precautions
  - Identification of OHS hazards, assessing and controlling risks
  - Types, selection, maintenance, storage and uses of personnel protective equipment
  - Live line access authority/permit system
  - Disabling auto-reclosing function
  - Ensuring functioning of fault current protective devices
  - Checking integrity of insulation prior to work commencement
  - Types and function of specialised live line working equipment and tools inspection prior to use
  - Safe working policies, procedures and practices when using and operating specialised equipment and tools
  - Methods of using specialised equipment and tools
  - Work team communication
  - Use of safety observers
  - Emergency response and rescue including First Aid etc
- Policies and procedures dealing with general work practices encompassing:
  - Definitions of terms used
  - Responsibilities of personnel
  - Types of structures from which hotstick methods can be performed
  - Types of equipment and their compliance with relevant standards
- Calculation of load supported by live line tools
- Techniques for using hotsticks encompassing:
  - Installing and/or replacing HV insulators
  - Note: Examples include intermediate insulators, angle insulators, bridging insulators, strain insulators and suspension insulators
  - Erecting and/or replacing HV cross-arms
  - Note: Examples include intermediate and angle
  - Connecting and/or disconnecting HV bridges connections
  - Note: Examples include strain/"Tee" bridges, bypass bridges/connections, high voltage A. B. C and similar/dissimilar metals
- Techniques in the installation and/or maintenance of electrical equipment
  - Note: Examples include air break switches, gas switches, isolators, bird covers, surge diverters and fault indicators
- Techniques in the erection and/or replace poles
- Techniques in installing and/or replacing armour grip suspension unit
- Techniques in installing and/or replacing Ontario Vibration Recorders

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- Techniques in installing and/or replacing vibration dampers
- Techniques in installing and/or replacing performed repair rods
- Techniques in insulator washing encompassing:
  - High pressure washing from an elevated work platform

T2.2.37 Live line working up to 33kV with glove and barrier

Evidence shall show an understanding of working on energised lines to 33 kV using live line glove and barrier techniques to an extent indicated by the following aspects:

- Commonwealth/State/Territory legislation, Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations and or enterprise requirements associated with working on energised lines to 33 kV (poles) using live line glove and barrier techniques
- Safety precautions working on energised lines to 33 kV using live line HV rubber gloving techniques encompassing:
  - Live line minimum approach distances persons and plant
  - Identification of OHS hazards, assessing and controlling risks
  - Types, selection, maintenance, storage and uses of personnel protective equipment
  - Live line access authority/permit system
  - Disabling auto-reclosing function
  - Ensuring functioning of fault current protective devices
  - Checking integrity of insulation prior to work commencement
  - Types and function of specialised live line working equipment and tools inspection before use
  - Safe working policies, procedures and practices when using/operating specialised equipment and tools
  - Methods of using specialised equipment and tools
  - Work team communication
  - Use of safety observers
  - Emergency response and rescue including First Aid etc
- Policies and procedures dealing with general work practices encompassing:
  - Definitions of terms used
  - Responsibilities of personnel
  - Types of structures from which glove and barrier methods can be performed
  - Types of equipment and their compliance with relevant standards
- Relationship between combined glove and barrier and stick methods encompassing:
  - Conditions under which they can be practiced
- Techniques in installing and/or replacing HV insulators when working live line

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glove and barrier;

Note: Examples include intermediate insulators, angle insulators, bridging insulators, strain insulators and suspension insulators

- Techniques in erecting and/or replacing HV cross-arms when working live line glove and barrier;

  Note: Examples include intermediate, angle, strain, termination and suspension

- Techniques in connecting and/or disconnecting HV bridges connections when working live line glove and barrier;

  Note: Examples include strain/"Tee" bridges, bypass bridges/connections, HV A. B. C. and similar/dissimilar metals

- Techniques in the installation and/or maintenance of electrical equipment;

  Note: Examples include air break switches, gas switches, fuse assemblies, isolators, bird covers, surge diverters and fault indicators

- Techniques in erecting and/or removing temporary midspan switching devices
- Techniques using live line glove and barrier to erect and/or replace of poles

  Note: Examples of poles include, intermediate, angle, strain

- Techniques using live line glove and barrier for the repair and or replacing of HV conductors/cables
- Techniques in repairing and/or replacing HV armour rods and/or line guards
- Conversion methods using live line glove and barrier, of intermediate construction to strain construction

T2.2.38 Working on live lines up to 33kV with glove and barrier/hotstick combined

Evidence shall show an understanding of working on energised lines to 33 kV (poles) using live line glove and barrier/hotstick combined to an extent indicated by the following aspects:

- Commonwealth/State/Territory legislation, Standards, codes, supply authority regulations and or enterprise requirements associated with working on energised lines to 33 kV (poles) using live line glove and barrier/hotstick combined
- Safety precautions working on energised lines to 33 kV using live line glove and barrier/hotstick combined encompassing:

  Live line minimum approach distances persons and plant

  Occupational Health and Safety hazards and precautions

  Identification of OHS hazards, assessing and controlling risks

  Types, selection, maintenance, storage and uses of personnel protective equipment

  Live line access authority/permit system

  Disabling auto-reclosing function

  Ensuring functioning of fault current protective devices

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Checking integrity of insulation prior to work commencement

Types and function of specialised live line working equipment and tools inspection before use

Safe working policies, procedures and practices when using/operating specialised equipment and tools

Methods of using specialised equipment

Work team communication

Use of safety observers

Emergency response and rescue including First Aid etc

- Policies and procedures dealing with general work practices for both glove and barrier/ hotstick combined, encompassing:

  Definitions of terms used

  Responsibilities of personnel

  Types of structures from which glove and barrier methods can be performed

  Types of equipment and their compliance with relevant standards
- Relationship between combined glove and barrier and stick methods encompassing:

  Conditions under which they can be practiced
- **Techniques for installing and/or replacing HV insulators using glove and barrier/hotstick** combined

  Note: Examples include intermediate insulators, angle insulators, bridging insulators, strain insulators and suspension insulators
- Techniques for erecting and/or replacing HV cross-arms using glove and barrier/hotstick combined

  Note: Examples include intermediate and angle
- Techniques for connecting and/or disconnecting HV bridges connections using glove and barrier/hotstick combined

  Note: Examples include strain/"Tee" bridges, bypass bridges/connections, HV A. B. C, HV and similar/dissimilar metals
- Techniques in the installation and/or maintenance of electrical equipment using hotstick;

  Note: Examples include air break switches, gas switches, fuse assemblies, isolators, bird covers, surge diverters and fault indicators
- Techniques in the erection and/or replacement of poles;

  Note: Examples include intermediate/suspension, angle, strain and termination
- Techniques in repairing and/or replacing HV armour rods and/or line guards and/or conversion methods of intermediate construction to strain in construction
- Techniques in the repairing and replacing HV conductors/cables and the identification of equipment used
- Techniques in installing and/or maintaining switching devices using glove and barrier

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T2.2.39 Plant, equipment and tools used for HV live line work

Evidence shall show an understanding of plant, equipment and tools used for HV live line work to an extent indicated by the following aspects:

- Commonwealth/State/Territory legislation, Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations and or enterprise requirements associated with plant, equipment and tools used for HV live line work
- Safety precautions when working on plant, equipment and tools using hotstick combined encompassing:
  - Safe working clearances
  - Occupational Health and Safety hazards and precautions
  - Identification of OHS hazards, assessing and controlling risks
  - Types, selection, maintenance, storage and uses of personnel protective equipment
  - Authorisation to work systems
- Identification of plant, equipment and tools used for HV live line work encompassing:
  - Types
  - Applications
  - Construction
  - Characteristics
  - Limitations
  - Safe working load
- Serviceability of plant, equipment and tools used for HV live line work encompassing:
  - Inspection procedures
  - Testing procedures
  - Maintenance procedures
  - Storage procedures
- Relationship of live line work access authority/permit, disabling auto-reclose function and ensuring correct functioning of fault current protective devices prior to live line work
- Live line access authorities, disabling auto-reclose function and ensuring fault current protective devices prior to live line work
- Conductor supports encompassing:
  - Methods
  - Types of equipment
  - Construction
  - Characteristics

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Limitations

- Techniques in selecting appropriate conductor support method in accordance with requirements
- Calculation of loads and wind loading on conductors
- Effects of resultant forces when transferring conductor loads
- Rigging procedures for conductor support equipment

T2.2.40 Jointing and terminating oil and gas filled specialised underground cables

Evidence shall show an understanding of the jointing and termination of oil or gas filled specialised underground cables to an extent indicated by the following aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and or enterprise requirements pertaining to the working with oil or gas filled specialised underground cables
- Safety precautions of working with oil or gas filled specialised underground cables encompassing:
  - Safe operation procedures
  - Occupational Health and Safety hazards and precautions
  - Dangers of working in confined spaces
  - Identification of OHS hazards, assessing and controlling risks
  - Types, selection, maintenance, storage and uses of personnel protective equipment
  - Authorisation to work systems and isolation procedures
  - Safe working policies, procedures and practices when using/operating specialised equipment
  - Emergency response and rescue including First Aid etc
- Types, function and serviceability of tools and equipment used for the jointing and terminating of oil or gas filled specialised underground cables
- Techniques in the safe jointing and terminating oil or gas filled specialised underground cables
- Techniques in the safe testing of the oil or gas filled specialised underground cables to ensure successful jointing and/or termination has occurred

T2.2.41 Polymeric specialised underground cable principles

Evidence shall show an understanding of construction and characteristics, of polymeric specialised underground cables to an extent indicated by the following aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and or enterprise requirements pertaining to the working with polymeric specialised

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underground cables
- Types of polymeric specialised underground cables encompassing:
  - Construction
  - Characteristics and capabilities of the polymeric specialised cable
  - Pressure/Volume characteristics of oil and gas
  - Precautions when handling
- Types and functions of tools and equipment used on polymeric specialised underground cables
- Techniques when handling polymeric specialised underground cables

T2.2.42 Jointing and terminating specialised polymeric underground cables

Evidence shall show an understanding of the jointing and termination of polymeric specialised underground cables to an extent indicated by the following aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and or enterprise requirements pertaining to the working with polymeric specialised underground cables
- Safety precautions of working with polymeric specialised underground cables encompassing:
  - Safe operation procedures
  - Occupational Health and Safety hazards and precautions
  - Dangers of working in confined spaces
  - Identification of OHS hazards, assessing and controlling risks
  - Types, selection, maintenance, storage and uses of personnel protective equipment
  - Authorisation to work systems and isolation procedures
  - Safe working policies, procedures and practices when using/operating specialised equipment
  - Emergency response and rescue including First Aid etc
- Types, function and serviceability of tools and equipment used for the jointing and terminating of polymeric specialised underground cables
- Techniques in the safe jointing and terminating polymeric specialised underground cables
- Techniques in the safe testing of the polymeric specialised underground cables to ensure successful jointing and/or termination has occurred

T2.2.43 Installing oil and gas filled specialised underground cables

Evidence shall show an understanding of the installation of oil or gas filled specialised underground cables to an extent indicated by the following aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and or

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enterprise requirements pertaining to the installation of oil or gas filled specialised underground cables

- Safety precautions of working with oil or gas filled specialised underground cables encompassing:
  - Safe operation procedures
  - Occupational Health and Safety hazards and precautions
  - Dangers of working in confined spaces
  - Identification of OHS hazards, assessing and controlling risks
  - Types, selection, maintenance, storage and uses of personnel protective equipment including intrinsically safe equipment for use in confined and hazardous environments
  - Permit/Authorisation to work systems and isolation procedures
  - Safe working policies, procedures and practices when using/operating specialised equipment
  - Emergency response and rescue including First Aid etc
- Types, function and serviceability of tools and equipment used for the installation of oil or gas filled specialised underground cables
- Techniques in the safe installation of oil or gas filled specialised underground cables
- Techniques in the safe testing/inspection of the oil or gas filled specialised underground cables to ensure successful installation has occurred

T2.2.44 Installing and maintaining polymeric specialised underground cables

Evidence shall show an understanding of the installation and maintenance of polymeric specialised underground cables to an extent indicated by the following aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and or enterprise requirements pertaining to the installation and maintenance of polymeric specialised underground cables
- Safety precautions of working with polymeric specialised underground cables encompassing:
  - Safe operation procedures
  - Occupational Health and Safety hazards and precautions
  - Dangers of working in confined spaces
  - Identification of OHS hazards, assessing and controlling risks
  - Types, selection, maintenance, storage and uses of personnel protective equipment including intrinsically safe equipment for use in confined and hazardous environments
  - Authorisation to work systems and isolation procedures
  - Safe working policies, procedures and practices when using/operating

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specialised equipment

Emergency response and rescue including First Aid etc

- Types, function and serviceability of tools and equipment used for the installation of polymeric specialised underground cables
- Techniques in the safe installation of polymeric specialised underground cables
- Techniques in the safe maintenance of polymeric specialised underground cables
- Techniques in the safe testing/inspection of the polymeric specialised underground cables to ensure successful installation and/or maintenance has occurred

T2.2.45 Maintaining oil and gas filled specialised underground cables

Evidence shall show an understanding of the maintenance of oil or gas filled specialised underground cables to an extent indicated by the following aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and or enterprise requirements pertaining to the maintenance of oil or gas filled specialised underground cables
- Safety precautions of working with oil or gas filled specialised underground cables encompassing:

  Safe operation procedures

  Occupational Health and Safety hazards and precautions

  Dangers of working in confined spaces

  Identification of OHS hazards, assessing and controlling risks

  Types, selection, maintenance, storage and uses of personnel protective equipment including intrinsically safe equipment for use in confined and hazardous environments

  Permit/Authorisation to work systems and isolation procedures

  Safe working policies, procedures and practices when using/operating specialised equipment

  Emergency response and rescue including First Aid etc
- Safe storage and disposal of oil or gas filled specialised underground cables and associated equipment and components; Types, function and serviceability of tools and equipment used for the maintenance of oil or gas filled specialised underground cables
- Techniques in the safe maintenance of oil or gas filled specialised underground cables
- Techniques in the safe testing/inspection of the oil or gas filled specialised underground cables to ensure successful maintenance has occurred

T2.2.46 Install and maintain oil and gas pressurised systems

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Evidence shall show an understanding of the installation and maintenance of oil and gas pressurised systems for specialised underground cables to an extent indicated by the following aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and or enterprise requirements pertaining to the installation and maintenance of oil and gas pressurised systems
- Safety precautions when installing and/or maintaining of oil and gas pressurised systems encompassing:
    - Safe operation procedures
    - Occupational Health and Safety hazards and precautions
    - Dangers of working in confined spaces
    - Identification of OHS hazards, assessing and controlling risks
    - Types, selection, maintenance, storage and uses of personnel protective equipment including intrinsically safe equipment for use in confined and hazardous environments
    - Authorisation to work systems and isolation procedures
    - Safe working policies, procedures and practices when using/operating specialised equipment
    - Emergency response and rescue including First Aid etc
- Safe storage and disposal of oil or gas pressurised equipment and associated components; Requirements for the use of manuals, system diagrams/plans, drawings, charts and layouts encompassing:
- Characteristics, application and care of hand and specialised tools
- Techniques in determining route profiles and access locations
- Pressure system characteristics for oil filled and gas filled cables
- Pressure/Volume characteristics of oil and gas
- Techniques in the safe installation of oil and gas pressurised systems
- Techniques in the safe maintenance of oil and gas pressurised systems
- Techniques in the safe use of tools and equipment in the process of installation and maintenance of oil and gas pressurised systems
    - Note: Examples include gas analyser/detector, manometers, flow boards, cable freezing equipment, accessory impregnation equipment, oil degasification plant, manometers, flowboards, vacuum pumps, site bottles, gas cylinders, pressure/vacuum meters, oil evacuation pumps, RGP equipment, oil sampling equipment, gas control cubicles, oil control cubicles, cable joints and terminations, oil degasification units and oil pressure tanks

T2.2.47 Oil and gas filled specialised underground cable principles

Evidence shall show an understanding of construction and characteristics, of oil or gas filled specialised underground cables to an extent indicated by the following

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aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and or enterprise requirements pertaining to the working with oil or gas filled specialised underground cables
- Types of oil or gas filled specialised underground cables encompassing:
  - Properties of paper insulation, oil and nitrogen gas
  - Construction
  - Reasons for gas and or oil filled
  - Characteristics and capabilities of the cable
  - Pressure/Volume characteristics of oil and gas
  - Precautions when handling
- Types and functions of tools and equipment used on oil or gas filled specialised underground cables
- Techniques when handling, storing and disposing of oil or gas filled specialised underground cables

T2.2.48 Electrical equipment — HV and LV powerline

Evidence shall show an understanding of electrical equipment fundamentals used in the powerline industry to an extent indicated by the following aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and specific enterprise regulations pertaining to the use and care of electrical equipment
  - Note: Examples of electrical equipment will vary according to the enterprise but encompass both HV and LV equipment
- Characteristics, capabilities and application of powerline electrical equipment
- Safety precautions with regards to using electrical equipment
- Techniques in pre-use inspection on the serviceability of electrical equipment
- Techniques in the general maintenance, and care and storage of electrical equipment
- Identifying hazards, assessing and controlling risks associated with their the use of electrical equipment

T2.2.49 Co-ordinating permit access authority procedures

Evidence shall show an understanding of co-ordinating access authority procedures to an extent indicated by the following aspects:

- Specific enterprise processes, policies and procedures to be followed
- Processes of consultation, negotiation and co-ordination encompassing:
  - Clear and concise instructions and information
  - Methods for the encouragement of feedback and contributions of

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information and ideas

Responsibilities of members of the team

- Techniques in analysing, planning, co-ordination and organising work for a safe outcome and according to statutory requirements and regulations
- Techniques in the effective utilisation of available resources
- Techniques in the development of an access authority/permit and/or access authority/permit issuing procedures
- Techniques in facilitating and co-ordinating the delivery and issuing of access authorities
- Techniques in gathering, collating and confirming data on different worksites

  Note: Examples include electrical network diagrams for the specific work site, earth access authorities, safe working area, work to be carried out in confined space or in hazardous environment, specific outsourcing procedures, specific hazard identification, risk classification and management procedures, regulatory requirements such as Occupational Health and Safety and electrical safety
- Techniques in the receiving and co-ordinating the cancellation of access authorities in readiness for restoration
- Methods of conducting audits on correct access authority procedures
- Process of issuing of other access authorities for work permits

  Note: Examples include working in confined space, if required, co-ordination of access authorities, engaging and briefing contractors on electrical and other work
- Issue and receipt of operating agreements

T2.2.50 Extra High Voltage — Bare hand live line principles

Evidence shall show an understanding of safe practice and effective working practice in the application of bare-hand live line work at voltages of 132 kV and above to an extent indicated by the following aspects:

- Commonwealth/State/Territory legislation, Standards, codes, supply authority regulations and or enterprise requirements associated with plant, equipment and tools used for live line bare-hands work
- Safety precautions when working on plant, equipment and tools using bare-hand combined encompassing:

  Live line minimum approach distances

  Occupational Health and Safety hazards and precautions

  Identification of OHS hazards, assessing and controlling risks

  Types, selection, maintenance, storage and uses of personnel protective equipment

  Live line access authority/permit systems

  Disabling auto-reclosing function

  Ensuring functioning of fault current protective devices

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Checking integrity of insulation prior to work commencement

Types and function of specialised live working equipment and tools inspection before use

Safe working policies, procedures and practices when using/operating specialised equipment and tools

Methods of using specialised equipment and tools

Work team communication

Use of safety observers

Emergency response and rescue including First Aid etc

- Identification of ropes used for bare-hand live work encompassing:

  Types — insulating, live line and rescue rope

  Characteristics

  Application

  Restrictions
- Precautions for the storage of ropes used for bare-hand live linework
- Type of storage facility needed
- Cleaning and caring of ropes used for bare-hand live linework
- Labelling of ropes
- Testing of ropes for bare-hand live linework encompassing:

  LV tests

  HV tests

  Recording frequency of tests
- Techniques in splicing, preparing an eye and preparing the ends of insulating rope
- Techniques for preparation and usage of tools employed in bare-hand work on energised lines encompassing:

  Live line insulator tester, Live line insulating rope test set and Ladder leakage monitor
- Methods of determining suitability of the rope for continued use for bare-hand live linework by the monitoring of the leakage current along the live line ladder
- Techniques for the positioning, connecting and rigging of equipment such as a live line ladder
- Methods of monitoring of ladder leakage current
- Techniques for undertaking the preparation sequence when bonding on to a transmission line conductor encompassing:

  Means of communication to the safety observer

  Process of safely moving out onto the live line ladder

  Process of safely moving towards the transmission line conductor

  Process for connecting the bare-hand conductive suit bonding wand to the transmission line conductor
- Procedure for the carrying out of bonding off from a transmission line conductor

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T2.2.51 Extra High Voltage — Bare hand live line procedures

Evidence shall show an understanding of working on energised lines at or above 132 kV using live line bare-hand techniques to an extent indicated by the following aspects:

- Commonwealth/State/Territory legislation, Standards, codes, supply authority regulations and or enterprise requirements associated with plant, equipment and tools used for live line bare-hands work associated with extra high voltage (EHV)
- Safety precautions when working on plant, equipment and tools using bare-hand combined encompassing:
  - Live line minimum approach distances
  - Occupational Health and Safety hazards and precautions
  - Identification of OHS hazards, assessing and controlling risks
  - Types, selection, maintenance, storage and uses of personnel protective equipment
  - Live line access authority/permit systems
  - Disabling auto-reclosing function
  - Ensuring functioning of fault current protective devices
  - Checking integrity of insulation prior to work commencement
  - Types and function of specialised live working equipment and tools inspection before use
  - Safe working policies, procedures and practices when using/operating specialised equipment and tools
  - Methods of using specialised equipment and tools
  - Work team communication
  - Use of safety observers
  - Emergency response and rescue including First Aid etc
- Techniques for undertaking the preparation sequence to replace insulator string on an outer and centre phase
- Techniques for erecting insulated ladder
- Techniques for connecting and rigging equipment
- Techniques for bonding on and off; procedures
- Techniques for disc insulator string replacement on the outer phase and centre phase

T2.2.52 Extra High Voltage — Bare hand live line work using a helicopter

Evidence shall show an understanding of working on energised lines at or above 132 kV using live line bare-hand techniques from a helicopter platform to an extent indicated by the following aspects:

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- Commonwealth/State/Territory legislation, Standards, codes, Commonwealth/State/Territory legislation, supply and aviation authority regulations and or enterprise requirements associated with extra high voltage (EHV) live line bare-hands work form a helicopter platform
- Safety precautions when working on helicopters encompassing:
  - Live line minimum approach distances including safe approach for selected helicopter type(s)
  - Occupational Health and Safety hazards and precautions
  - Determination of helicopter platform for task and working environment (i.e. network and relevant aircraft authority)
  - Identification of OHS hazards, assessing and controlling risks
  - Types, selection, maintenance, storage and uses of personnel protective equipment
  - Live line access authority/permit systems
  - Disabling auto-reclosing function
  - Ensuring functioning of fault current protective devices
  - Checking integrity of insulation prior to work commencement
  - Types and function of specialised live working equipment and tools
  - Safe working policies, procedures and practices when using/operating specialised equipment and tools
  - Methods of using specialised equipment and tools
  - Work team communication
  - Use of safety observers
  - Pilot briefing requirements
  - Emergency response and rescue including First Aid etc
  - Techniques for working bare-hands on live line extra high voltage from a helicopter platform
  - Aircraft operations induction including flight plan clearances, systems, equipment and communication requirements
  - Types and functions of aerial attachment equipment including appropriate testing, rating and certification
  - Aircrew familiarisation with live-line systems operations and equipment requirements

T2.2.53 HV principles

Evidence shall show an understanding of the principles of high voltage to an extent indicated by the following aspects:

- Commonwealth/State/Territory legislation, Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations and or enterprise requirements associated with working on or near High Voltage
- Electrical and electrostatic principles related to high voltage lines

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encompassing:

- Relationship of current, voltage and resistance as related to transmission lines
- Relationship of phase voltage and respective line voltages
- Production of an electric field encompassing:
- Units
- Effect of distance
- Potential of an object within the field and the effect of distances to the potential

- HV insulators encompassing:
  - Construction of a disc insulator
  - Construction of a polymeric insulator
  - Effects of an electrical field on disc insulators
  - Identification of the number of disc insulators needed for a single line voltage
  - Performance of a failed disc insulator on the line and the system
  - Determining the minimum allowable number of discs per string for each line voltage in the system before bare-hand work is to proceed
  - Techniques in detecting a failed disc in a string
  - Techniques in using appropriate tools and equipment to test a string
  - Methods of recording data
- Effects of electrostatic induction on the human body encompassing:
  - Relationship of the resistance of a human body to different levels of current and voltage
  - Relationship of a human body to an electric field
  - Effects of electrostatic induction on bare-hand work
- Application of Faraday’s cage encompassing:
  - Effects of a body
  - Advantages
  - Description of the Faraday’s cage used by bare-hand live-line workers
- Safety precautions working on or near High Voltage electrical apparatus
  - Safe approach distances from live line
  - Identification of OHS hazards, assessing and controlling risks
  - Types, selection, maintenance, storage and uses of personnel protective equipment
  - Permit to work systems and isolation procedures
  - Types and function of specialised live working equipment
  - Safe working policies, procedures and practices when using and operating specialised equipment
  - Methods of using specialised equipment
  - Emergency response and rescue including First Aid etc

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- Effects of lighting and switching surges on performance off string insulators encompassing:
  - Health effects to workers
  - Methods used to alleviate surges on transmission lines
- Magnetic field encompassing:
  - Difference between magnetic fields and electrostatic fields
  - Source of magnetic field
  - Techniques in locating, measuring and analysing known sources of magnetic fields
  - Reasons for monitoring magnetic field exposure
  - Techniques used to monitor magnetic fields

T2.2.54 Low voltage electrical overhead service installation

Evidence shall show an understanding of the installation of low voltage electrical services to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements
- Requirements for the use of enterprise construction manuals, system diagrams/plans and drawings, encompassing:
  - Types of low voltage overhead services
  - Methods of construction and installation
  - Minimum clearances for overhead services to assets and structures
  - Ground clearances for overhead services
  - Maximum span lengths and tensions for overhead services
  - Customer poles
- Installation equipment/tools
  - Equipment and tools for overhead service installation
  - Fittings and hardware for overhead service installation
- Characteristics and applications of different types of cables encompassing:
  - Cable cross-sectional area of conductors
  - Current rating and fuse types and ratings
- Stringing and terminating methods encompassing:
  - Energised and de-energised cables
  - Connections to point of attachment, fuse boxes and pole top boxes
  - Termination at customer pole
- Connection of overhead services:
  - Types of overhead service connections
  - Live low voltage work principles
- Techniques for maintenance of overhead service installations encompassing:

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Diagnosis and repair of faults
Removing, repairing and replacing of damaged overhead services
Removing and replacing pole type fuses

- Testing and commissioning procedures encompassing:
  Inspection
  Equipment functionality tests
  Continuity tests
  Polarity, voltage and phase sequence tests
  Neutral and phase identification tests
  Neutral integrity tests
  Meter function test
  Testing check forms
- Connection principles:
  Purpose and function of MEN system
  Types of connection faults
  Causes and effects of incorrect and poor electrical connections
  Principles of loop impedance
  Reasons for and methods used to maintain standard phase sequencing
  Purpose and operation of service fusing
  Use of independent earth for testing

T2.2.55 Low voltage electrical underground service installation

Evidence shall show an understanding of the installation of low voltage electrical services to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements
- Requirements for the use of enterprise construction manuals, system diagrams/plans and drawings, encompassing:
  Types of low voltage underground services
  Methods of construction and installation
  Minimum depths for underground services to be buried and proximity to other assets and structures
- Installation equipment/tools
  Equipment and tools for underground service installation
  Fittings and hardware for underground service installation
- Methods of laying cables including:
  Conduits and sand and slabbing
- Characteristics and applications of different types of cables encompassing:
  Cable cross-sectional area of conductors

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Current rating and fuse types and ratings
- Techniques for maintenance of service installations encompassing:
  Diagnosis and repair of faults
- Jointing and terminating methods encompassing:
  Polymeric heat-shrink materials
  Polymeric tape materials
  Insulated piercing connectors (IPCs)
  Energised and de-energised cables
  Connections to point of entry, fuse boxes, pillars, pits
- Testing and commissioning procedures encompassing:
  Pre-energising tests - insulation resistance and continuity test
  Inspection
  Equipment functionality tests
  Polarity, voltage and phase sequence tests
  Neutral and phase identification tests
  Neutral integrity tests
  Meter function test
  Testing check forms
- Connection principles:
  Purpose and function of MEN system
  Types of connection faults
  Causes and effects of incorrect and poor electrical connections
  Principles of loop impedance
  Reasons for and methods used to maintain standard phase sequencing
  Purpose and operation of service fusing
  Use of independent earth for testing

2.2.04 T2.3 Powerline safety and protection

T2.3 Powerline safety and protection

T2.3.1 Powerline safety practices

Evidence shall show an understanding of powerline safety practices to an extent indicated by the following aspects:

- Protective apparatus and apparel for linework

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Note: Examples include responsibilities for the selection, use, maintenance and storage of protective apparatus and apparel and the types of protective apparatus and apparel used for the line worker

- Requirements for the use of ladders

  Note: Examples include practical demonstration of carrying, erecting, collapsing and lowering different types of extension ladder against a standing pole, maintenance checks on different types of ladders, renewal of extension ropes and the safety issues relating to clearances from overhead conductors

- Requirements for climbing and working aloft

  Note: Examples include methods used to identify a pole is safe to climb, methods used to inspect a line worker's body belt, application of knots and hitches appropriate to the requirements of a line worker, height safety principles including personal fall protection, prevention and related requirements, and the practical procedure of climbing an overhead structure and fitting a pole chair

- Traffic management

  Note: Examples include purpose of traffic management and a line worker's responsibilities in accordance with relevant statutory requirements and electricity supply industry requirements, demonstration of the procedure used to provide an effective traffic management scheme and the use of a two-way radio

- Control of small fires

  Note: Examples include the identification, selection and operation of the appropriate extinguishing mediums for various types of fires, general fire prevention methods and the precautions for personal protection when fighting small fires

- Rescue victims from heights and confined spaces

  Note: Examples include planning, identifying, the procedures, and establishing responses, developing techniques, involvement of external emergency services and practical demonstration/rehearsals of rescuing a person from heights and from confined spaces and emergency procedures for the rescue of an electric shock victim including CPR

- Requirements for aerial linework

  Note: Examples include planning, establishing and implementing relevant aviation authority clearances, determining system requirements, aircrew familiarisation with network operations and equipment, requirements for effective communications operations for aerial work

T2.3.2 Powerline safety — implementation and monitoring

Evidence shall show an understanding of the implementation and monitoring requirements for powerline safety to an extent indicated by the following aspects:

- Identification of relevant legislation, codes and government guidelines for the

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implementation and monitoring of OHS in the workplace

Note: Examples include Commonwealth/State/Territory legislation relevant to the workplace and the meaning of general duty of care under OHS legislation and common law

- Workplace OHS enterprise plan

  Note: Examples include responsibilities of each member of the work team, review process for changing/improving OHS safety plan/standing instructions for the systematic management of OHS in the workplace

- Relationship between the OHS committee and employees

  Note: Examples include methods used to collate and distribute/disseminate OHS information, staff development activities and legislation requirements with regards to OHS training, methods of addressing barriers such as literacy and cultural differences and provisions relating to OHS issue resolution

- Hazards associated with Powerline industry

  Note: Examples include identification of hazards in the workplace, processes used and contributing factors to a hazardous situation assessment of risks and control of OHS risks (risk management), the hierarchy of control and monitoring of risk control measures

- Risk assessment and its management in Powerline industry

  Note: Examples include principles and purposes of risk management, processes for conducting risk assessment including, risk analysis and risk evaluation activities for selecting and implementing appropriate options for eliminating or minimising risk

- Maintenance strategies for OHS programs

  Note: Examples include developing processes for promoting, maintaining and improving OHS in the workplace and identify techniques for the evaluating and reviewing OHS education and training programs and elements of an effective OHS management system, OHS consultation and accident/incident investigations

T2.3.3 Statutory and safety considerations

Evidence shall show an understanding of the principles of Statutory and safety considerations to an extent indicated by the following aspects:

- Commonwealth/State/Territory legislation, standards, codes, supply authority regulations and or enterprise requirements associated with working on High Voltage
- Particular reference to State and Territory regulations regarding:

  Working near energised conductors

  Electrical access

  Heights

  Confined space

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Testing procedures

Licensing rules

T2.3.4 Electrical equipment — protection and control schemes

Evidence shall show an understanding of the electrical equipment associated with protection and control schemes to an extent indicated by the following aspects:

- Types and applications of electrical equipment encompassing::

  Characteristics

  Capabilities

  Note: Examples include the following schemes, overcurrent, frame leakage, cooling, buchholz, DC supplies, restricted earth, sensitive earth fault, CB fail, reclose, DC frame leakage, CEL Fail, under frequency load shed and earth fault

T2.3.5 Discrete protection schemes — isolation and tagging procedures

Evidence shall show an understanding of the principles of isolation and tagging procedures associated with protection testing to an extent indicated by the following aspects:

- Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations and or enterprise requirements associated with the installation, maintenance, isolation and tagging procedures
- Requirements for the use of, isolation and tagging, manuals, system diagrams/plans and drawings
- Techniques in documenting isolations
- Techniques in appropriate isolation and tagging procedures as per Commonwealth/State/Territory legislation, supply authority regulations and enterprise standards
- Techniques in the installation and maintenance procedures protection devices as per Commonwealth/State/Territory legislation, supply authority regulations and enterprise standards

T2.3.6 Protection devices — maintenance and commissioning principles

Evidence shall show an understanding of the maintenance and commissioning procedures associated with discrete protection schemes to an extent indicated by the following aspects:

- Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations and or enterprise requirements associated with the maintenance and commissioning procedures

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- Requirements for the use of maintenance and commissioning manuals, system diagrams/plans and drawings
- Techniques in maintenance and commissioning procedures encompassing:
  - Planning
  - Policy
  - Testing techniques
  - Close out requirements

T2.3.7 Protection devices — manufacturer requirements

Evidence shall show an understanding of relay manufacturer specifications to an extent indicated by the following aspects:

- Standards, codes, Commonwealth, State/Territory and local government legislation, supply authority regulations and or enterprise requirements applicable to the use and application of relay manufacturer specifications
- Requirements for the use of relay manufacturer manuals, system diagrams/plans and drawings
- Types, function and characteristics of specific relays encompassing:
  - Differences between specific relays used for the same functionality

T2.3.8 Safe design principles

Evidence shall show an understanding of the principles of safe design to an extent indicated by the following aspects:

- Commonwealth/State/Territory legislation, standards, codes, supply authority regulations and or enterprise requirements associated with safe design principles
- Particular reference to state and territory regulations regarding:
  - Working near energised conductors
  - Electrical access
  - Heights
  - Confined space
  - Testing procedures
  - Licensing rules
- Application of safe design principles encompassing::
  - Safe design duty related information
  - Safe design process related information
  - Safe design evaluations

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2.2.05 T2.4 Switching

T2.4 Switching

T2.4.1 Switchgear installation

Evidence shall show an understanding of the installation of switchgear and associated equipment to an extent indicated by the following aspects:

- Types and function of various switchgear
  - Note: Examples include isolators, air-break switches, gas-filled switches, vacuum type, links, fuses, oil disconnectors, fuse switches, circuit breakers, operating characteristics, advantages and disadvantages of different types switchgear, installation procedures, earthing, requirements and techniques
- Types of equipment
  - Note: Examples include transformers, reactors, regulators, capacitors, relays, surge arrestors, fault indicators and mobile generators
- Installation procedures for switchgear and equipment encompassing:
  - Standards, codes, legislation, supply authority regulations and or enterprise requirements
  - Assembly and erecting procedures
  - Earthing requirements and techniques
  - Pole mounted locations
- Maintenance procedures for switchgear and equipment encompassing:
  - Diagnosing and rectifying faults according to electricity supply industry standards and procedures
- Testing and commissioning encompassing:
  - Electricity supply industry standards and procedures

T2.4.2 Low voltage switching principles

Evidence shall show an understanding of low voltage switching principles to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to switching of low voltage to a given schedule
- 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

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LV network interconnectors source of possible backfeed

- Low voltage switching techniques encompassing:
  - Identifying hazards, assessing and controlling risks associated with LV switching operations
  - Electrical access permit(s)
  - Operational procedures
  - Earthing procedures
- Personnel protective equipment (PPE) for LV switching

T2.4.3 High voltage switching principles

Evidence shall show an understanding of high voltage switching principles to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to switching of high voltage to a given schedule
- 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
- Role of the HV switching operator
- Operational forms, access authorities and permits associated with HV switching encompassing:
  - Types of operational forms, access authorities and permits
  - Purpose and procedure for operational forms, access authorities and permits
- Use and operation of equipment associated with HV overhead and substation equipment encompassing:
  - Test instruments
  - Sticks
  - Interrupters
  - Arc stranglers
- Types and categories of HV switchgear
- Application, function and operating capabilities of switchgear
- Restrictions pertaining to HV switching equipment
- Procedures for the isolation of HV transmission main and working earths
- 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

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  - Acceptable industry procedures
  - Personal protective equipment
- High voltage switching techniques
- Operate switching apparatus encompassing:
  - Identifying hazards, assessing and controlling risks associated with HV switchgear operation
  - Systematic and defensive techniques
  - Mobile radio procedures
  - Double isolation procedures

T2.4.4 High voltage fault switching principles

Evidence shall show an understanding of high voltage fault switching principles to an extent indicated by the following aspects:

- Primary causes, effects and types of HV electrical faults
- HV protection devices encompassing::
  - Main components
  - Types
  - Categories
  - Applications
  - Functions
- Basic principle of operation of HV system protection devices
- Protection co-ordination and protection "zoning"
- HV feeder auto-reclosing suppression encompassing:
  - Function
  - Application
- Circuit condition requirements and switching considerations when paralleling and separating HV feeders

T2.4.5 High voltage distribution transformer principles

Evidence shall show an understanding of high voltage distribution transformer principles to an extent indicated by the following aspects:

- 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

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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

- 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

T2.4.6 High voltage SWER system

Evidence shall show an understanding of high voltage SWER system to an extent indicated by the following aspects:

- 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

T2.4.7 Feeder automation system

Evidence shall show an understanding of feeder automation system to an extent indicated by the following aspects:

- Function of feeder automation system and the main components
- Operation procedure for a remote field device from a local control station
- Functions of "System Control and Date Acquisition" (SCADA) (or any other relevant Data Acquisition and Control) systems and its main components
- SCADA system security interlocks and access restrictions
- SCADA system operation when switching apparatus or retrieving data via a remote access device such as; Remote Access Terminal (RAT), Dial Up Voice Annunciated System and Local Control Station
- Function of the main components of a local/remote control system
- Operation of a field devices using SCADA systems via a Remote Access Terminal (RAT), Dial Up Annunciated System and Local Control Station

T2.4.8 System switching operations and authorisation procedures — HV

Evidence shall show an understanding of HV system switching principles including

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switching authorisation procedures to an extent indicated by the following aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to system switching
- Requirements for the use of manuals, system diagrams/plans and drawings
- Types and characteristics of HV systems and equipment to be switched
- 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
- Techniques in HV system switching encompassing:
  - 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

T2.4.9 System switching operations and authorisation procedures — LV

Evidence shall show an understanding of LV system switching principles including switching authorisation procedures to an extent indicated by the following aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to system switching
- Requirements for the use of manuals, system diagrams/plans and drawings
- Types and characteristics of LV systems and equipment to be switched
- Procedures for obtaining correct LV 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

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  - Requirements for team switching
  - Procedures for coordination of operations
- Techniques in LV system switching encompassing:
  - Isolation procedures and proving dead
  - Earthing procedures (comment not aware of any electricity network that earths LV)
  - Pre-switching checks
  - Switching operational procedures
  - Emergency fault procedures
  - Energisation procedures

T2.4.10 Co-ordinating and directing switching instructions

Evidence shall show an understanding of coordinating and directing switching instructions to an extent indicated by the following aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to switching sheet instructions
- Specific enterprise processes, policies and procedures to be followed
- Processes of consultation, negotiation and coordination encompassing:
  - Clear and concise instructions and information
  - Methods for the encouragement of feedback and contributions of information and ideas
  - Responsibilities of members of the team
- Techniques in analysing, planning, co-ordination and organising work for a safe outcome and according to statutory requirements and regulations
- Techniques in the effective utilisation of available resources
- Techniques in the co-ordination and directing of switching schedules instructions
- Relationship between the operating authorities and HV customers, operating agreements
- Techniques in co-ordinating and directing HV and LV switching of electrical networks
- Requirements for the use of manuals, system diagrams/plans and drawings encompassing:
  - Types, characteristics and capabilities of LV and HV electrical equipment to be switched
- Responsibilities of the switching operator
- Techniques in writing switching instructions encompassing:
  - Sequence of switching operations
  - Isolation procedures
  - Earthing procedures

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Switching completion notification procedures

- Techniques in gathering, collating and confirming data on switching procedures

T2.4.11 High voltage overhead and substation switching principles

Evidence shall show an understanding of HV overhead and substation switching principles to an extent indicated by the following aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to HV overhead and substation switching
- Requirements for the use of manuals, system diagrams/plans and drawings encompassing:
  - Types, characteristics and capabilities of HV electrical equipment to be switched
  - Use, characteristics and capabilities of specialised tools and testing equipment
- Role and responsibilities of the HV switching operator
- Operational forms, access authorities and permits hazard/risk assessments associated with HV switching encompassing:
  - Types of operational forms, access authorities and permits hazard/risk assessments
  - Purpose and procedure for operational forms, access authorities and hazard/risk assessments
- Use and operation of equipment associated with HV overhead and substation equipment encompassing:
  - Test instruments
  - Sticks
  - Interrupters
  - Arc stranglers
- HV switchgear encompassing:
  - Types
  - Categories
  - Application
  - Operating capabilities
- Operation of HV overhead switching or indicating devices
  - Note: Examples include fuses; disconnect fuses; load switching; live line indicators; capacitors; reclosers; sectionalisers, underslung links, airbreaks; switches, disconnects; live line clamps; phasing sticks; phasing tester
- Operation of protection systems and substation equipment
  - Note: Examples include fault levels and settings; types and applications; protection systems and substation equipment fault levels and settings;

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types and applications

- Restrictions pertaining to HV switching equipment
- Procedures for the isolation of HV mains and working earths encompassing:

  Earthing HV electrical apparatus practices and procedures for access authority issuing;
- HV switching techniques;
- Operate switching apparatus encompassing:

  Identifying hazards, assessing and controlling risks associated with HV switchgear operation

  Systematic and defensive techniques

  Mobile radio procedures

  Double isolation procedures

T2.4.12 Low voltage overhead and substation switching principles

Evidence shall show an understanding of low voltage overhead and substation switching principles to an extent indicated by the following aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to low voltage overhead and substation switching
- Requirements for the use of manuals, system diagrams/plans and drawings encompassing:

  Types, characteristics and capabilities of LV electrical equipment to be switched

  Use, characteristics and capabilities of specialised tools and testing equipment
- Role and responsibilities of the LV switching operator
- Operational forms, access authorities and hazard/risk assessments associated with HV switching encompassing:

  Types of operational forms, access authorities and hazard/risk assessments

  Purpose and procedure for operational forms, access authorities and hazard/risk assessments
- Use and operation of equipment associated with LV overhead and substation equipment encompassing:

  Test instruments

  Sticks

  Interrupters

  Arc stranglers; (not a common term)
- LV switchgear encompassing:

  Types

  Categories

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Application

Operating capabilities

- Operation of LV overhead switching or indicating devices:

  Note: Examples include fuses; disconnect fuses; load switching; underslung links, air break switches; disconnects; live line clamps; phasing sticks; phasing tester

- Operation of protection systems and substation equipment

  Note: Examples include fault levels and settings; types and applications, protection systems and substation equipment fault levels and settings; types and applications

- Restrictions pertaining to LV switching equipment
- Procedures for the isolation of LV distributions main and working earths
- Earthing LV electrical apparatus practices and procedures for access authority issuing
- Low voltage switching techniques
- Operate switching apparatus encompassing:

  Identifying hazards, assessing and controlling risks associated with LV switchgear operation

  Systematic and defensive techniques

  Mobile radio procedures

  Double isolation procedures

T2.4.13 High voltage switching instruction preparation

Evidence shall show an understanding of the preparation of a HV switching instruction schedule to an extent indicated by the following aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to switching instruction schedules
- Requirements for the use of manuals, system diagrams/plans and drawings encompassing:

  Types, characteristics and capabilities of HV electrical equipment to be switched

- Points of isolation and earthing locations (safety and working earths)
- Responsibilities of the switching operator
- Techniques in writing switching instructions encompassing:

  Sequence of switching operations

  Isolation procedures

  Earthing procedures

  Switching completion notification procedures

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T2.4.14 Low voltage switching instruction preparation

Evidence shall show an understanding of the preparation of a LV switching instruction to an extent indicated by the following aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to switching sheet schedules
- Requirements for the use of manuals, system diagrams/plans and drawings encompassing:
  - Types, characteristics and capabilities of LV electrical equipment to be switched
  - Isolation points and earthing (if considered necessary)
  - Responsibilities of the switching operator
- Techniques in writing switching schedules encompassing:
  - Sequence of switching operations
  - Isolation procedures
  - Earthing procedures — if necessary
  - Switching completion notification procedures

2.2.06 T2.5 Vegetation

T2.5 Vegetation

T2.5.1 Ecological principles for vegetation control

Evidence shall show an understanding of ecological principles for vegetation control to an extent indicated by the following aspects:

- Ecological principles encompassing:
  - Interdependence of plants, animals, the soil and the environment
  - Environment
  - Habitats
  - The food chain
- Soil and erosion control principles encompassing:
  - Soil types
  - Simple tests
  - Types of erosion
  - Theory of erosion prevention and control
  - Land degradation control
  - Functions of trees in the environment

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- Basic anatomy and physiology encompassing:
  - Plant morphology
  - Internal anatomy
  - Growth patterns and habits
  - Simple physiology
- Tree hazard assessment encompassing:
  - Symptoms of stress in trees
  - Diagnosing tree problems
  - Assessments for line clearance
  - Personal hazards
  - The tree's response to wounding and decay
  - Theory of compartmentalisation
  - Tree stability (damage to root systems due to excavation)
  - Principles of pruning
  - Branch collars

T2.5.2 Vegetation control techniques

Evidence shall show an understanding of the control of vegetation to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements including relevant certification and licensing applicable to the control of vegetation encompassing:
  - Clearance zones and approach distances from overhead power lines
  - Legislation associated with easement access and maintenance
  - Appropriate personal protection equipment
  - Equipment maintenance and safety precautions
- Tree climbing and pruning encompassing:
  - Chainsaw safety and maintenance
  - Basic cross-cutting techniques
  - Simple felling
  - Use of EWPs
  - Safe climbing with ropes and harnesses
  - Use of chainsaws in the tree
  - Cutting techniques
  - Roping techniques
  - Chemical control of foliage and the required safety techniques
  - Practical work on site with a range of trees
- Easement management encompassing:

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Legislation relating to easement access and maintenance

Use of chemicals and herbicides and provision of MSDSs for those substances

Use of machinery and plant

Access tracks

T2.5.3 Fundamentals for working safely near live electrical apparatus

Evidence shall show an understanding of working safely up to the defined "safe working zone" near energised electrical apparatus (inc. electrical powerlines) for non-electrical worker to an extent indicated by the following aspects:

- 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

  Note: Examples include ‘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 encompassing:

  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

  Note: Examples of 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

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T2.5.4 Coordinate vegetation control inspection programs

Evidence shall show an understanding of the co-ordination of vegetation control inspection programs to an extent indicated by the following aspects:

- Commonwealth/State/Territory/local government legislation/regulations, Standards, codes, supply authority regulations and or enterprise requirements including relevant certification and licensing applicable to co-ordinating the inspection of vegetation control encompassing:
    - Clearance zones and approach distances from overhead power lines
    - Legislation associated with easement access and maintenance
    - Use and operation of plant and equipment such as ’EWPs, chainsaws/pole saws, stump grinders
    - Appropriate personal protection equipment
    - Equipment maintenance and safety precautions
    - Endangered plants/animals/insects
    - Soil erosion
    - Chemical treatment
    - Provision of manufacturers and suppliers information such as material safety data sheets (MSDSs)
    - Traffic management control plan
- Alternative engineering solutions for vegetation management
- Emergency response and First Aid procedures
- Techniques in the inspection of vegetation to determine action required encompassing:
    - Diagnosing tree problems and systems of stress in trees
    - Identification of fall zone
    - Identification of OHS hazards, assessing and controlling risks
    - Safety policies, procedures and precautions
    - Responsibilities and protocols for team members
    - Procedures for obtaining electrical access authorities
    - Procedures for coordination of operations
- Techniques in determining the resources required for a particular vegetation control project
- Techniques in determining the condition of the tools and equipment needed for a particular vegetation control project
- Techniques in determining the duration and cost of the vegetation control project
- Techniques in relaying information to team members encompassing:
    - Safe precautions and procedures
    - Clearances zones and approach distances

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Proper selection, maintenance, use and storage of personal protective equipment

Procedures regarding safe use of equipment including pre-operational checks for serviceability

Procedures in the safe transporting, use, storage and disposal of chemicals

- Procedures for removal of vegetation
- Techniques in record keeping of data

T2.5.5 Powerline clearances and approach distances

Evidence shall show an understanding of powerline clearance and approach distance practices to an extent indicated by the following aspects:

- Regulatory environment of powerline clearance encompassing:

  Statutory Requirements

  Commonwealth/State/Territory legislation

  Technical standards, acts, codes and guides
- Approved Work Procedures encompassing:

  Documentation of Work Procedures

  Procedures in the event of an incident

  Note: Examples include events constituting an incident, procedures for responding to incidents

  Safe Approach Distances for plant and equipment

  Note: Examples include Insulated Cranes and Plant Operated by an Authorised or Instructed Person

  Safe Approach Distances for Personnel and Hand Held Tools

  Special Limits of Approach for Authorised Persons Only

  Minimum vegetation approach distances

  Minimum Safe Working Distances for personnel

  Tool Length Determination

  Proximity to Electrical and Telecommunications Apparatus

  Safety Precautions

  Field Supervision at the Work Site

  Duties of the Safety Observer

  Identification of OHS hazards, assessing and controlling risks

  Types, selection, maintenance, storage and uses of personnel protective equipment

  Permit to work systems and isolation procedures

  Emergency response and rescue including First Aid etc

  Working at heights

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Working in confined spaces

T2.5.6 Basic vegetation control hazard assessment and risk management principles

Evidence shall show an understanding of hazard assessment and risk management appropriate to the level of responsibility in the vegetation control field and to an extent indicated by the following aspects:

- Identifying the terminologies associated with risk assessment
  Note: Examples include risk management, risk analysis and risk evaluation activities and eliminating or minimising risk. This incorporates principles and purposes of risk management, processes for conducting risk assessment including risk analysis and risk evaluation activities for selecting and implementing appropriate options for eliminating or minimising risk.
- Relationship risk assessment has with vegetation control
- Basic principles of hazard and risk assessment encompassing:
  What to look for
  Basic procedures in conducting work-site hazards/risk assessment
  Contingences
  Essential components of hazard assessment checks
  Identification of hazards associated with work function and the environment
  Note: Examples include type of equipment to be used, location of the work-site, condition of the surrounding vegetation and climate conditions
- Techniques in the elimination or minimization of hazards/risk encompassing:
  Identification of resources available
  Identification of appropriate methodology in hazard control
  Identification of the hierarchy of control
  Formulating a worksite hazard and risk assessment checklist
  Pre-job Hazard Assessment Check (HAC) Items
  Note: Examples include JSAs, planned inspection, hazard risk assessment form,
  Prompt sheet reference
  Note: Examples include VMP2 (electrical hazards) VMP1 (general) VMP3 (vegetation)
  Recognizing electrical hazards
- Evaluation of risk assessment and management procedures
- Communicating worksite procedures

T2.5.7 Pruning principles near powerline

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Evidence shall show an understanding of pruning principles near powerlines to an extent indicated by the following aspects:

- Reasons for pruning around powerlines
- Identifying site conditions encompassing:
  - Inspection methods of vegetation to be pruned what to look for
  - Determination of work-site working area
  - Identification of possible endangered species
  - Identification of appropriate personnel protective equipment to be used
  - Identification of the location of plant, tools, equipment and fellow workmates for safe work practices
- Inspecting location and determining work methods
- Principles of correct pruning practice encompassing:
  - Types of pruning
  - Note: Examples include Formative, Corrective, Preventative, Natural target pruning
  - Cutting Techniques
  - Different Branch Cuts
  - Note: Examples include single top cut technique, single under-cut, handsaw technique for light small branches, chainsaw technique for heavy branches, single side-cut technique, step cut (under-cut then a top cut) technique, scarf under-cut- then top cut technique, top scarf - bottom-back cut technique, side scarf - then opposite back-cut technique, spear-cut technique, snipping/cutting back overhang (lv)
  - Poor pruning practices
  - Correct pruning practices
  - Effects of pruning
  - Note: Examples include incorrect pruning, how much to prune, size of cut
- Principles of authorised tree trimming encompassing:
  - Qualifications for instructed/authorised work
  - Qualifications for working in the Safe working zone
  - Basic requirements for instructed/authorised work
  - Statutory requirements
  - Approved work procedures
  - Documentation of work procedures
  - Procedures in the event of an incident
  - Events constituting an incident
  - Procedures for responding to incidents

T2.5.8 Establishing rigging requirements for vegetation control

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Evidence shall show an understanding of establishing rigging requirements to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements associated with rigging including the operation of cranes, hoists and winches and relevant certification and licensing (if required)
- Requirements for the use of enterprise construction manuals, system diagrams/plans and drawings
- Safe use of rigging equipment, tools and associated equipment encompassing:
  - Types, techniques and application
  - Inspecting location
- Identifying site conditions encompassing:
  - Reasons for pruning around powerlines
  - Inspection of tree and site
  - Identifying hazards, assessing and controlling risks
  - Appropriate sequence of loading and unloading
- Selection and inspection procedures encompassing:
  - Rigging equipment, materials and tools
  - Note: Examples include natural and synthetic fibre ropes and chains, fittings, winch and capstan
- Establishing rigging in proximity to power lines encompassing:
  - Structural integrity for rigging on trees
  - Serviceability of safety lines, ropes, load bearing equipment
  - Inspecting safety harnesses/belt, straps and slings
  - Inspecting lowering devices
  - Note: Examples include lifts, restraints, slings, bends and hitches, pulleys, maillon rapides, lowering drum, T-bar flying capstan
- Checking the integrity of support structure; visual inspection of load connections
- Techniques in moving, lifting, shifting, managing and placing loads encompassing:
  - Use of appropriate communication and signalling methods
  - Codes of practice/compliance
  - Enterprise and Commonwealth, State/Territory legislative requirements
  - Weather conditions
  - Erection of safety nets and lines
  - Methods of fixing and anchoring loads
  - Load stability

T2.5.9 Powerline access and isolation procedures

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Evidence shall show an understanding of the procedures and protocols for access to powerline facilities and isolation of powerlines to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements associated with accessing powerline facilities together with the relevant certification and licensing (if required)
- Powerline access permit procedures and documentation
- Work place signage encompassing:
  - Traffic management
  - Unauthorised access
  - Public protection
- Powerline distribution voltages
- Switching requirements for authorised tree trimming work on high voltage overhead lines encompassing:
  - Information required by system control.
  - Information to be included on the ‘vicinity permit’
  - System control functions
  - Authorised work adjacent to an area under an access permit
  - Communications
  - Weather conditions at work site
  - Work team communications
  - Adequate light at work site
- Safety precautions to ensure powerline isolation procedures has been undertaken

T2.5.10 Tree preservation principles

Evidence shall show an understanding of the principles of tree preservation to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements associated with endangered species of
- Identifying site conditions and inspection of tree and or vegetation encompassing:
  - Suitability of this type of tree in this location
  - Identifying hazards, assessing and controlling risks with this tree in this location
- Inspecting location and determining work methods for tree preservation encompassing:
  - Tree defects
  - Tree Diseases

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Insect Attacks

- Relationship to how a tree grows to vegetation control encompassing:
  Australian tree families
- Tree preservation encompassing:
  Methods of clearing vegetation
  Tree trimming
  Pruning
  Tree felling
  Safety work measures/methods
  Prevention of soil erosion
  Regrowth control
  Disposal of debris
  Heritage, significant and urban/rural vegetation
  Fire prone areas

T2.5.11 SPARE CLAUSE

T2.5.12 Assessment of vegetation principles

Evidence shall show an understanding of the principles of conducting assessment of the condition and type of vegetation for the purpose of controlling its growth away from live lines, to an extent indicated by the following aspects:

- Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations, permit requirements and/or enterprise requirements associated with the cutting/pruning/controlling the growth of vegetation around live powerlines up to the high voltage live work zone as defined for both Instructed and Authorised Persons in the industry guidelines associated with live electrical apparatus
- Techniques in established procedures for defining species of vegetation, tree types and characteristics, including tree defects and hazards
- Techniques in identifying hazards and risk assessment control measures that encompass job safety assessment and compliance with 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
- Techniques in determining the appropriate safe working up to the defined "safe working zone" near energised electrical apparatus (including electrical

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powerlines) for non-electrical worker/ordinary persons
- Safety precautions working on vegetation control encompassing:
  - Safe working clearances from live line
  - Identifying OHS hazards, assessing and controlling OHS risks
  - Types, selection, maintenance and uses of personnel protective equipment
  - Permit to work systems and isolation procedures
  - Safe working practices when using specialised equipment
  - Emergency response and rescue including First Aid etc
  - Working at heights and in confined spaces
- Techniques in establishing the appropriate safe work methods and/or type of plant, tools and or equipment to control vegetation
  - Note: Examples include the selection of most appropriate tools such as chainsaw, movers, saws, trimmers and or the most appropriate chemical
- Use and application of plant, tools and equipment use to control vegetation
  - Note: Examples include the chainsaw, movers, saws and trimmers
- Mathematical calculations and technology related to load, slings, weights and height
- Techniques in communicating and relaying information to other personnel
- Techniques in compiling and recording assessment data collected

T2.5.13 Chemical control of foliage

Evidence shall show an understanding of vegetation control using chemicals to an extent indicated by the following aspects:

- Commonwealth, State and local government legislation, standards, codes, supply authority regulations and or enterprise requirements including relevant certification and licensing applicable to the control of vegetation using chemicals
- Chemical treatment principles encompassing:
  - Types and characteristics of chemical(s) to be used
  - Regulations and procedures in handling and transporting chemicals safely
  - Application procedures of chemicals to be used
  - Mixing desirable quantities
  - Pouring, spraying, and storing procedures
- Techniques in handling equipment to eliminate/reduce risks to the environment from spillages of oils, herbicides, pesticides and chemicals from such equipment as
  - Methods of disposing and storage of herbicides, pesticides and chemicals
- Safety precautions specific to working with chemicals encompassing:
  - Safe working practices and procedures
  - Occupational Health and Safety hazards and precautions

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Identification of OHS hazards, assessment and control of OHS risks

Types, selection, maintenance, storage and use of personal protective equipment

Note: Examples include appropriate selection of complete or partial body protection and processes of inspection prior to use and cleaning after use

Dangers of working in confined spaces and at heights while using chemicals

Permit to work systems and isolation procedures/protocols

Safe working policies, procedures and practices when using/operating specialised chemical equipment

Emergency response and rescue, including First Aid etc

Reasons and provisions of MSDSs

Precautions in the use of machinery, plant, equipment and tools when working with chemicals

- Required safety techniques in the handling of herbicides encompassing:

  Use and application of chemical agents

  Transporting and storage of chemicals and solvents

  Cleaning of equipment used in applications

  Procedures for spillages and contamination outside of vegetation control area

T2.5.14 Safety observer principles

Evidence shall show an understanding of responsibilities of a safety observer to an extent indicated by the following aspects:

- Commonwealth, State and local government legislation, standards, codes, supply authority regulations and or enterprise requirements including relevant certification and licensing applicable to the duties and responsibilities of a safety observer encompassing:

  Areas of responsibility

  Protocols and procedures

  Emergency response and rescue including First Aid etc
- Enterprise specific duties of a safety observer
- Techniques in observing others in the safe performance of their work
- Safe Approach Distances for Personnel and Hand Held Tools
- Special Limits of Approach for Authorised Persons Only
- Minimum vegetation approach distances
- Minimum Safe Working Distances
- Proximity to Electrical and Telecommunications Apparatus

T2.5.15 Operating tools and equipment from a platform

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Evidence shall show an understanding of the techniques in operating tools and equipment from a platform to an extent indicated by the following aspects:

- Commonwealth, State and local government legislation, standards, codes, supply authority regulations and or enterprise requirements including relevant certification and licensing applicable to the operating of tools and equipment from a platform
- Types of platforms used for vegetation control
- Advantages and disadvantages of each type of platform
- Types of pre-operational checks on platforms
- Transporting and storage methods
- Safety precautions when using platforms encompassing:
  - Proper use of elevating work platforms
  - Earthing of the EWP
  - Proper methods of mounting and alighting platforms
  - Hydraulic tools
- Use of insulated Elevating Work Platforms encompassing:
  - The insulated Elevating Work Platforms Operator
- Platform operational techniques on a platform encompassing:
  - Height safety
  - Working aloft
- Safety precautions specific to working on platforms encompassing:
  - Safe working practices and procedures
  - Occupational Health and Safety hazards and precautions
  - Identification of OHS hazards, assessment and control of OHS risks
  - Types, selection, maintenance, storage and use of personal protective equipment including harnesses
  - Dangers of working in confined spaces and at heights while on a platform
  - Permit to work systems and isolation procedures/protocols
  - Safe working policies, procedures and practices when using/operating hand and power tools
  - and equipment from a platform
  - Emergency response and rescue including First Aid etc

T2.5.16 Climbing techniques

Evidence shall show an understanding of climbing techniques to an extent indicated by the following aspects:

- Commonwealth, State and local government legislation, standards, codes, supply authority regulations and or enterprise requirements including relevant certification and licensing applicable to climbing for the purpose of vegetation

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control

- Items/structures that are and are not permissible to climb for vegetation control
- Safety precautions which are specific to climbing structures for the control of vegetation encompassing:
  - Safe working practices and procedures
  - Occupational Health and Safety hazards and precautions
  - Identification of OHS hazards, assessment and control of OHS risks
  - Types, selection, maintenance, storage and use of personal protective equipment including harnesses
  - Dangers of climbing in confined spaces and at heights
  - Permit to work systems and isolation procedures/protocols
  - Safe working policies, procedures and practices when climbing
  - Emergency response and rescue including First Aid etc
- Techniques in rigging encompassing:
  - Safety procedures including safety ropes and lines
  - Checking and setting up equipment
  - Load calculations/estimations
  - Techniques in using rigging equipment
  - Determining the serviceability of ropes and other lowering devices
- Load charts encompassing:
  - Safe working load estimates — field formulas
  - Branch and trunk calculations
  - Mathematical calculations and use of technology related to loads, slings, weights, and height
- Tree climbing and pruning practices encompassing:
  - Safe climbing with ropes and harnesses
  - Methods of ensuring operation of safety lines and ropes
  - Roping techniques
  - Load bearing equipment and lifts
  - Purposes of restraints, straps, slings, bends and hitches
  - Purposes of pulleys, maillon rapides, lowering drum, T-bar flying capstan
  - Techniques in climbing with spikes and pole belts

T2.5.17 Emergency procedures for climbers

Evidence shall show an understanding of the basic emergency procedures in releasing a person from an energised position to an extent indicated by the following aspects:

- Commonwealth, State and local government legislation, standards, codes, supply authority regulations and or enterprise requirements including relevant

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certification and licensing applicable to the requirements of releasing a person from energised situation

- Comprehension of EC24 Release and Rescue encompassing:
  - Detail a range of emergency situations that may arise during climbing operations
  - Detail of resources available at the worksite
  - Determining climber position with respect to live power lines in an emergency
  - Assess response requirements
  - Determining the appropriate personal protective equipment to be used
- Techniques in undertaking emergency response procedures for the release of a climber encompassing:
  - Assessment of priorities of procedures to follow including isolation of supply
  - Procedures for contacting emergency services and power supply company/asset owners
  - Assessing the possibility of safe rescue of the climber and the factors to consider
  - Assessing the best approach to rescuing the climber
  - Determining appropriate personal protective equipment
  - Techniques in climbing tree or structure
  - Techniques in safely removing climber from energised and/or de-energised supply
  - Techniques to the application of First Aid procedures including CPR
  - Techniques in lower climber to the ground
  - Techniques in First Aid procedures when climber is on the ground

2.2.07 T2.6 Rail traction

T2.6 Rail traction

T2.6.1 Electrical traction principles

Evidence shall show an understanding of electrical traction principles to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to the electrical traction
- Electrical traction voltage and current circuit paths encompassing:
  - Transmission distribution voltages

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Traction supply system and voltages

Return and stay current paths, including electrolysis

- Relationship of sectioning, section insulator and overlaps/air gaps in a traction power system
- Traction power system components encompassing:

  Function of transformer/rectifiers

  Configuration and purpose of traction overhead wiring systems

  Function of isolators/switches

  Function of the circuit breaker
- Reliability and security of traction supply

T2.6.2 Electrical traction protection requirements

Evidence shall show an understanding of protection requirements for electrical traction to an extent indicated by the following aspects:

- Traction power system electrical protection encompassing:

  Load protection

  Surge protection

  Fault protection

  Electrolytic protection
- Impact of electromagnetic forces encompassing:

  Telephone interference

  Effects of television/radio interference
- Insulation methods in a traction power system encompassing:

  Types of electrical insulation

  Insulation coordination

  Reason for electrical clearances
- Bonding systems

  Note: Examples include structure bonds, traction bonds/bonding cables and impedance bonds
- Ancillary conductors

  Note: Examples include feeder wires, current return path and other ancillary conductors
- Relationship of current and potential drapers/jumpers to the traction power system

T2.6.3 Electrical overhead traction wiring systems

Evidence shall show an understanding of electrical traction systems to an extent

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indicated by the following aspects:

- Electrical wiring system components

  Note: Examples include earth wires, feeder wire, return conductor, insulators, catenary wire, contact/trolley wire, droppers, tensioning equipment, current collectors, tram support networks, tram fittings, bridge/tunnel fittings
- Electrical traction circuits encompassing:

  Types

  Applications
- Relationship of the components, apparatus and the conductors to the operation of the traction system
- Effective current collection and wire interface
- Effective registration in the traction power system
- Profiling overhead traction wire methods encompassing:

  Factors that impact on current collectors

  Methods to achieving smooth current collector transitions and interfaces
- Dynamic and static forces encompassing:

  Types that effect traction systems

  Effects on effective registration

  Techniques to minimise the adverse effects

T2.6.4 Traction bonding

Evidence shall show an understanding of temporary and permanent traction bonds to an extent indicated by the following aspects:

- Traction bonds and cables encompassing:

  Temporary and permanent bonding methods

  Applications for temporary and permanent bonding

  Components of temporary and permanent bonds

  Interface between traction and signalling circuits
- Safe working procedures/practices when carrying out temporary and permanent bonding encompassing:

  Personal protective equipment (PPE)

  Electrical and visual testing on PPE
- Installation and removal of temporary traction bonds and cables encompassing:

  Types and purpose of tools and equipment

  Installation and removal methods

  Testing for electrical integrity of bonds and cables
- Installation and removal of permanent traction bonds and cables encompassing:

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Types and purpose of tools and equipment
Installation and removal methods
Testing for electrical integrity of bonds, cables and equipment

T2.6.5 Electrical traction configurations

Evidence shall show an understanding of overhead configurations used in the traction power system to an extent indicated by the following aspects:

- Traction configuration principles encompassing:
  - Types
  - Purpose
  - Assemblies
  - Subassemblies
  - Components
- Requirements for the use of enterprise construction manuals, system diagrams/plans and drawings, encompassing:
  - Types of components
  - Types and function of tools and equipment
- Installation of traction configurations encompassing:
  - Installation methods
  - Measurement of tolerances
  - Recording of tolerances
- Maintenance of traction configurations encompassing:
  - Types of components
  - Types and function of tools and equipment
  - Maintenance/repair procedures
  - Inspection and recording procedures
- Diagnose and correct simple faults in specific traction configurations encompassing:
  - Types and causes
  - Determination of appropriate corrective actions
  - Repair and replace procedures for components of specific configurations

T2.6.6 Road rail traction height access equipment

Evidence shall show an understanding of the operation of road rail and rail/tram traction height access equipment used in the installation and maintenance of overhead traction system to an extent indicated by the following aspects:

- Operator requirements encompassing:

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Pre-operational checks

Recording procedures e.g. logbook

- Road rail traction height access equipment operation encompassing:

  Equipment characteristics, capabilities and limitations

  Prestart requirements

  Operation procedure

  Basic problem solving equipment faults

  Safe working procedures when mechanical failure occurs

  Use of appropriate communication systems

  Permit to work systems and isolation procedures
- Safe working and safety requirements when using road rail traction height access equipment
- Procedures for effective traffic management
- Electrical safety requirements prior to operating equipment under live overhead equipment and adjacent to or in the vicinity of live overhead equipment
- Emergency procedures in the event of an electrical incident/accident
- Emergency procedures in the event of a safe working/road traffic incident/accident
- OHS and EPA requirements in the context of Commonwealth/State/Territory legislative requirements
- Rescue a person form a height access equipment encompassing:

  Methods for rescuing a person

  Methods for rescuing a person from a disabled height access equipment

  Methods for rescuing an incapacitated person from a height access equipment

  Methods for rescuing a person in contact with live overhead equipment

T2.6.7 Overhead traction equipment and components

Evidence shall show an understanding of overhead traction equipment and components in the traction supply system to an extent indicated by the following aspects:

- Overhead traction equipment encompassing:

  Types

  Purpose

  Note: Examples include switches/isolators, fuse switches, links, section insulators, and fuses
- Types of overhead traction components encompassing:

  Types

  Purposes

  Note: Examples include cantilever hardware, droppers, bay components,

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portal hardware, head span hardware, section insulators, neutral sections, registration fittings, steady span, tension regulators, and cross spans

- Types of conductors used for overhead wiring such as hard-drawn, CAD, and tin-bearing copper, aluminium, steel, and other alloyed conductors
- Types of traction wire support structures that may consist of portals, cantilevers, drop pieces, head spans, cross spans and pull-offs
- Ancillary equipment
  - Types
  - Purpose
  - Notes: Examples include surge arresters, booster and auxiliary transformers
- Methods for installing/replacing conductors that may consist the use of:
  - Preformed fittings
  - Compression fittings
  - Wedged fittings
  - Bolted splices
  - Lugs
  - Bolted clamps
- Methods for installing/replacing components such as:
  - Feeders
  - Droppers
  - Dissimilar conductors
  - Jumpers
  - Surge arresters
- Use of plant and equipment for installation/maintenance work, such as:
  - Elevating work platforms
  - Ladders
  - Works trains
  - Rail-mounted overhead wiring equipment/vehicles
  - Road/rail height access machinery/vehicles
  - Voltage detectors
  - Micrometer/gauges
  - Tension wrenches
  - Dynamometers
  - Other specialised tools

T2.6.8 DC Traction — energised working practices

Evidence shall show an understanding of the safe working on energised DC traction equipment to an extent indicated by the following aspects:

- Commonwealth/State/Territory/local government legislation, Standards, codes,

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supply authority regulations and or enterprise requirements

- Safety precautions specific to working on energised LV DC Traction overhead conductors and cables encompassing:
  - Safe approach distances
  - Safe working practices, instructions and procedures
  - Occupational Health and Safety hazards and precautions
  - Identification of OHS hazards, assessment and control of OHS risks
  - Types, selection, maintenance, storage and use of personal protective equipment
  - Dangers of working in confined spaces and at heights
  - Notification to work systems
  - Safe working policies, procedures and practices when using/operating specialised equipment and tools
  - Emergency response and rescue including First Aid etc;
- Techniques in installation, maintenance, replacing and repairing of energised DC traction overhead conductors, cables and equipment
  - Note: Examples of conductors, cables and/or equipment include span, cross-span, head-span, section insulator, support equipment, tramway support network, catenary, dropper, contact/trolley, feeder/ in-span feeder, drape/potential jumper
- Techniques in carrying out work on energised DC traction overhead conductors, cables and equipment
  - Note: Examples of the type of work include removing trapped foreign objects, profiling, vertical adjustment of contact or trolley wire
- Techniques in using plant, equipment and/or tools to carry out work on energised DC traction overhead conductors, cables and equipment
- **Note: Examples of the type of plant, equipment and/or tools include insulated elevating work vehicles, insulated ladder, insulated work platforms, tensioning equipment, insulated sticks, ropes**, slings, and chains

T2.6.9 Traction live line work

Evidence shall show an understanding of the safe working on energised HV AC and/or DC traction equipment to an extent indicated by the following aspects:

- Commonwealth/State/Territory/local government legislation, Standards, codes, supply authority regulations and or enterprise requirements
- Safety precautions specific to working on energised LV DC Traction overhead conductors and cables encompassing:
  - Live line minimum approach distances
  - Occupational Health and Safety hazards and precautions
  - Identification of hazards, assessing and controlling risks
  - Types, selection, maintenance and uses of personnel protective equipment

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Live line permit system

Disabling auto-reclosing function

Ensuring functioning of fault current protective devices

Checking integrity of insulation prior to work commencement

Types and function of specialised live line working equipment and tools inspection before use

Safe working practices when using specialised equipment and tools

Methods of using specialised equipment

Work team communication

Use of safety observers

Emergency response and rescue including First Aid etc

- Techniques in the use of hotsticks for the maintenance of energised traction overhead apparatus
- Techniques in the use of glove and barrier on energised traction overhead apparatus

2.2.08 T2.7 Environmental issues - powerline

T2.7 Environmental issues - powerline

T2.7.1 Environmental fundamentals

Evidence shall show an understanding of the environmental fundamentals to an extent indicated by the following aspects:

- 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

  Note: Examples include land care agreements
- 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

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Best practice

Sustainable energy

- Procedures in implementing management plans to ensure compliance

T2.7.2 Material handling and the environment

Evidence shall show an understanding of the environmental fundamentals to an extent indicated by the following aspects:

- Methods of obtaining updated environmental information and data sheets on the proper use and handling of equipment and materials
- Environmental standards, codes, environmental legislation, OHS legislation, hazardous substances/dangerous goods regulations, supply authority regulations and or enterprise requirements applicable environmental care when handling materials including provision of manufacturers and suppliers information such as material safety data sheets (MSDS)
- Types and application of personal protective equipment used for hazards substances
- Types and application of personal protective equipment used for hazards substances and dangerous goods
- Techniques in handling equipment to eliminate/reduce risks to the environment from spillages of oils, herbicides, pesticides and chemicals from such equipment encompassing:

  Vehicle loading crane

  Chainsaw

  Enterprise vehicles

  Explosive power tools
- Procedures for handling and control of spillages of herbicides
- Methods of disposing and storage of herbicides, pesticides and chemicals
- Methods of cleaning mobile plant, equipment and tools
- Recording of data

T2.7.3 Filtering and sampling oil and the environment

Evidence shall show an understanding of the environmental issues when undertaking sampling and filtering of oil to an extent indicated by the following aspects:

- Environmental standards, codes, environmental legislation, supply authority regulations and or enterprise requirements applicable to the work to be undertaken
- Methods of obtaining updated environmental information and data sheets on the proper use and handling of oil used on transformers and switchgear including provision of MSDS

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- Techniques in filtering and sampling oil to eliminate/reduce risks to the environment from spillages
- Safety procedures and equipment for handling and control of the oil
- Methods of disposing and storage of the oil
- Methods of cleaning equipment, tools and equipment
- Emergency procedures for spillages of oil to reduce risks to the environment encompassing:
  - Methods of cleaning up excessive spillages
  - Methods of protection to surrounding environment
  - Procedure for notification of relevant personnel and authorities
  - Recording procedures
- PCB contamination, handling and disposal procedures

T2.7.4 Powerline environmental impact - implementation and monitoring

Evidence shall show an understanding of the implementation and monitoring requirements for the impact of powerline installations and operation on the environment and/or the area surrounding the powerline and/or equipment to an extent indicated by the following aspects:

- Identification of relevant legislation, codes and government guidelines for the implementation and monitoring of environmental impact factors in the workplace and areas of power distribution or transmission
  - Note: Examples include Commonwealth/State/Territory legislation relevant to the workplace and the Environment Protection Act legislation and common law
- Identification, assessment, control and monitoring of the hazards to the environment associated with the Powerline industry
- Workplace environment quality standards enterprise plan encompassing:
  - Setting of acceptable emission level limits from power plant equipment
  - Impact of the enterprise activities on air and water quality
  - Nature, impact and level of emissions from power plant, power distribution and transmission equipment and network infrastructure
  - Note: Examples include noise generation, noxious gas emissions, greenhouse gas production, electromagnetic emissions, electromagnetic field strength, oil leakage, insulation breakdown products
- Provision of manufacturers and suppliers information such as material safety data sheets (MSDSs)
- Gathering of environment management information
- Maintenance of environmental records
- Risk assessment and its management in Powerline industry
- Maintenance strategies for environment protection programs
  - Note: Examples include developing processes for promoting, maintaining

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and improving environmental impact in the workplace and identify techniques for the evaluating and reviewing environment protection education and training programs and elements of an effective environment protection management system, EPA consultation and accident/incident investigations

T2.7.5 Powerline sustainable energy management Implementation and monitoring

Evidence shall show an understanding of the implementation and monitoring requirements for the management of sustainable energy in powerline installations and operation of plant and equipment to an extent indicated by the following aspects:

- Identification of relevant legislation, codes and government guidelines for the implementation and monitoring of sustainable energy principles in the workplace, the power distribution and the transmission networks encompassing:
  - Commonwealth/State/Territory legislation
  - Legislation relevant to the workplace
  - Environment Protection Act legislation
  - Local government by-laws
  - Community planning and development agreements
  - Note: An example includes land care agreements
- Monitoring and reporting procedures for enterprise specific policy implementation on sustainable energy issues, including the gathering of energy consumption and loss information
- Ongoing development of energy conservation policy -
  - Procedures for quantifying energy usage and wastage
  - Energy usage auditing procedures
  - Planning of energy conservation methods
  - Monitoring and review processes
- Resource availability planning for policy implementation
- Techniques in managing documentation
  - Note: Examples include information on applicable sustainable energy 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

T2.7.6 Disposal procedures for insulating materials

Evidence shall show an understanding of the safe handling and/or disposing of insulation materials used in power distribution devices, which are potential

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environmental pollutants to an extent indicated by the following aspects:

- Standards, codes, Commonwealth, State/Territory and local government legislation, supply authority regulations and or enterprise requirements applicable to the handling and disposing of **insulation or heat dissipation materials used in power distribution devices**
- Identification of environmental issues associated with the handling and disposing of insulation materials
- Safety precautions when handling and disposing of **heat dissipation materials**
  - Safe working practices
  - Occupational Health and Safety hazards and precautions
  - Identification of hazards, assessing and controlling risks
  - Types, selection, maintenance and uses of personnel protective equipment
  - Permit to work systems and isolation procedures
  - Types and function of specialised equipment
  - Safe working practices when using specialised equipment
  - Emergency response and rescue including First Aid etc
- **Techniques in the** handling and disposing of **insulation materials encompassing:**
  - Polychlorinated Bi-Phenyls (PCB's)
  - Asbestos
  - Insulating Oil
  - SF6 gas

2.2.09 T2.8 Enterprise specific

T2.8 Enterprise specific

T2.8.1 Enterprise specific — policy and procedure instructions

Evidence shall show an understanding of the enterprise specific policies and procedures to an extent indicated by the following aspects:

- Responsibilities and duty of care of employer and employee relationship
- Methods of obtaining the up-to-date information on enterprise policy and procedures
- Rules and regulations
- Induction into workplace encompassing:
  - Location of work area and storage area
  - Timetable
  - Uniform

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  - Personal well-being
  - Housekeeping rules
  - Emergency procedures
  - Evacuation procedures
- Techniques when deal with others encompassing:
  - Working in teams
  - Customer relation
- Complaint and issues procedures
- Overview of enterprise professional development available encompassing:
  - Fire fighting procedures
  - Fatigue management
- Training and competency development - understanding and promotion

T2.8.2 Enterprises specific — OHS instructions

Evidence shall show an understanding of the enterprise specific Occupational Health and Safety rules, regulations, policies and procedures to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and specific enterprise regulations pertaining to the OHS policies and procedures
- Methods of obtaining the up-to-date information on enterprise OHS policy and procedures
- Specific enterprise personal protection equipment encompassing:
  - Type and application
  - Where and when to be used
  - Method of replacement
  - Responsibility of maintenance including cleaning inspection and testing
- Emergency response, rescue, evacuation and First Aid procedures
- Personal well-being encompassing:
  - Hygiene
  - Fatigue/stress management
  - Drugs/alcohol
- OHS training encompassing:
  - Induction training
  - Specific hazard training
  - Specific task or equipment training
  - Emergency and evacuation training
  - Training as part of broader programs such as equipment operation
- OHS records including audits, inspection reports, workplace health and environmental monitoring records, training and instruction records,

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manufacturers and suppliers information such as MSDSs, registers, maintenance reports, workers compensation and rehabilitation records and First Aid/medical records

T2.8.3 Enterprises specific — technical drawing and documents

Evidence shall show an understanding of the specific enterprise technical drawings and documents to an extent indicated by the following aspects:

- Types and application of enterprise specific drawings and documents encompassing:
  - Electrical and electronic drawings
  - Mechanical drawings
  - Project charts
  - Schedules
  - Graphs
  - Technical manuals and catalogues
  - Instruction/worksheets sheets
- Types and application of enterprise specific symbols and diagrams
- Title box encompassing:
  - Description of parts
  - Version control

T2.8.4 Enterprise specific — switching diagrams

Evidence shall show an understanding of enterprise specific switching diagrams and drawing to an extent indicated by the following aspects:

- Types and application of enterprise specific switching drawings and documents encompassing:
  - Wiring and schematic diagrams and switching symbols
  - Mechanical drawings dealing with switching operations
  - Project charts
  - Switching schedules
  - Graphs
  - Technical manuals and catalogues
  - Instruction/work sheets
- Interpretation of different system switching diagrams encompassing:, where applicable
  - LV system switching diagrams
  - DC traction supply sectioning diagrams

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HV transmission and distribution system symbols and feeder plans

- Processes of updating switching diagrams

T2.8.5 Enterprise specific — sustainable energy principles

Evidence shall show an understanding of the enterprise policies and procedures in maintaining the operation of plant, equipment and powerline installations using sustainable energy principles to an extent indicated by the following aspects:

- Overview of sustainable energy technologies encompassing:
  - Solar
  - Wind
  - Biomass
  - CO2 generation
  - Economic benefits of sustainable energy initiatives
- Relationship between "greenhouse effect" and sustainable energy
- Types of renewable energy technology suitable for use in Australia
  - Note: Examples include photovoltaic, solar thermal, wind energy conversion, biomass, wind/tidal, gas thermal
- Relationship between safe building design and energy efficiency
  - Note: Examples include building aspect, insulation, ventilation, glazing and passive solar design and shading
- Techniques in selecting control devices
  - Components within a lighting system
  - Energy efficient lighting products, design and installation
  - Use of natural light
  - Automated lighting control systems
  - Assessment of requirements and selection of system
- Techniques in selecting control devices
  - Components within a HVAC and refrigeration control system
  - Energy efficient refrigerants
  - Detection systems to control air flow
  - Energy star ratings for coefficient of performance
  - Energy control systems
  - Advantages of evaporative air conditioners in dry climates
  - Assessment of requirements and selection of system

T2.8.6 Enterprise specific -— specialised tools

Evidence shall show an understanding of enterprises specific specialised tools to an

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extent indicated by the following aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and specific enterprise regulations pertaining to the use and care of specialised tools

  Note: Examples of specialised tools and test equipment include but not limited to, voltage detectors; polarity testers, phase rotation
- Characteristics, capabilities and application of specialised tools for a particular job
- Safety policies, procedures and precautions with regards to using, transporting and storage of specialised tools
- Selection methods for obtaining the correct specialised tool for the particular job including during procurement, purchasing and or hiring arrangements
- Techniques in pre-use inspection on the serviceability of specialised tools
- Techniques in the selection, use, maintenance, and care and storage of specialised tools
- Identifying OHS hazards, assessing and controlling risks associated with their use
- Techniques for the safe use of specialised power tools

T2.8.7 Enterprise specific - equipment installation procedures

Evidence shall show an understanding of Enterprise Specific Equipment Installation Procedures to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to equipment installation
- Requirements for the use of manuals, substation diagrams/plans and drawings
- Types, characteristics and capabilities of HV substation equipment to be installed
- Identification of components within the equipment to be Installed and associated control housings
- Use, characteristics and capabilities of specialised tools and equipment
- Enterprise Specific Policies and Procedures for equipment to be Installed
- Control equipment and auxiliary relays, flags and alarms
- Techniques in evaluating serviceability of equipment to be Installed
- Safety precautions when testing and measuring equipment to be Installed encompassing:

  Safe working practices and procedures

  Identification of hazards, assessment and control of OHS risks

  Types, selection, maintenance and use of personal protective equipment

  Responsibilities and protocols

  Safe working clearances
- Remote and local operating principles and conventions

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T2.8.8 Enterprise specific — data management processes

Evidence shall show an understanding of Enterprise Specific Data Management Processes to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to Data Management
- Requirements for the use of manuals, substation diagrams/plans and drawings
- Types of enterprise specific computer software
- Techniques in storing and retrieving data and reports from the computer
- Techniques in using the Data Management systems in following necessary commands and protocols in accordance with the Enterprise Specific Procedures
- Calculation of results and data measurements using the computer
- Techniques in the preparation of preliminary works creation and closure

T2.8.9 Enterprise Specific — teamwork high voltage live line

Evidence shall show an understanding of working teams on high voltage live line to an extent indicated by the following aspects:

- Commonwealth/State/Territory legislation, Standards, codes, supply authority regulations and or enterprise requirements associated with working on high voltage live lines
- Safety precautions working on energised live lines when working in teams encompassing:
    - Live line minimum approach distances for person and plant
    - Occupational Health and Safety hazards and precautions
    - Identification of OHS hazards, assessing and controlling risks
    - Types, selection, maintenance, storage and uses of personnel protective equipment
    - Live line access authority/permit system
    - Disabling auto-reclosing function
    - Ensuring functioning of fault current protective devices
    - Checking integrity of insulation prior to work commencement
    - Types and function of specialised live line working equipment and tools inspection prior to use
    - Safe working policies, procedures and practices when using and operating specialised equipment and tools
    - Methods of using specialised equipment and tools
    - Use of safety observers
    - Emergency response and rescue including First Aid etc
- Relationship and responsibilities of each team member encompassing:

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Roles of individuals in the team

Contribution to joint outcome

Goals/plans and objectives of the team

Work team communication

- Techniques in effective communication
- Techniques in effective teamwork
- Dangers of ineffective teamwork

T2.8.10 Technical enquiries and requests

Evidence shall show an understanding of technical enquiries and requests to an extent indicated by the following aspects:

- Basic Network operating principles and parameters
  - Sources of electricity
  - Basic principles of electricity, the three phase power system, electric shock and resuscitation, power system
  - Aerial and underground voltage systems
  - Low Voltage Network systems
  - High Voltage Network systems
  - Equipment used in a Network system
  - MEN system
  - Hazards and risks in a Network system

  Note: Examples include risk to life, property or commerce, fallen wires/equipment, fires,
  - Voltage gradients

  Note: Examples include step potential, touch potential — (transferred earth potentials)
- Applicable legislation, regulations, standards, industry codes, industry guidelines, and policies
  - relevant sections of legislation used
  - relevant sections of international or Australian standards used
  - relevant sections of Industry codes used
  - relevant sections of Industry guidelines used
  - relevant sections of policies used
  - relevant sections of advisory information used
- Incident event procedures
- Incidents constituting an event
- Incidence response procedures
- General Hazard and risk assessment principles and procedures
- Principles for conducting work-site Hazard Assessment checks,

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- Basic safety principles and hazard control measures
- Key industry terms and performance indicators and measures used

  Note: SAIDI — System Average Interruption Duration Index, SAIFI - System Average Interruption Frequency Index, MAIFI — Momentary Average Interruption Frequency Index, CAIDI — Customer Average Interruption Duration Index; Network owners and operators
- Critical industry codes used

  Note: Examples include storm code emergencies
- Key equipment used in the industry

  Note: Examples include industry-specific equipment, switchgear, transformers, aerial conductors, insulators, poles, mobile plant, mobile equipment
- Normal and abnormal industry situations, key processes and systems used in the industry

  Note: Examples include anomalies report, critical system/network failures/anomalies and key processes and systems used in the industry e.g. maps, drawings, as well as safety and environment processes and practices, communications systems; fires; automatic switching; emergencies; security breaches
- Techniques and processes for responding to a technical enquiry or request in accordance with established procedures in a timely manner

  Note: Examples include ethical performance; assessing applications, enquiries, or requests; using technology and media including catalogues to assist assessments; client quality service; reflecting on the completed enquiry or request
- Enquiries may be internal or with customers

  - customer protocols

  - legal requirements and obligations for property access

  - relevant heritage and environmental requirements

T2.8.11 SPARE CLAUSE

T2.8.12 Enterprise specific — vegetation control equipment

Evidence shall show an understanding of enterprise specific vegetation control equipment to an extent indicated by the following aspects:

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- Types and application of vegetation cutting tools encompassing::
  - Chainsaws
  - Brush cutters
  - Hydraulic pruning saws
  - Tool line
  - Chainsaws
  - Specialised pruning tools
  - Note: Examples include cocky beaks and pruning saws
- Types and application of vegetation mulching tools
- Types and application of herbicide application equipment
- Purpose and use of cutting plans relevant to the vegetation type
- Cutting techniques of vegetation control tools and equipment
- Techniques in undertaking different branch cuts
  - Note: Examples include scarf under-cut, top cut technique, top scarf - bottom-back cut technique, side scarf opposite back-cut technique
- Pre-operational checks on vegetation control tools and equipment
- Techniques in safely using vegetation control equipment encompassing:
  - Visual inspection of vegetation control equipment
  - Methods of using equipment at heights and in confined spaces
  - Precautions to note during use of equipment
  - Note: Examples include proximity of other personnel, proximity of powerlines and obstacles, length of power lead and possible fire danger due to sparks. The type of precautions should not be limited to these samples but dependant on the environment in which the equipment will be used.
- Types of personal protective equipment used in conjunction with vegetation control equipment encompassing:
  - Head Protection
  - Eye protection
  - Hearing protection
  - Hand protection
  - Foot protection
  - Body protection
  - General protection
- Basic maintenance of vegetation control equipment
  - Note: Examples include cleaning, proper storage, basic repair and replacement and testing for compliance to manufacturer’s and OHS requirements

T2.8.13 Enterprise specific — procedures and work practices relating to

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fault restorations

Evidence shall show an understanding of the enterprise specific procedures and work practices relating to fault restorations to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, supply authority regulations, Standards, codes, and or enterprise requirements applicable to the procedures and work practices relating to fault restorations
- Requirements for the use of operational manuals, system diagrams/plans and drawings
- Identify and interpret enterprise operating procedures
- Techniques in the applying enterprise operating procedures

T2.8.14 Enterprise specific — procedures and work practices relating to critical events

Evidence shall show an understanding of the enterprise specific procedures and work practices relating to critical events to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, supply authority regulations Standards, codes, and or enterprise requirements applicable to the procedures and work practices relating to critical events
- Requirements for the use of operational manuals, system diagrams/plans and drawings
- Identify and interpret enterprise operating procedures
- Techniques in the applying enterprise operating procedures

T2.8.15 Enterprise specific — procedures and work practices relating to generating plant

Evidence shall show an understanding of the enterprise specific procedures and work practices relating to generating plant to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, Standards, codes, supply authority regulations and or enterprise requirements applicable to the procedures and work practices relating to generating plant
- Requirements for the use of operational manuals, system diagrams/plans and drawings
- Identify and interpret enterprise operating procedures
- Techniques in the applying enterprise operating procedures

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T2.8.16 Enterprise specific — procedures and work practices relating to managing network demand

Evidence shall show an understanding of the enterprise specific procedures and work practices relating to managing network demand to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, supply authority regulations Standards, codes, and or enterprise requirements applicable to the procedures and work practices relating to managing network demand
- Requirements for the use of demand management manuals, system diagrams/plans and drawings
- Identify and interpret enterprise demand management procedures
- Techniques in the applying enterprise demand management procedures

T2.8.17 Enterprise specific — effective management and communication

Evidence shall show an understanding of the effective management and communication to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, Standards, codes, supply authority regulations and or enterprise requirements applicable to assisting in effective management and communication
- Enterprise operational principles encompassing:
  - Workplace OHS enterprise plan
  - Environmental enterprise policies and procedures
  - Industrial relations policies and procedures
  - Anti-discrimination policies and procedures
- Relationship between the management and employees
  - Note: Examples include methods used to collate and distribute/disseminate information, responsibilities of each member of the work team, staff development activities and legislation requirements with regard to OHS training, methods of addressing barriers such as literacy and cultural differences and provisions relating to OHS issue resolution
- Techniques associated with organisational policies and procedures related to human resources encompassing:
  - Relevant awards and certified agreements
  - Legislation impacting on people management
  - Range of support services and expertise available
- Techniques in managing relationships encompassing:
  - Identifying problems
  - Methods of conflict resolution
  - Methods of consultation, communication, negotiation and mentoring

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Strategies for positive feedback

- Techniques in leadership in achieving enterprise strategic and operational plans
- Techniques in managing relationships under stress encompassing:
- Stress management

T2.8.18 Enterprise specific — write management reports

Evidence shall show an understanding of the methodology used in writing enterprise specific management reports to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, supply authority regulations Standards, codes, and or enterprise requirements applicable to the writing enterprise specific management reports
- Techniques in researching, collating and analysing information for the report encompassing:

  Recording, filing, retrieving systems

  Storing and retrieving data from computer systems
- Relationship of management reports to enterprise policies and procedures encompassing:

  Enterprise structure and resources

  Workplace OHS and risk management enterprise data

  Financial and operational data

  Environmental enterprise policies and procedures

  Industrial relations policies and procedures

  Anti-discrimination policies and procedures
- Techniques in writing enterprise specific management reports encompasses

  Note: Examples include methods used to disseminate information and facilitate enterprise requirements, document proformas and compliance and legislative requirements to produce effective reports in the appropriate format

T2.8.19 Enterprise specific — procedures and work practices relating to managing critical events

Evidence shall show an understanding of the enterprise specific procedures and work practices relating to managing critical events to an extent indicated by the following aspects:

- Commonwealth/State/Territory and local government legislation, Standards, codes, Commonwealth, State/Territory and local government legislation, supply authority regulations and or enterprise requirements applicable to the procedures and work practices relating to managing critical events

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- Requirements for the use of critical event manuals, system diagrams/plans and drawings
- Identify and interpret enterprise critical event management procedures
- Techniques in the applying enterprise critical event management procedures

2.2.10 T2.9 Drafting and drawing

T2.9 Drafting and drawing

T2.9.1 Interpretation of power distribution network drawings and documentation

Evidence shall show an understanding of power distribution network documentation to an extent indicated by the following aspects:

- Requirements for the use of manuals, system diagrams/plans and drawings and for plans such as work method statements for the control of OHS risks
- Types and application of power distribution network documentation drawings and documents encompassing:
  - Wiring and schematic diagrams, drawings and switching symbols
  - Mechanical drawings dealing with the power distribution network
  - Project charts
  - Schedules
  - Graphs
  - Technical manuals and catalogues
  - Instruction/worksheets sheets
- Interpretation of different diagrams and documentation on LV and HV systems encompassing:
  - Overhead distribution extensions
  - Underground distribution extensions
  - Distribution substation
  - Street lighting system

T2.9.2 Overhead distribution extension layout principles

Evidence shall show an understanding of the layout principles for overhead distribution to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, Standards, codes, supply authority regulations and or enterprise requirements applicable to

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overhead distribution layout
- Requirements for the use of overhead line construction manuals, system diagrams/plans and drawings and for plans such as work method statements for the control of OHS risks
- Methods in determining material, equipment and tool lists encompassing:
  - Components types and quantity required
  - Spacing of components such as equipment, poles, cross-arms
  - Costings of items and components
- Purchasing and contractual arrangements to include a requirement to eliminate OHS hazards, minimise risks and provide residual OHS risk information
- Determination of conductor size, type and route length -
  - Resources needed for the stringing and maintenance of conductors
  - Types of low LV and HV overhead electrical conductor connections
  - Minimum clearances between overhead conductors and low LV and/HV structures
  - Estimation of the duration of overhead distribution extension project

T2.9.3 Surveying techniques

Evidence shall show an understanding of the fundamentals of surveying for the purpose of producing an overhead or underground distribution extension to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, Standards, codes, supply and aviation authority regulations and or enterprise requirements applicable to the surveying for an overhead and underground extension
- Techniques in measuring heights and distances
- Techniques in taking bearings angles of deviation using a compass
- Techniques in using a clinometer
- Techniques in recording and storage of data
- Requirements for the use of overhead line construction manuals, system diagrams/plans and drawings
- Techniques in plotting long spans
  - Note: Examples include measuring stick, clinometer, trundle wheel, tapes, correction for sloping ground, distance across objects and range rods
- Techniques in pegging pole positions
  - Note: Examples include foot path alignments, types of pegs, pegs of other authorities and locating survey pegs

T2.9.4 Introduction to computer software (powerline) and CAD

Evidence shall show an understanding of the fundamentals of computer aided

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drafting (CAD) for drafting and layout of distribution extension and upgrades to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, Standards, codes, supply authority regulations and or enterprise requirements applicable to the drafting and layouts of distribution extensions and upgrades
- Types of computer hardware and software, tools and equipment for the production of a draft and layout of distribution extension and or upgrade
- Techniques in storing and retrieving programs and files from the computer
- Identification and methods of retrieving and manipulating, digital symbols, designs, layouts, fonts and graphs stored in the computer
- Techniques in using the CAD package in following necessary commands and protocols in accordance with the operating instructions of the CAD software manufacturer

  Note: Examples include using file structure, menu utilisation, system library usage, data banking, achieving, file management and maintenance procedures
- Calculation of dimensions and drafting measurements using the computer
- Techniques in the preparation of preliminary sketches using the computer
- Techniques in using 2D computer graphics system and associated equipment to produce a distribution extension and or upgrade draft or layout
- Techniques to diagnosing basic faults in computer operation

T2.9.5 Principles of lighting design

Evidence shall show an understanding of the principles to light design layout to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, Standards, codes, supply authority regulations and or enterprise requirements applicable to the light design principles
- Requirements for the use of street lighting system construction manuals, system diagrams/plans and drawings and for plans such as work method statements for the control of OHS risks
- Types of tariffs and charges
- Types of street lighting components

  Note: Examples include column types, foundations, brackets, luminaries and mounting heights
- Types of electrical street lighting circuits

  Note: Examples include types of supply, lighting circuit and control circuit
- Fundamentals of lighting production encompassing:

  Electromagnetic spectrum

  Visible and non-visible radiation

  Spectral energy distribution

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Infra-red, ultra-violet, radiation-safety, incandescence and phosphorescence

Reflection and refraction

- Fundamentals of lighting concepts encompassing:

Terms and units

Purpose of reflectors and diffusers

- Factors affecting external lighting design
- Calculation of light output
- Determining illuminance encompassing:

Point to point method

Lumen method

- Determining rated life of luminaries
- Fundamentals of street lighting design
- Considerations for special lighting situations

Note: Examples include security lighting, hazardous street locations, and emergency lighting

T2.9.6 Underground mains layout principles

Evidence shall show an understanding of the layout principles for underground mains distribution extension to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, Standards, codes, supply authority regulations and or enterprise requirements applicable to underground mains distribution extension
- Requirements for the use of underground mains construction manuals, system diagrams/plans and drawings and for plans such as work method statements for the control of OHS risks
- Methods in determining material, equipment and tool lists encompassing:

Components types and quantity required

Spacing of components and equipment

Costings of items and components

- Purchasing and contractual arrangements to include a requirement to eliminate OHS hazards, minimise risks and provide residual OHS risk information
- Determination of conductor size, type and route length
- Resources needed for the laying of conductors
- Determining the appropriate excavation for the location
- Determining the size and depth of excavation
- Determining the trench and pit layout procedures
- Minimum clearances between conductors
- Estimation of the duration of underground distribution extension project

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T2.9.7 Distribution substation minor upgrade layout principles

Evidence shall show an understanding of the layout principles for a distribution substation minor upgrade to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, Standards, codes, supply authority regulations and or enterprise requirements applicable to a distribution substation minor upgrade
- Requirements for the use of distribution substation minor upgrade construction manuals, system diagrams/plans and drawings and for plans such as work method statements for the control of OHS risks
- Methods in determining material, equipment and tool lists encompassing:
  - Components types and quantity required
  - Spacing of components and equipment
  - Costings of items and components
- Purchasing and contractual arrangements to include a requirement to eliminate OHS hazards, minimise risks and provide residual OHS risk information
- Determination of conductor size, type and route length
- Resources needed for the laying of conductors, cables and equipment
- Determining the appropriate installation sequence
- Minimum clearances between conductors and equipment
- Estimation of the duration of underground distribution extension project

T2.9.8 Principles in drafting street lighting system

Evidence shall show an understanding of the principles to layout and draft a street lighting system to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, Standards, codes, supply authority regulations and or enterprise requirements applicable to street lighting system layouts and drafts
- Requirements for the use of street lighting system construction manuals, system diagrams/plans and drawings and for plans such as work method statements for the control of OHS risks
- Methods in determining material, equipment and tool lists encompassing:
  - Components types and quantity required
  - Spacing of components such as equipment, poles, cross-arms
  - Costings of items and components
- Purchasing and contractual arrangements to include a requirement to eliminate OHS hazards minimise risks and provide residual OHS risk information
- Determination of conductor size, type and route length
- Determination of street lighting positions for optimum visibility and minimise traffic hazards
- Techniques in mounting and position of lights

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- Resources needed for the installation of street lighting system
- Methods of pegging out of pole positions and/or underground cable positions
- Minimum clearances between overhead conductors and low LV/and HV structures
- Estimation of the duration of overhead distribution extension project

2.2.11 T2.10 Substations

T2.10 Substations

T2.10.1 Visual inspection procedures — substations

Evidence shall show an understanding of the procedure to undertake a visual inspection of a scheme to an extent indicated by the following aspects:

- Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations and or enterprise requirements associated with visual inspection procedures of a scheme
- Requirements for the use of manuals, system diagrams/plans and drawings
- Identify obvious deficiencies in operating to the standard functionality
- Techniques in determining relay malfunction encompassing:

  Targeting

  Techniques in determining wiring defects

T2.10.2 Surge relay operation and maintenance — substations

Evidence shall show an understanding of the operation and maintenance procedures associated with discrete protection and control systems to an extent indicated by the following aspects:

- Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations and or enterprise requirements associated with operating procedures
- Requirements for the use of operating manuals, system diagrams/plans and drawings
- Techniques encompassing:

  Gas collection and analysis

  Bleeding and resetting

  Calibration, operational and sensitivity checks

  Trip and alarm checks
- Surge relay types and uses, including transformer main tanks, diverter switch chambers

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T2.10.3 Commissioning of discrete protection devices — substations

Evidence shall show an understanding of the commissioning procedures associated with discrete protection and control systems to an extent indicated by the following aspects:

- Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations and or enterprise requirements associated with the commissioning procedures
- Requirements for the use of commissioning manuals, system diagrams/plans and drawings
- Techniques in commissioning procedures encompassing:
  - Planning
  - Policy
  - Testing techniques
  - Close out requirements

T2.10.4 Substation DC circuit breaker principles

Evidence shall show an understanding of the substation DC circuit breaker principles to an extent indicated by the following aspects:

- Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations and or enterprise requirements associated with the DC circuit breakers
- Types of DC CB's
  - Note: Examples include self and withdrawable types
- Characteristics of DC CB's encompassing:
  - Purpose of DC CB's
  - Application of DC CB's
- Principles of operation of different types of DC CB's encompassing:
  - Arc expulsion versus arc containment
  - Latched versus magnetically held
  - Advantages and disadvantages of different types
  - Fixed or withdrawable
  - Protection/diagnostic technology
- Principles of operation of high speed DC CB encompassing:
  - Characteristics
  - Calibration
- How DC CB's are designated
  - Note: Examples include feeder, rectifier, EDR, bus-section and negative breakers, auto-reclose or non auto-reclose type

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- Type and function of DC CB peripheral components

  Note: Examples include Delta I relays, busbar, control wiring, trunk and associated plug/receptacle
- Identification, characteristics, application and care of DC CB components

  Note: Examples include holding coils, closing coils, contactors, resistors, arc chutes, blow-out coils, arcing contacts, main contacts, braids, moving arm, pole face, arcing horns, electronic cards, dashpots, fingers, diode strings, fuses, insulators, latching mechanisms, motors, wiring, relays
- Characteristics, application and care of hand and specialised tools used on DC CB's

  Note: Examples include combination/multigrips/long nose pliers, side cutters, screwdrivers, wire strippers, crimpers, knife, hacksaw, hammers, mallets, levels, tape measures, spanners, T-wrench, pistol drills, battery drills, heat gun, de-soldering tools and soldering iron/torches, Allen keys, socket spanners, gauges, feeler gauges and specialist tools supplied by the manufacturers
- Characteristics, application and care of test and measurement instruments used on DC CB's

  Note: Examples include multimeters, tong testers, ammeters, voltmeters, ohmmeters, test lamps, high and low voltage insulation resistance/ continuity testers, earth resistance tester, Ductor, drop-out test sets

T2.10.5 Substation DC circuit breaker maintenance

Evidence shall show an understanding of the maintenance of substation DC circuit breakers and associated equipment to an extent indicated by the following aspects:

- Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations and or enterprise requirements associated with the maintenance of DC circuit breakers
- Requirements for the use and interpretation of manuals, system diagrams/plans and drawings encompassing:

  1500V sectioning diagrams

  Substation HV operating diagrams

  Substation arrangement diagrams and layout drawings

  Technical/manufactures' specifications

  Maintenance instructions/schedules
- Relationship and function of DC CB's equipment/component interface encompassing:

  DC CB frame

  Connection fingers

  Associated busbar, physical arrangements and clearances
- Safety precautions when undertaking maintenance procedures on DC CB's encompassing:

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Safe working practices
Occupational Health and Safety hazards and precautions
Identification of hazards, assessing and controlling risks
Types, selection, maintenance and uses of personnel protective equipment
Permit to work systems and isolation procedures
Types and function of specialised equipment
Safe working practices when using specialised equipment
Emergency response and rescue including First Aid etc

- Techniques in maintenance of DC CB's encompassing:
  Closing and opening operations
  Range settings, adjustments and calibration
  Spring settings
  Main contact arrangement and auxiliary contact arrangement
  Arc chute inspection and procedures
  Basic fault finding and repair/adjustment techniques
  Control cards, their uses, application and fault finding
  Earthing requirements and techniques
- Techniques in testing and commissioning of DC CB's encompassing: supply authority regulations and or enterprise requirements, standards and procedures

T2.10.6 Substation DC circuit breaker installation

Evidence shall show an understanding of the installation of substation Direct Current circuit breakers (DC CB's) and associated equipment to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements pertaining to the installation of substation Direct Current circuit breakers (DC CB's)
- Safety precautions when installing substation Direct Current circuit breakers (DC CB's) encompassing:
  Safe operation procedures
  Occupational Health and Safety hazards and precautions
  Identification of hazards, assessing and controlling risks
  Types, selection, maintenance and uses of personnel protective equipment
  Permit to work systems and isolation procedures
  Safe working practices when using specialised equipment
  Emergency response and rescue including First Aid etc
- Use and interpretation of technical manuals and diagrams encompassing:
  Manufacturer/Enterprise Manuals, block, wiring and schematic diagrams
  1500V sectioning diagrams

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Substation HV operating diagrams

Substation arrangement diagrams and layout drawings

Technical/manufactures' specifications

Maintenance instructions/schedules

- Techniques in the safe installation of DC CB's

T2.10.7 Substation tools and equipment

Evidence shall show an understanding of the types, uses and techniques when using the tools and equipment associated with substation to an extent listed below:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements pertaining to the use of high voltage or high current test equipment associated with substation
- Safety precautions when using tools and equipment on substations encompassing:

  Safe operation procedures

  Occupational Health and Safety hazards and precautions

  Identification of hazards, assessing and controlling risks

  Types, selection, maintenance and uses of personnel protective equipment

  Permit to work systems and isolation procedures

  Safe working practices when using specialised equipment

  Emergency response and rescue including First Aid etc
- Techniques in the use of tools and equipment associated with substations encompassing:

  Recorders

  Note: Examples include oscilloscopes, real time recorders, storage recorders, data loggers and chart recorders. Measurements may include harmonics, transient capture and point-on-wave assessment
- Insulation test instruments

  Note: Examples include digital, analogue instruments up to 5kV DC and 10kV AC. Techniques include Guarding and shielding. Measurements may include polarisation index, step voltage methods with appropriate temperature correction, dielectric dissipation factor on grounded and ungrounded objects
- Meters and the techniques used to carry out measurements

  Note: Examples may include temperature, winding resistance, conductor resistance, capacitance and inductance, phase angle, frequency, ratio and phase shift and vector group
- Timing measurement tools

  Notes: Examples may include sequence timers, event timers, contact timers. Measurements on circuit breakers and other interrupter types may include close-open, open-close, close-open-close, open-close-open

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sequences

- Equipment used

  Note: Examples may include chain blocks, tension devices, power hand tools, slings and hoists, hydraulic crimping tools, elevated work platforms and other mobile plant used to gain access to work at height, appropriate hand tools and other mechanical instruments

T2.10.8 Typical fault conditions and symptoms — substations

Evidence shall show an understanding of typical fault conditions and symptoms related to the plant and/or equipment type to an extent indicated by the following aspects:

- Standards, codes, Commonwealth, State/Territory/local government legislation, supply authority regulations and or enterprise requirements pertaining to typical fault conditions and systems
- Interpretation of faults in operating mechanisms which may include drive trains and mechanical power drives, stored energy systems including hydraulic systems, pneumatic systems and mechanical storage systems, accumulators
- Interpretation of faults in electrical control systems which may include electro-mechanical relay systems, micro-processor based systems, PLC systems, integrated control systems or combinations of electrical/mechanical systems
- Types of electrical systems including AC, DC and combinations of both
- Types of fault conditions

  Note: Examples may include failure to operate, failure in service and include the appropriate procedures for work on in service plant/equipment
- Types of symptoms

  Note: Examples may include alarms, relay flags, mechanical defects, insulation deterioration, leaks, over-pressure, under pressure, out of tolerance measurements and checks

T2.10.9 Analyse and interpret results and measurements — substations

Evidence shall show an understanding of measurements and the interpretation and analysis of those measurements related to the plant and/or equipment type to an extent indicated by the following aspects:

- Type of measurements

  Note: Examples include timing, current, voltage, capacitance, inductance, impedance, phase angle, phase shift, resistance, dielectric dissipation factor, frequency, polarisation index, ratio, vector group, temperature
- Interpretation and analysis the use of techniques

  Note: Examples include digital comparison of data, extrapolation, use of graphs and charts, statistics and tables, mathematical calculation of

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expected values and comparison with manufacturers data and measurements

- Techniques in the processes involved in follow-up actions and recommendations resulting from analysis and interpretation of results and measurements

T2.10.10 Equipment components and materials — substations

Evidence shall show an understanding of equipment components and materials related to the plant and/or equipment type to an extent indicated by the following aspects:

- Types of components

  Note: Examples include those which together make up the complete unit of plant and/or equipment, replacement components or appropriate substitutes, their dimensions, suitability and serviceability; also the components associated with the local control systems of the equipment including indication of levels, quantities, volumes, pressures and temperatures and the operating principles of these devices and components
- Types of materials

  Note: Example include those associated with the insulation, construction, fabrication or lubrication of the plant/equipment
- Techniques in enterprise procedures and regulatory/legislative requirements for the handling/use and storage of equipment components and materials which may present an OHS hazard to persons in the workplace

T2.10.11 Substation safety practices

Evidence shall show an understanding of substation safety practices to an extent indicated by the following aspects:

- Standards, codes, Commonwealth, State/Territory/local government legislation, supply authority regulations and or enterprise requirements pertaining to substation safety practices
- Techniques in the use of protective apparatus and apparel for substations work, including responsibilities with regard to the use and maintenance of protective apparatus and apparel and the types of protective apparatus and apparel used for work in substations
- Requirements for the use of ladders and appropriate ladder types for work in substations

  Note: Examples include safe work methods when carrying, erecting, collapsing and lowering different types of extension ladder against substation structures, plant and equipment, maintenance checks on different types of ladders, renewal of extension ropes and the safety

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issues relating to clearances from energised conductors

- Requirements for climbing and working at heights in substations

  Note: Examples include attached climbing principles, selection, use and operation of elevated work platforms and any OHS requirements associated with the use of EWPs

- Control of small fires

  Note: Examples include the identification, selection and operation of the appropriate extinguishing mediums for various types of fires and the precautions for personal protection when fighting small fires

- Control of oil spills

  Note: Examples include the identification, use and maintenance of spill oil control equipment and materials, oil containment facilities and systems

- Rescue and release procedures encompassing:

  The rescue personnel from energised conductors

  Emergency descent from an EWP and may include rescue from confined spaces

- Enterprise requirements encompassing:

  Safe access and Authorisation to Work procedures

  Use of mobile extendable equipment on or near energised HV conductors

  Emergency response procedures

- Hazards associated with work in substations including earthing systems, transfer potentials, step and touch effects, electrostatic and electromagnetic induction, dangers of near approach to energised conductors

T2.10.12 Substation LV supply design principles

Evidence shall show an understanding of the design principles of Substation LV AC and DC supply systems to an extent indicated by the following aspects:

- Standards, codes, Commonwealth, State/Territory/local government legislation, supply authority regulations and or enterprise requirements
- Wiring conventions, systems and labelling conventions
- Substation equipment identification and layout, wiring and schematic diagrams and other appropriate diagrammatic representations
- LV design specifications, supply requirements, electrical load assessments
- Substation LV system distribution requirements including:

  Substation batteries

  Isolation requirements

  Paralleling requirements

  Battery Chargers

  DC distribution panels and control systems

  AC distribution panels and control systems

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Auto change-over requirements

- Control equipment and auxiliary relays, flags and alarms
- Common panel layouts

T2.10.13 Substation control systems design principles

Evidence shall show an understanding of the design principles of Substation control systems to an extent indicated by the following aspects:

- Standards, codes, Commonwealth, State/Territory/local government legislation, supply authority regulations and or enterprise requirements
- Wiring conventions, systems and labelling conventions
- Substation equipment identification and layout, wiring and schematic diagrams and other appropriate diagrammatic representations
- Control system design specifications, functions and alarms
- Substation control system requirements which may include:

  Circuit breaker control

  Note: Examples include auto reclose, pole discrepancy, anti hunting, spring charge timer over run

  Transformer control

  Note: Examples include parallel operations, cooling control, master/slave operation, tap changer control, alarm systems

  Reactive plant control systems

  Note: Examples include over voltage/under voltage, under frequency load shed, VAR control

T2.10.14 Hydraulic and pneumatic operating mechanism principles - Substations

Evidence shall show an understanding of the design principles of hydraulic and pneumatic operating mechanism principles to an extent indicated by the following aspects:

- Standards, codes, Commonwealth, State/Territory/local government legislation, standards, supply authority regulations and or enterprise requirements
- Control system operating diagrams, including nomenclature, symbols and operating sequences, units of measurement
- Fundamentals of pressure intensification, forces and energy accumulators
- Applications for substation high voltage equipment, which may include:

  Note: Examples include circuit breaker operating mechanisms, interrupter mechanisms, pumps and compressors, GIS operating mechanisms and transformer cooling systems
- Safety precautions for work on hydraulic and/or pneumatic systems encompassing:

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Note: Examples include safe working practices and procedures; identification of hazards, assessment and control of OHS risks; types, selection, maintenance and use of personal protective equipment

T2.10.15 High voltage insulation system principles — substations

Evidence shall show an understanding of the design principles of high voltage insulation systems to an extent indicated by the following aspects:

- Insulation design principles encompassing:
  - Common materials used
  - Electrical characteristics
  - Thermal characteristics
  - Uses and applications to substation high voltage plant and equipment
  - Grading
  - Construction
  - Cooling
- Common contaminants and their effects encompassing:
  - Internal contaminants
  - External contaminants
- Testing and measurement of insulation quality encompassing:
  - Test types and common measuring instruments and techniques
  - Resistance and resistivity
  - Losses
  - Measurement errors
  - Temperature corrections
  - Safe work practices related to testing and measurement
- Safety precautions when testing and measuring high voltage insulation systems encompassing:
  - Safe working practices and procedures
  - Identification of hazards, assessment and control of OHS risks
  - Types, selection, maintenance and use of personal protective equipment

T2.10.16 Power transformers and reactor principles — substations

Evidence shall show an understanding of the principles of power transformer construction and operations to an extent indicated by the following aspects:

- Transformer types
  - Note: Examples include shell, core, auto, double wound, three phase, single phase and combinations of these types, step up and step down transformers, transmission and generation types

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- Reactor types
  Note: Examples include shunt and series, applications and design considerations
- Iron circuit characteristics
  Note: Examples include steel types, losses and techniques used to eliminate excess eddy currents and other circulating currents
- Winding configurations and construction techniques
  Note: Examples include helical, spiral, disc, interleaved disc types
- Insulation methods and techniques
  Note: Examples include fully insulated windings and graded insulation techniques, oil filled and gas filled power transformers
- Transformer and reactor ratings, losses and efficiency
  Note: Examples include equivalent circuits and vector relationships, impedance percent
- Nameplate details
  Note: Examples include BIL, tapping winding detail, physical layout, cooling ratings, physical details
- Transformer and reactor cooling types and their effects on design and rating
- Transformer and reactor auxiliaries
  Note: Examples include temperature indicators, over pressure devices and control systems
- Winding configurations
  Note: Examples include star-star, star-delta, star-zigzag, nomenclature and common methods of diagrammatic representation of winding configuration
- Operating constraints as single units and in parallel
- Tapping windings encompassing:
  Placement issues
  Tapping range
  OLTC versus off load TC techniques
  Types in use
  Note: Examples include high speed resistor, reactor and vacuum types, Jansen mechanisms, dead tank and live tank types
  Control system characteristics
- High voltage bushing selection encompassing:
  Type
  Insulation system used, rating, BIL
  Selection criteria
  Testing considerations

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T2.10.17 Static reactive plant principles — substations

Evidence shall show an understanding of the principles of power transformer construction and operations to an extent indicated by the following aspects:

- Applications of static reactive plant in high voltage networks, including voltage control, VAR control, transient response capacity
- Types of static reactive plant including high voltage capacitors, high voltage reactors, static VAR compensators and combinations of these
- Operating characteristics and operational constraints including point on wave switching issues
- Ratings, cooling systems and control systems and ancillary equipment used
- Configurations and system layout including single star, double star, bridge type
- Typical protection systems used including neutral unbalance current, neutral unbalance voltage
- Techniques used when balancing elements within static reactive plant
- Safety precautions when testing and maintaining high voltage static reactive plant encompassing::

  Safe working practices and procedures

  Identification of hazards, assessment and control of OHS risks

  Types, selection, maintenance and use of personal protective equipment

T2.10.18 On load tap changer principles — substations

Evidence shall show an understanding of the principles of power transformer high speed on load tap changers to an extent indicated by the following aspects:

- Selector types and applications for high voltage power transformers
- Diverter switch types and applications for high voltage power transformers including live tank, dead tank, resistor type, reactor type, vacuum type, pennant flag, pennant cycle
- Ratings and construction principles
- Operating mechanism types, stored energy systems and associated control systems
- Operating principles and operating sequences of selectors and diverters
- Measurement requirements including contacts, differential wear, transition resistors and transient protection devices, rotation lag, out of sequence controls and end-of-life unit and component assessment
- Online diagnostic tools and devices
- Ancillary equipment including online filters, over pressure relays and devices
- Testing requirements including cycle timing, differential delay, energy accumulator mechanical and operational tests and control system functional tests
- Safety precautions when testing and maintaining high voltage power transformer on load tap changers encompassing::

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Safe working practices and procedures
Identification of hazards, assessment and control of OHS risks
Types, selection, maintenance and use of personal protective equipment

T2.10.19 Substation switching practices

Evidence shall show an understanding of substation switching practices to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to substation switching
- Requirements for the use of manuals, substation diagrams/plans and drawings
- Types, characteristics and capabilities of HV substation equipment to be switched
- Procedures for obtaining correct HV switching authorisation encompassing:
  - Identification of hazards and controlling risks
  - Safety procedures and precautions
  - Responsibilities and protocols
  - Identifying switching resources
- Techniques in HV substation switching encompassing:
  - Isolation procedures and proving dead
  - Earthing procedures
  - Pre-switching checks
  - Switching operational procedures
  - Emergency fault procedures
  - Commissioning procedures
- Use, care and operation of equipment associated with HV substation equipment encompassing::
  - Test instruments
  - Sticks
- HV switchgear encompassing:
  - Types
  - Categories
  - Application
  - Operating capabilities
- Basic Operation of protection systems
- Restrictions pertaining to HV substation switching equipment
- Restrictions pertaining to Enterprise Specific procedures

T2.10.20 Low voltage substation switching principles

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Evidence shall show an understanding of low voltage substation switching principles to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to low voltage substation switching
- Requirements for the use of manuals, system diagrams/plans and drawings encompassing:
  - Types, characteristics and capabilities of LV electrical equipment to be switched
  - Use, characteristics and capabilities of specialised tools and testing equipment
- Role and responsibilities of the LV switching operator
- Operational forms, access authorities and permits associated with LV switching encompassing:
  - Types of operational forms, access authorities and permits
  - Purpose and procedure for operational forms, access authorities and permits
- Use, care and operation of equipment associated with LV substation switching
- LV switchgear encompassing:
  - Types
  - Categories
  - Application
  - Operating capabilities
- Operation of LV substation switching or indicating devices
- Operation of protection systems and substation equipment
- Restrictions pertaining to LV switching equipment
- Earthing LV electrical apparatus practices and procedures for access
- Low voltage switching techniques
- Restrictions pertaining to Enterprise Specific procedures

T2.10.21 Circuit breaker construction principles — substations

Evidence shall show an understanding of circuit breaker construction principles to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to circuit breakers
- Requirements for the use of manuals, circuit breaker diagrams/plans and drawings
- Types, characteristics and capabilities of HV substation circuit breakers installed
- Use, characteristics and capabilities of specialised tools and equipment
- Identification of components within the circuit breaker and associated control housings

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- Identification of energy sources within the circuit breaker and associated control housings
- Identification of insulation paths within the circuit breaker
- Types and characteristics of operating mechanisms
- Types and characteristics of interrupter chambers
- Safety precautions when Constructing circuit breakers encompassing::
  - Safe working practices and procedures
  - Identification of hazards, assessment and control of OHS risks
  - Types, selection, maintenance and use of personal protective equipment

T2.10.22 Circuit breaker operating principles — substations

Evidence shall show an understanding of circuit breaker Operating Principles to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to circuit breakers
- Requirements for the use of manuals, circuit breaker diagrams/plans and drawings
- Operation of protection systems and substation equipment associated with circuit breakers
- Use, characteristics and capabilities of specialised tools and equipment
- Capabilities of operating mechanisms
- Capabilities of interrupter chambers
- Enterprise Specific Policies and Procedures for the operation of circuit breakers
- Techniques in evaluating serviceability of circuit breaker operation
- Control equipment and auxiliary relays, flags and alarms
- Safety precautions when Constructing circuit breakers encompassing::
  - Safe working practices and procedures
  - Identification of hazards, assessment and control of OHS risks
  - Types, selection, maintenance and use of personal protective equipment
  - Responsibilities and protocols
  - Access for operating

T2.10.23 Infrared imaging principles — substations

Evidence shall show an understanding of Infrared Imaging Principles to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to Infrared Imaging
- Requirements for the use of manuals, substation diagrams/plans and drawings
- Types of enterprise specific computer software

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- Techniques in storing and retrieving data and reports from the computer
- Use, characteristics and capabilities of specialised tools and equipment
- Enterprise Specific Policies and Procedures for Infrared Imaging reporting
- Techniques in evaluating serviceability of circuit breaker operation
- Procedures for obtaining correct HV switchyard arrangements encompassing:
  - Identification of hazards and controlling risks
  - Safety procedures and precautions
  - Responsibilities and protocols
  - Identifying switching resources
- Safety precautions when testing and measuring equipment with Infrared Imaging encompassing::
  - Safe working practices and procedures
  - Identification of hazards, assessment and control of OHS risks
  - Types, selection, maintenance and use of personal protective equipment
  - Responsibilities and protocols

T2.10.24 Rotating reactive plant principles — substations

Evidence shall show an understanding of Synchronous Condenser Principles to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to Synchronous Condensers
- Requirements for the use of manuals, substation diagrams/plans and drawings
- Types, characteristics and capabilities of Synchronous Condensers installed
- Identification of components within the Synchronous Condensers and associated control housings
- Use, characteristics and capabilities of specialised tools and equipment
- Enterprise Specific Policies and Procedures for Synchronous Condensers
- Techniques in evaluating serviceability of Synchronous Condensers operation
- Safety precautions when testing and measuring Synchronous Condensers encompassing::
  - Safe working practices and procedures
  - Identification of hazards, assessment and control of OHS risks
  - Types, selection, maintenance and use of personal protective equipment
  - Responsibilities and protocols
  - Safe working clearances
- Communicating worksite procedures

T2.10.25 Commissioning of distribution protection and control systems — substations

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Evidence shall show an understanding of the commissioning procedures associated with distribution protection and control systems to an extent indicated by the following aspects:

- Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations and or enterprise requirements associated with the commissioning procedures
- Requirements for the use of commissioning manuals, system diagrams/plans and drawings
- Techniques in commissioning procedures encompassing:
  - Planning
  - Policy
  - Testing techniques
  - Close out requirements

T2.10.26 Voltage regulation scheme principles — substations

Evidence shall show an understanding of the operation and maintenance procedures associated with voltage regulation schemes to an extent indicated by the following aspects:

- Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations and or enterprise requirements associated with the operating procedures
- Requirements for the use of operating manuals, system diagrams/plans and drawings
- Principles of operation and operating sequences including:
  - Voltage control, VAR control
  - Live Bus/Dead Bus synchronising checks
  - Tap changer principles
  - Requirements for parallel operations
  - Settings
  - Grading
- Techniques associated with:
  - Isolation requirements
  - Enterprise maintenance requirements
  - Setting checks
  - LV injections
  - Electrical measurements
- Ancillary equipment which may include transducers, Buswire schemes, tap position indicators, local/remote control systems, alarm systems
- Voltage regulation scheme types which may include electro mechanical, micro-processor or combinations of both

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T2.10.27 Use of test equipment on a discrete protection scheme — substations

Evidence shall show an understanding of the types and applications of test equipment to an extent indicated by the following aspects:

- Standards, codes, Commonwealth, State/Territory and local government legislation, supply authority regulations and or enterprise requirements applicable to the use and application of electrical and/or electronic test equipment
- Types and applications of test equipment **used on discrete protection scheme**
- Techniques in the use of test equipment encompassing:

  Electronic test equipment

  Note: Examples include Doble, Ohmnicrome

  Gas injection equipment

  Manufactures test equipment

  Multimeters

  Phase angle meters

  Meggers

T2.10.28 Electrical equipment — distribution field device protection and control schemes — substations

Evidence shall show an understanding of the electrical equipment associated with distribution field device protection and control schemes to an extent indicated by the following aspects:

- Types and applications of electrical equipment encompassing:-

  Characteristics

  Capabilities

  Note: Examples include the following schemes, automatic circuit reclosers (ACR's), gas switches, secondary injection tests, primary injection tests, TMR Radio's, SCADA, remote control, overcurrent, earth fault, sensitive earth fault, inverse time curves, definite time curves, tripping, reclose, DC supplies, AC supplies and alarms

2.2.12 T2.11 Advanced power systems

T2.11 Advanced power systems

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T2.11.1 Power system layouts

Evidence shall show an understanding of system components and layouts to an extent indicated by the following aspects:

- Distribution system layouts encompassing:
  - Overhead/underground
  - Urban/rural
  - HV customers
  - High rise building systems
  - Three phase lines
  - Single phase lines
  - SWER systems
  - Spur, parallel and ring systems
  - Typical substation types
- Transmission system layouts encompassing:
  - Lines, buses, transformers and cables
  - Line/bus layouts including single, double, ring and breaker and half systems
  - HV crossing methods

T2.11.2 Circuit breaker auxiliary systems

Evidence shall show an understanding of circuit breaker auxiliary systems to an extent indicated by the following aspects:

- Types and characteristics of high pressure air systems including air storage and air handling processes
- Types and characteristics of DC systems including battery types, charging systems, protection systems
- Types and characteristics of special ambient gases (SF6) systems including gas conditioning, storage and handling systems
- Types and characteristics of vacuum interrupters
- Types and characteristics of oil filled and oil handling

T2.11.3 DC transmission system principles

Evidence shall show an understanding of DC transmission systems to an extent indicated by the following aspects:

- Structure of DC transmission systems
- Types of equipment required for DC transmission systems
- Types of connections used for DC transmission systems

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- Principles of control of DC transmission systems
- Advantages of DC transmission in comparison to AC transmission
- Disadvantages of DC transmission in comparison to AC transmission

T2.11.4 AC transmission system components

Evidence shall show an understanding of AC transmission system components to an extent indicated by the following aspects:

- Support structures and reasons for selection
- Insulators and reasons for selection
- Conductors and reasons for selection
- Vibration management systems and principles
- Line ratings based on voltage, span, tension and temperature

T2.11.5 AC transmission line electrical parameters

Evidence shall show an understanding of AC transmission line electrical parameters to an extent indicated by the following aspects:

- Typical arrangements
- Parameters of significance
- Calculation of line parameters

  Note:
  Calculation of resistive, inductive and capacitive values assuming regular transposition and solid conductors
- Comparison with actual values
- Typical parameter values and ratios for different voltage level lines

T2.11.6 AC transmission lines equivalent circuit calculations

Evidence shall show an understanding of AC transmission line models to an extent indicated by the following aspects:

- Types of transmission line models based on line length
- Calculation of voltage drop, line regulation, and transmission efficiency
- Load sharing between lines

T2.11.7 Basic design characteristics of transmission structures and associated equipment

Evidence shall show an understanding of basic design features and characteristics of

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transmission structures and associated equipment and or components to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to installing of poles/structures and associated equipment and or components
- Transmission systems principles encompassing:
  - Terminologies
  - Primary and secondary
  - Voltage levels
  - Types of lines
- Characteristics of structure encompassing:
  - Types of structure (towers and poles, concrete and steel)
  - Characteristics of types of structures
  - Installation methods
  - Maintenance techniques
- Characteristics of associated equipment used on structures encompassing:
  - Insulators
  - Earthing
  - Note: Examples include overhead earth and communication lines

T2.11.8 Voltage control devices on interconnected transmission systems

Evidence shall show an understanding of voltage control techniques to an extent indicated by the following aspects:

- Conditions leading to voltage collapse
- Effects on system of high and low voltage
- Voltage control devices
  - Note: Examples include voltage regulators applied to generators and synchronous phase modifiers, electromagnetic voltage regulators, series and parallel capacitors, OLTC transformers and static VAR compensators (SVC's). SVC's includes saturated reactor compensators; thyristor controlled reactor compensators and combined systems
- Production of harmonics and methods of harmonic control
- Location of voltage control devices within the system

T2.11.9 Calculation of rating of voltage control devices

Evidence shall show an understanding of voltage control devices to an extent indicated by the following aspects:

- Typical devices applications and capacities

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- Estimation of rating of VAR regulating devices using graphical techniques

T2.11.10 Control of power flow in interconnected transmission systems

Evidence shall show an understanding of power flow control to an extent indicated by the following aspects:

- Use of system components to control power flow patterns
  - Note: Examples include base load, spinning reserve, regulating machines, rapid start plant, phase shifting transformers and load shedding
- Principles of automated control
- Synchronising power
- Relationship of power and frequency
- Machine stabilisation techniques
- System oscillations and stability
  - Note: Examples include damped and undamped oscillation, relationship of fault clearance times and system stability, critical clearance times

T2.11.11 Control of transient overvoltages

Evidence shall show an understanding of transient overvoltages to an extent indicated by the following aspects:

- Causes and effects of transient overvoltages
  - Note: Examples include switching transients and lightning transients, effects on plant items
- Control techniques and systems
  - Note: Examples include surge diverters, shield wires and CB arc control
- Insulation systems
  - Note: Examples include insulation systems, insulation coordination and insulation grading

T2.11.12 Corona and discharge losses

Evidence shall show an understanding of corona to an extent indicated by the following aspects:

- Factors leading to the generation of corona
  - Note: Examples include voltage levels, conductor spacings, conductor sizes and shaping, atmospheric conditions
- Consequences of corona
- Corona reduction
  - Note: Examples include conductor selection, conductor bundling, conductor

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surface treatment, grading rings

- Internal discharge

  Note: Examples include causes of internal discharge, effects of internal discharge, testing techniques

T2.11.13 AC generators

Evidence shall show an understanding of power flow control to an extent indicated by the following aspects:

- Constructional features of alternators

  Note: Examples include weights, lengths, lengths, cooling mediums, cooling systems, prime mover types, prime mover attachment, types of windings, core arrangements
- Principle of operation

  Note: Examples include induction machines, synchronous machines
- Modes of operation

  Note: Examples include island and infinite bus operation, running up of prime movers, loading the alternator, requirements for synchronising, methods of synchronising
- Use of reactive capability diagram

  Note: Examples include related diagram types, current circle diagram, performance chart, capability diagram, values represented, per unit representation, limits representation and meaning
- Automatic voltage regulators

  Note: Examples include need for voltage control, required attributes of an AVR, range, response time, constraints on AVR capability, desirable attributes of an AVR, power consumption, compensation, rotor stabilisation, automatic changeover systems, input and output requirements and components
- Operation on an infinite bus

  Note: Examples include definition of infinite bus, power/angle dependence, reactive flow/voltage dependence, power/angle diagram, effect of saliency, transient conditions, practical and theoretical stability limits, voltage dependence of stability, control of reactive flow using AVR and generator transformer tap changer

T2.11.14 Fault calculation techniques

Evidence shall show an understanding of the calculation of fault levels to an extent indicated by the following aspects:

- Calculation of fault levels in symmetrical and asymmetrical fault conditions

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Note: Examples include types of faults, interconnected and radial systems, symmetrical components, representation of voltages and currents, sequence impedances of system plant, calculation/determination of sequence impedance networks, determination of operative sequence impedances, fault or arc impedances, first approximation techniques

- Interrupting device capabilities

  Note: Examples include determination of fault current breaking capability and let through energy capability of fuses and circuit breakers, DC offset and transient condition effects

T2.11.15 Visual inspection procedures

Evidence shall show an understanding of the procedure to undertake a visual inspection of a scheme to an extent indicated by the following aspects:

- Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations and or enterprise requirements associated with visual inspection procedures of a scheme
- Requirements for the use of manuals, system diagrams/plans and drawings
- Identify obvious deficiencies in operating to the standard functionality
- Techniques in determining device malfunction
- Techniques in determining wiring defects

T2.11.16 Commissioning procedures

Evidence shall show an understanding of the commissioning procedures associated with relevant equipment to an extent indicated by the following aspects:

- Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations and or enterprise requirements associated with the commissioning procedures
- Requirements for the use of commissioning manuals, system diagrams/plans and drawings
- Techniques in commissioning procedures encompassing:

  Planning

  Policy

  Testing techniques

  Close out requirements

T2.11.17 Protection scheme requirements

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Evidence shall show an understanding of protection system types to an extent indicated by the following aspects:

- Requirements of a protection scheme
  Note: Examples include relationship to primary system design, purpose of protection, safety of persons, protection of plant, system instability, system break up, loss of customers, loss of revenue, protection zones, restricted schemes, unrestricted schemes, duplicate protection, local backup protection, remote backup protection, selectivity, discrimination, stability, sensitivity, reliability
- Components of a protection scheme
  Note: Examples include current transformers, potential transformers, summation current transformers, interposing transformers, multitapped transformers, all-or-nothing relays, induction relays, balanced beam relays, directional relays, biased relays, solid state relays, microprocessor based relays, gas relays, thermal sensors, hardwired communication, powerline carriers systems, microwave systems, fibre optic systems, need for isolation, need for interfacing
- Protection applied to buses
  Note: Examples include overload, differential, earth leakage, structure leakage, combined schemes, protection overlap
- Protection applied to transformers
  Note: Examples include biased differential, gas, winding temperature, oil temperature
- Protection applied to single/radial lines
  Note: Examples include overcurrent, earth leakage, slow earth leakage, distance, auto reclose, sectionalising, over voltage
- Protection applied to interconnected lines
  Note: Examples include overcurrent, pilot wire, directional, directional overcurrent, current differential, phase comparison, current comparison, distance, impedance, admittance, offset

T2.11.18 Discrete protection systems

Evidence shall show an understanding of the detailed operation and setting of discrete protection systems to an extent indicated by the following aspects:

- Earth fault protection
  Note: Examples include master earth leakage schemes, sensitive earth fault relays and schemes, residual earth fault scheme, core balance earth fault scheme, frame/structure earth leakage scheme, time graded discrimination, backup protection
- Overcurrent protection
  Note: Examples include feeder overcurrent protection, instantaneous

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overcurrent schemes, inverse timed overcurrent schemes, types and location of components of an overcurrent scheme, CT summation, time graded discrimination, backup protection

- Alarms and controls

  Note: Examples include auxiliary relays, voltage regulating relays, line drop compensation, gas relay types, gas relay scheme operation and setting, over temperature schemes

T2.11.19 Interdependent protection systems

Evidence shall show an understanding of the detailed operation of interdependent protection systems to an extent indicated by the following aspects:

- Overcurrent and earth leakage schemes including intertripping, interlocking and blocking

  Note: Examples include logic mapping, master control, elctromechanical, electronic, shading coils
- Pilot wire, phase comparison

  Note: Examples include opposed voltage schemes, circulating current schemes, location of components of a scheme, pilot supervisory techniques,
- Load shedding, voltage control, parallel operation, load rejection
- Busbar Protection and CB failure protection
- Reclose systems

  Note: Examples include applications, single shot, multishot, blocking schemes, synchronisation checking

T2.11.20 Complex protection systems

Evidence shall show an understanding of the detailed operation of complex protection systems to an extent indicated by the following aspects:

- Distance

  Note: Examples include characteristics, electromechanical, electronic, impedance, mho, offset mho, switched schemes, non-switched schemes, blocking schemes, bus zone
- Differential, transformer differential, bus overcurrent

  Note: Examples include principles, feeder protection, transformer protection, bias systems, harmonic restraint, CT connections, bus protection, low impedance schemes, high impedance schemes, bus overcurrent schemes, generator protection, CT connections, special considerations, digital systems
- Types of revenue metering

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- Applications of SCADA
- Complex protection systems for communications
- Harmonic control
- Point on wave switching

T2.11.21 Financial impact statements

Evidence shall show an understanding of financial impact statements to an extent indicated by the following aspects:

- Techniques in budgeting and tracking project progress
- Preparation and analysis of budget figures
- Techniques in the co-ordination of contingencies and risks that have a budget effect
- Techniques in dealing with problems that have a budget effect
- Examples of forms of recording project status and costings
- Application of relevant computer software packages
- Methods of prepare proposals encompassing:
  - Prepare specifications
  - Prepare tender
  - Evaluation and letting of tenders
- Techniques in estimating encompassing:
  - Contract documents
  - Note: Examples include drawings, specifications, general conditions, special conditions
  - Resources costs
  - Note: Examples include hourly rates (labour, plant, material, subcontractors)
  - Direct and indirect costs
  - Contingency costs
  - Project margin
  - Cost of money
  - Budget
  - Preliminary tender
  - Labour costing
  - Equipment costing
  - Economic comparisons
  - Contract variations
  - Techniques in prepare and interpret proposals and tender documents
- Techniques in preparing tender documents
- Techniques in interpret tender documents
- Techniques in preparing cost estimates for a project from relevant data

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- Techniques in preparing financial impact statements

T2.11.22 Instrument transformers

Evidence shall show an understanding of the detailed operation of instrument transformers to an extent indicated by the following aspects:

- Voltage and current transformer principles and terminology
- Types and classes of current transformers
- Constructions of current transformers
- Characteristics of current transformers
- Testing of current transformers
- Types and categories of voltage transformers
- Constructions of voltage transformers
- Characteristics of voltage transformers
- Testing of voltage transformers

T2.11.23 Locate and rectify faults in electrical equipment

Evidence shall show an understanding of procedures for the location and rectification of faults in electrical equipment up to 1000 volts AC and or 1500 volts DC, to an extent indicated by the following aspects:

- Relationship of Occupational Health and Safety to the location and rectification of faults in electrical equipment encompassing:
    - Act and regulations
    - Identification of personal safety
    - Workplace hazards
    - Working with electrically operated tools and equipment
    - Emergency First Aid/resuscitation
    - Rescue from a live electrical situation
    - Enterprise policies and procedures
- Types of drawings encompassing:
    - Differentiation between symptoms
    - Faults and causes in malfunctioning equipment
    - Fault-finding techniques and procedures
- Fundamental electrical concepts encompassing:
    - Effects of current
    - Practical resistors
- Sources of EMF
    - Series, parallel and series-parallel circuits

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Electrical measurement;
Capacitors
Inductors
Magnetism

- Fundamentals of general appliances encompassing:
  Basic principles of appliances (non mathematical);
  Appliance identification
  Appliance ratings
  Basic principles of operation of control equipment and protection devices
  Fault conditions and symptoms
  Safe isolation procedures
  Test equipment
  Safe testing procedures, including continuity
  Fault types in appliances
  Fault-finding procedures (prescriptive)
- Fundamentals of single phase induction motors encompassing:
  Basic principles of operation (non mathematical)
  Motor identification
  Motor ratings
  Basic principles of operation of control equipment and protection devices
  Fault conditions and symptoms
  Safe isolation procedures
  Test equipment
  Safe testing procedure, including continuity
  Fault types in "phase splitting" and universal type motors
  Fault-finding procedures (prescriptive)
- Fundamentals of three phase induction motors encompassing:
  Basic principles of operation (non mathematical)
  Motor identification
  Motor ratings
  Motor starter principles
  Basic principles of operation of control equipment and protection devices
  Fault conditions and symptoms
  Safe isolation procedures
  Safe testing procedure
  Fault-finding procedures (prescriptive)
- Fundamentals of single and three phase electrical heaters encompassing:
  Basic principles of operation
  Types of electrical heaters

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Electrical heater identification
Electrical heater ratings
Basic principles of operation of control and protection devices
Fault conditions and symptoms
Safe testing procedure
Fault-finding procedures (prescriptive)

T2.11.24 Metering devices and principles

Evidence shall show an understanding of the detailed operation of metering devices and principles to an extent indicated by the following aspects:

- Common circuit configurations
- Meters and measurement principles
- Instrument transformer application
- Testing of metering systems and devices
- Implications of market operation

T2.11.25 Communication devices and principles

Evidence shall show an understanding of the detailed operation of communication devices and principles to an extent indicated by the following aspects:

- Types of communication systems
- Interface to power system equipment
- Hardware configurations
- Testing of communication links

T2.11.26 Test equipment A — fundamental

Evidence shall show an understanding of the detailed operation of fundamental test equipment to an extent indicated by the following aspects:

- Care and safe use
- Operating principles
- Comparison of different operating principle meters used for the same purpose
- Accuracy and loading effects of meters

  Note: Examples include measurement of voltage, current, power, resistance, insulation resistance, impedance and phase sequence and the use of oscilloscopes

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T2.11.27 Test equipment B — protection

Evidence shall show an understanding of the detailed operation of protection test equipment to an extent indicated by the following aspects:

- Care and safe use
- Operating principles
- Comparison of different operating principle meters used for the same purpose
- Accuracy and loading effects of meters

    Note: Examples include measurement of timing, voltage, current, resistance, inductance, capacitance, impedance, frequency, phase angle, phase difference and the use of primary, secondary and gas injection equipment

T2.11.28 Test equipment C — metering

Evidence shall show an understanding of the detailed operation of metering test equipment to an extent indicated by the following aspects:

- Care and safe use
- Operating principles
- Comparison of different operating principle meters used for the same purpose
- Accuracy and loading effects of meters

    Note: Examples include measurements of, voltage, current, power, reactive power, phase angle, resistance, inductance, capacitance, impedance, frequency, harmonics and the use of transient and data logging devices

T2.11.29 Test equipment D — control

Evidence shall show an understanding of the detailed operation of control equipment test equipment to an extent indicated by the following aspects:

- Care and safe use
- Operating principles
- Comparing of different control system methods and equipment for the same purpose

    Note: Examples include circuit breaker, isolators, On Load Tap Changer, pumps, fans, fire systems,

T2.11.30 Test equipment E — field

Evidence shall show an understanding of the detailed operation of field device test equipment to an extent indicated by the following aspects:

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- Care and safe use
- Operating principles
- Comparison of different operating principle meters used for the same purpose
- Accuracy and loading effects of meters

    Note: Examples include measurements of voltage, current, power, reactive power, phase angle, resistance, inductance, capacitance, impedance, frequency, harmonics and the use of transient and data logging devices

T2.11.31 Primary plant testing

Evidence shall show an understanding of Primary Plant testing to an extent indicated by the following aspects:

- Transformers:

    Note: Examples include DC high voltage tests, AC high voltage tests, induced high voltage tests, ratio tests, polarity tests, winding resistance tests, impedance tests, insulation resistance tests, transformer vector group test, winding temperature indicator test, alarm tests, neutral ct tests
- Circuit breakers:

    Note: Examples include DC high voltage tests, AC high voltage tests, induced high voltage tests, function tests, operation timing, minimum voltage operation test, insulation resistance test, contact resistance test, auxiliary contact test, alarm tests
- Capacitor banks:

    Note: Examples include DC high voltage tests, AC high voltage tests, induced high voltage tests, neutral ct tests, balance tests, insulation resistance

T2.11.32 Quality of supply measures

Evidence shall show an understanding of quality of supply measures to an extent indicated by the following aspects:

- Measure, analysis and provide solutions for the following;

    Voltage variation outside of standards

    Voltage sags and swells

    Repeated fluctuations

    Impulses

    Momentary interruptions

    Frequency variation

    Harmonics

    Note:

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Includes causes, effects and methods of minimisation

T2.11.33 Geographic information systems principles

Evidence shall show an understanding of Geographic Information Systems principles to an extent indicated by the following aspects:

- Standards, codes, supply authority regulations and or enterprise requirements associated with the use of geographic information systems
- Requirements for the use of system manuals, system diagrams/plans and drawings
- Techniques in system use encompassing:
  - System structure
  - Preparation of data
  - Methods of data entry
  - Methods of accessing data
  - Linking to other databases
  - Output options

T2.11.34 SPARE CLAUSE

T2.11.35 Secondary Switching/isolation principles and sheet preparation

Evidence shall show an understanding of secondary switching/isolation principles and sheet preparation to an extent indicated by the following aspects:

- Techniques in performing and demonstrating correct sequence of isolation and/or restoration encompassing:
  - Communications with appropriate authorities
  - Ensuring adequate protection remains in service to provide plant protection
  - Reading and interpreting drawings for switching /isolating
  - Sheet/instruction preparation

T2.11.36 Disconnect and reconnect fixed wiring electrical equipment fundamentals

Evidence shall show an understanding of disconnection and reconnection

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procedures for fixed wiring electrical equipment up to 1000 volts AC and or 1500 volts DC, to an extent indicated by the following aspects:

- Safe electrical work practices and procedures according to standards such as AS/NZ 4836:2001 or equivalent
- Safe use of tools and plant
- Safe use of ladders and elevated work platforms
- Safe use of protective clothing
- Hazards in the (electrical) work environment encompassing:
  - Shock hazards
  - Fire hazards
  - Chemical hazards
  - Other Hazardous areas
- Special situations
- Procedures for dealing with fires associated with electrical equipment
- Procedures for dealing with PCBs
- Electric shock victim rescue methods and procedures encompassing:
  - Basic First Aid treatment for shock
  - Burns and bleeding
- Purpose of each procedure and application encompassing:
  - Expired air resuscitation (EAR);
  - External cardiac-compression (ECC)
  - Cardio-pulmonary resuscitation (CPR)
  - Combined application of EAR and ECC (purpose of each procedure and application)
- Components of a basic electrical circuit(s) encompassing:
  - Source
  - Control
  - Protection
  - Load
- Types of circuit diagrams encompassing:
  - Symbols
  - Conventions
  - Interpretations
  - Free sketches
- Types of circuit connections and functions encompassing:
  - Open circuit
  - Closed circuit
  - Short circuit
- Techniques in basic electrical measurement
  - Note:

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It includes the use of multimeters; use of ammeter; use of voltage measuring and indicating devices; testing of measuring instruments; care of measuring instruments; voltage, current and resistance measurement; estimating values of voltage, current and resistance; using ohms law

- Fundamental principles of electrical concepts:

  Note: Examples include effects of current; practical resistors; sources of EMF; simple practical circuit; series, parallel and series-parallel circuits; electrical measurement; capacitors; inductors; magnetism
- Techniques in insulation resistance measurement and requirements
- Earthing principles and systems

T2.11.37 Negotiation techniques

Evidence shall show an understanding of negotiation techniques to an extent indicated by the following aspects:

- Techniques associated with organisational policies and procedures related to human resources encompassing:

  Relevant awards and certified agreements

  Legislation impacting on people management

  Range of support services and expertise available
- Techniques in managing relationships encompassing:

  Identifying problems

  Methods of conflict resolution

  Methods of consultation, communication, negotiation and mentoring

  Strategies for positive feedback
- **Techniques in client interaction encompassing:**

  Relationships between client and enterprise

  Outcomes of the interaction

  Methods of achieving outcomes

T2.11.38 Disconnect and reconnect fixed wiring electrical equipment procedures

Evidence shall show an understanding of disconnection and reconnection procedures for fixed wiring electrical equipment up to 1000 volts AC and or 1500 volts DC, to an extent indicated by the following aspects:

- Methods for testing insulation resistance encompassing:

  Continuity of prospective earthing conductor

  Continuity between exposed conductive parts and the earthing system
- Methods of recognising acceptable test results for compliance with safety

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requirements
- Methods of recognising unacceptable test results and require an appropriate qualified person to further investigation
- Cable types and conductor termination methods and techniques encompassing:
  - Conductors solid
  - Stranded and flexible
  - Colour codes
- Single and three phase systems and loads encompassing:
  - Number of active and live conductors required
  - Line and phase voltage
  - Typical loads
- Identification and rating of general appliances
- Single phase induction motors encompassing:
  - Motor identification
  - Motor ratings
  - Direction of rotation
- Three phase induction motors encompassing:
  - Motor identification
  - Motor ratings
  - Direction of rotation
- Single and three phase heaters encompassing:
  - Types of heaters
  - Heater identification
  - Heater ratings
- Electrical distribution arrangement encompassing:
  - Power systems within premises
  - Purpose of switchboards/distribution boards (residual current devices and ELCBs)
- Circuit isolation and protection devices
- Isolation procedures encompassing:
  - Work clearance
  - Testing for voltage
  - Lock-off and tagging
  - Techniques in isolation and tagging
  - Regulation, codes of practice and procedures
- Disconnection procedures, practices and requirements
- Types of replacement equipment
- Methods of ensuring equipment is safe to connect to supply
- Methods of reconnection procedures, practices and requirements
- Methods of return equipment to service

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T2.11.39 Project management

Evidence shall show an understanding of project management to an extent indicated by the following aspects:

- Commonwealth, State and local government legislation, standards, codes, supply authority regulations and or enterprise requirements including relevant certification and licensing applicable to the duties and responsibilities for management a project
- Analyse functions of project management to determine achievement of project objectives
- Relationship of stakeholders to the project
- Techniques in development of project plan encompassing:
  - Project integration
  - Scope
  - Timelines
  - Cost
  - Quality
  - Resources
  - Communication/protocol requirements
  - Risk/uncertainties
  - Procurement and contacting
- Relationship between project processes, project life and project phases
- Planning and control procedures, resource management and risk management
- Techniques, methodologies and tools available to project managers
- Types of internal and external environmental factors that may affect the project

T2.11.40 Harmonics

Evidence shall show an understanding of effects of harmonics to an extent indicated by the following aspects:

- Characteristics and effects of harmonics on protection device functions/malfunction
- Effects of harmonics on the following:
  - Transformers
  - Generators
  - Motors
  - Quality of supply

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T2.11.41 Fault-finding and diagnosing techniques

Evidence shall show an understanding of procedure for the systematic fault isolation through the application of diagnostic techniques to an extent indicated by the following aspects:

- Principles of analytical questioning
- Techniques in drawing valid conclusions from first observations
- Concepts of broad first-line testing
- Consideration of/responsibility for, avoidance of further damage
- Interpretation of specific test results: cause/effect
- Techniques for isolation to appropriate level encompassing:
  - Half-split
  - Module/function isolation (kernel technique)
  - Substitution
  - Diagnostic software
  - Requirements for the use of manuals, system diagrams/plans, drawings, handbooks, specifications and fault pathways
- Software/firmware functions awareness
- Factors affecting field versus workshop repair costs
- Scheduling minor/major repair activities, downtime
- Implications of temporary repairs
- Use of system knowledge and history
- Data interpretation, expected versus actual
- Feedback to design/production/installation processes
- Subsystems and system structures
- System signals/status indicators
- Known failure modes and trends
- Action threshold warnings versus catastrophic failure
- Component ratings/upgrades
- Disassembly/reassembly techniques and care
- Relative costs of repair and replacement encompassing:
  - Remaining life
  - Ongoing maintenance
  - Additional benefits of replacement equipment, e.g. improved productivity, quality

T2.11.42 Basic design characteristics of poles/structures and associated equipment

Evidence shall show an understanding of basic design features and characteristics of poles/structures and associated equipment and or components to an extent indicated

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by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to installing of poles/structures and associated equipment and or components
- Distribution systems principles encompassing:
  - Terminologies
  - Primary and secondary
  - Voltage levels
  - Supply quality
  - Load curve profiles (residential/industrial/commercial)
  - Types of feeders
  - Urban and rural single-phase systems
  - SWER
- Characteristics of poles encompassing:
  - Types of poles (wood, concrete and steel)
  - Installation methods of poles (tooling, rake, life, labelling, sinking)
  - Maintenance techniques of poles - above and below ground pole strength and loads
- Characteristics of associated equipment used on poles and structures encompassing:
  - Crossarms (types and standard sizes)
  - Insulators

T2.11.43 Survey principles

Evidence shall show an understanding of the principles of surveying to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to surveying in the electricity supply industry
- Survey principles encompassing:
  - Measurement of ground levels
  - Deviation angles
  - Compass bearings
  - Basic survey of short distribution line extension

T2.11.44 Design characteristics of underground and overhead conductors and cables, poles and structures

Evidence shall show an understanding of basic design features and characteristics of underground cables, lines, poles/structures and associated equipment and or

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components to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to installing conductors and associated equipment
- Overhead lines characteristics encompassing:
  - Type of components
  - Characteristics of conductor material
  - Mechanical limitations and physical dimensions of lines
  - Current rating factors (heating, voltage drops, power losses) of conductors
  - Aerial bundled cables (HV and LV)
  - Covered conductors
- Characteristics and constructional features of poles and structures encompassing:
  - Types of poles and structures
  - Characteristics of poles/structure materials
  - Mechanical limitations of poles/structures
  - Footings and additional support techniques
- Characteristics and constructional features of underground cables encompassing:
  - Underground cables constructional features
  - Insulation materials and abbreviations
  - Cable dielectrics
  - Electric stress, cable voltage drop
- Calculation of cable volt drop in relation to length of cable run
- Techniques in reducing electrical stress on cables
- Cable rating factors
- Methods of joining and terminating cables
- Techniques in the installation of cables above and below ground
- Techniques in cable testing and the location of cable faults
- Techniques in cable drawing

T2.11.45 Voltage regulations of feeders and associated equipment

Evidence shall show an understanding of basic the voltage regulations of feeders and associated equipment and or components to an extent indicated by the following aspects:

- Terminologies used
  - Note:
    - Examples include distribution system, service line, customer’s terminals, customer voltage, utilisation voltage, base voltage, voltage variation and bandwidth

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- Voltage limits and effects of voltage variation
- Causes of variation

  Note:

  Examples include inductance, capacitance and reactance of distribution lines and transformers
- Methods of voltage control

  Note:

  Examples include off-load and on- load tap changers, voltage regulating relays, line drop compensation, different types of voltage regulators
- Voltage profiles:

  Note: Examples include principles, effect on voltage profiles, limits of voltage, voltage drops due to LV mains transformers, tap settings feeder and service lines
- Sketch/draw voltage profiles
- Calculations to determine percentage voltage drop for components within the distribution feeder

T2.11.46 Distribution transformers fundamentals

Evidence shall show an understanding of fundamentals of distribution transformers to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements pertaining to the safe operation and testing of distribution transformers and auxiliary equipment
- Drawing layouts, conventions and symbols

  Note: Examples include vector group of transformers and three phase transformers
- Construction of a distribution transformer
- Characteristics when operated under load and no load conditions
- Percentage impedance determinations by test and calculation
- Function and operation of tap charging switches including solid state tap changing equipment
- Function and operation of transformer auxiliary equipment
- Problems caused by harmonics in transformers
- Methods and equipment used to overcome harmonics in transformers

T2.11.47 Distribution transformers testing

Evidence shall show an understanding of testing procedures of distribution transformers to an extent indicated by the following aspects:

- Safety precautions specific to the testing of distribution transformers

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- Procedures for safely connecting distribution transformers for testing
- Testing of distribution transformers to determine losses
- Calculation of transformer's efficiency
- Methods and types of equipment used to cool transformers encompassing:
  - Properties of transformer oil
  - Tests performed on transformer oil
- Techniques in performing selected tests on transformer oil
- Techniques in performing testing procedures on armer
- Techniques in testing distribution transformers
- Distribution transformer parallel connections encompassing:
  - Conditions and restrictions for parallel operations
  - Calculations of loading on transformers operating in parallel
- Connection of transformer in parallel to supply a common load

T2.11.48 Power test equipment

Evidence shall show an understanding of power test equipment testing to an extent indicated by the following aspects:

- Safety precautions specific to the use and connection of power test equipment
- Meter operational principles
  - Note: Examples include moving coil, moving iron, transducer, digital and analogue
- Types, operation and use of meters encompassing:
  - Phase sequence meters
  - Phase angle meters
  - Instrument transformers
  - Wattmeters
  - Energy meters
  - Phase system analysers
  - Power oscilloscopes
  - Frequency meters

T2.11.49 Polyphase circuit analysis and application (pre-requisite E2.8.9 Circuit analysis)

Evidence shall show an understanding of polyphase systems and its application towards the calculation of circuits' conditions to an extent indicated by the following aspects:

- Structure of a three phase system encompassing:

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  - Components
  - Sequence of phases
  - Balanced and unbalanced load conditions
- Calculations of phase and line voltages for a specified phase sequence
- Calculation of voltage, current, power, power factor in a three phase system encompassing:
  - Balanced three phase systems
  - Unbalanced delta connected loads
  - Unbalanced four-wire star connected loads
  - Unbalanced three-wire star connected loads
  - Unbalanced four-wire star connected systems
- Calculation of the neutral displacement voltage in unbalanced three-wire star connected systems
- Selection and connection of meters to confirm calculations
- Control of harmonics encompassing:
  - Harmonic analysis of non-sinusoidal waves of voltage and current
  - Production of harmonics in three phase power systems
  - Effects of harmonics on three power systems and loads
  - Types of harmonics commonly encountered on three phase power systems
  - Identification by observation of harmonic components present in a waveform
- Calculation of effective value of non-sinusoidal waves
- Calculate the current/voltage in a complex load given a voltage/current with a Fourier analysis of up to 3 terms
- Pre-unit system in calculations encompassing:
  - Reasons for use
  - Groups of parameters commonly represented
  - Common applications of the per-unit system to represent device specifications
  - Applications of per-unit quantities in simple electrical calculations
- Method of symmetrical components encompassing:
  - Reasons for the use
  - Types of components used to represent a three phase system
  - Reasons for difference in the impedance of a component to the various symmetrical components
  - Commonly occurring relationships between different sequence impedances for common component groups

T2.11.50 Design of circuit switching

Evidence shall show an understanding of circuit switching to an extent indicated by

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the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to the design of the electrical distribution system
- Definitions, symbols used, operational features and applications of switching devices

  Note: Examples of switching devices include circuit breaker, load break switches, general purpose switch, limited purpose switch, isolators, earthing switch, automatic circuit reclosers (ACR), sectionalisers and expulsion drop out fuses (EDO)
- Types of HV circuit breakers

  Note: Examples of HV CB include air CBS, air-blast CBS, sulphur-hexafluoride puffer type CB, vacuum CB, small oil volume CB, bulk oil CB and auxiliary devices
- Types of isolators and air-break switches

  Note: Examples include load break switchgear, ring main switches, wall type indoor switches, outdoor switchgear, EDOs, ACRs, sectionalisers and HV separable connectors
- Concept of arc interruptions encompassing:

  Characteristics of arc interruption

  Restricting voltage

  Dielectric strength
- Arc interruptions under different load conditions

  Note: Examples include resistive, inductive and capacitive
- Main contact systems and classes of mechanisms used on switchgear
- Select switchgear for a given application and considerations encompassing:

  Environmental

  Current rating

  Fault current levels

  Voltage levels
- Techniques in design of single line diagrams

T2.11.51 Distribution earthing system

Evidence shall show an understanding of distribution earthing system to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to the distribution earthing system
- Reason and types of distribution earthing systems
- Terminologies used in the earth systems including, touch and step potential
- Conditions associated when an active HV conductor fails to earth
- Selection of earthing electrodes and grids

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- Determination of the earthing resistance of copper clad rods using earthing monograms

T2.11.52 Distribution tariff principles

Evidence shall show an understanding of distribution tariff system to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to the distribution earthing system
- Definitions of terms used
- Types of tariffs available to the consumer
- Relationship between tariffs and electricity supply costs
- Factors affect tariff selection
- Relationship between the terms, demand, load factor and power factor to tariffs
- Techniques to the selection of tariffs for specific applications encompassing:
  - Calculation of cost of energy consumed

T2.11.53 Protection schemes

Evidence shall show an understanding of protection schemes to an extent indicated by the following aspects:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to protection schemes
- Types of protection schemes encompassing:
  - Reasons for use
  - Application of protection zones around system elements
  - Degree of protection
- Types of feeder protection equipment encompassing:
  - Over current protection inverse time-current operating characteristics
- Operation of over current protection equipment used on distribution systems
- Operation of ACRs and their time-current characteristics
- Types and characteristics of over-current relays
- Coordination methods of a distribution feeder protection scheme
- Earth fault protection used on a distribution feeder
- Operation of a single wire earth return (S.W.E.R) system

T2.11.54 Distribution system planning principles

Evidence shall show an understanding of effect system planning to an extent

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indicated by the following aspects:

- Factors affecting distribution design
- Principles involved in distribution planning encompassing:
  - Load forecasts
  - Future demands and supply reliability
- Principles involved in load types effecting substation design encompassing:
  - Customer load control
  - System unbalance
- Methods of sketching and interpreting daily load curves
- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to protection schemes
- Effects of third harmonics
- Effects of fluorescent lamps
- Magnitude of third harmonics
- Cable losses and after diversity maximum demand
- Daily load curves encompassing:
  - Residential
  - Industrial
  - Commercial
- Application of electrical power and process steam plants encompassing:
  - Reasons for economy of combined plants
  - Heat balance diagrams
  - Ratio of steam to electric power
- Capital and interest cost encompassing:
  - Terms used in supply economics
  - Compound interest
  - Comparing capital and running costs

T2.11.55 Quality standard principles

Evidence shall show an understanding of quality standards and how they relate to an extent indicated by the following aspects:

- Quality system standards, international standards, codes, legislation, supply authority regulations and or enterprise requirements pertaining to the quality standards
- Principles of auditing
- Types of auditing quality systems encompassing:
- Interpret the international standard ISO 9001/2 relating to electrical distribution operation
- Quality system documentation encompassing:

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Types of documentation required
Documentation control system
Overhead and underground design manuals

- Responsibilities of auditors encompassing:
  Function
  Activities

T2.11.56 Analysis protection targeting

Evidence shall show an understanding of the use of fault information to analyse and develop optimal network restoration strategies to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, supply authority regulations Standards, codes, and or enterprise requirements applicable to the analysis of protection targeting
- Requirements for the use of operational manuals, system diagrams/plans and drawings
- Techniques in the collation of protection data
- Techniques in the analyse and assessment of fault information encompassing:
  Public
  Employee
  Protection equipment
- Application methods of fault information to analyse and develop optimal network restoration strategies encompassing:
  Public and employee safety
  Enterprise reliability guidelines
- Resource availability

T2.11.57 Analysis control and protection information

Evidence shall show an understanding of the methods used to analysis control and protection information to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, supply authority regulations Standards, codes, and or enterprise requirements applicable to the analysis of protection targeting
- Requirements for the use of operational manuals, system diagrams/plans and drawings
- Techniques in the collation of control and protection data
- Techniques in the analyse and assessment of control and protection information
- Methods of using control and protection information to analyse and develop

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operation strategies encompassing:

Enterprise reliability guidelines

Generation availability

T2.11.58 Distribution underground line component fundamentals

Evidence shall show an understanding of the different types and function of distribution underground components to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, supply authority regulations Standards, codes, and or enterprise requirements applicable to the use and application of distribution underground components
- Requirements for the use of underground line construction manuals, system diagrams/plans and drawings
- Types, function and characteristics of distribution underground components
- Safety policies, procedures and precautions related to the handling and installing distribution underground components

T2.11.59 Generator control systems - EHV

Evidence shall show an understanding of EHV generator control systems to an extent indicated by the following aspects:

- Legislation, Standards, codes, legislation, supply authority regulations and or enterprise requirements pertaining to the operation of a portable generator
- Safety precautions specific to the synchronisation of generator sets encompassing:
  - Safe working policies, practices and procedures
  - Synchronising procedures
- Techniques in the installation of generator sets control systems encompassing:
  - The synchronising of generator control systems onto and off the network without interruption to supply
  - Estimation of EHV load
  - Assessing the appropriateness of the generator
- Operating a generator in parallel to a single EHV job encompassing:
  - Overhead systems
  - Indoor systems
  - Customer Installations
  - Kiosk Substations
  - EHV generator set and control system to EHV Distribution assets

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T2.11.60 Transmission line component fundamentals

Evidence shall show an understanding of the different types and function of transmission components to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, supply authority regulations Standards, codes, and or enterprise requirements applicable to the use and application of transmission components
- Requirements for the use of transmission line construction manuals, system diagrams/plans and drawings
- Types, function and characteristics of transmission components
- Safety policies and procedures precautions related to the handling and installing transmission components

T2.11.61 Analysis network event records

Evidence shall show an understanding of the methodology in analysing network event records to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, supply authority regulations Standards, codes, and or enterprise requirements applicable to the analysis of critical events
- Requirements for the use of critical event data, manuals, system diagrams/plans and drawings
- Sources of critical event data
- Analyse and assess network event records and relevant data

  Note: Examples include the use of event records and data to analyse and develop optimal network restoration strategies taking into account public and employee safety, enterprise reliability guidelines and resource availability
- Safety policies, procedures and precautions related to critical events encompassing:

  Occupational Health and Safety hazards and precautions

  Identification of OHS hazards, assessing and controlling risks

  Types, selection, maintenance, storage and uses of personnel protective equipment

  Checking integrity of the system for minimum disruption

  Effective communication methods and chain of command

  Emergency response and rescue including First Aid procedures

T2.11.62 Preparing policies and procedures

Evidence shall show an understanding of the preparation of policies and procedures

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to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, supply authority regulations Standards, codes, and or enterprise requirements applicable to the preparation of policies and procedures
- Types of standard forms, documentation and data
- Techniques in disseminating policies and procedures
- Techniques in undertaking approval processes

T2.11.63 Prime mover principles

Evidence shall show an understanding of the prime mover principles to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, supply authority regulations, Standards, codes, and or enterprise requirements applicable to the prime movers
- Requirements for the use of operational manuals, system diagrams/plans and drawings
- Types, characterises and applications of energy sources and conversion systems encompassing:
  - Wind
  - Steam turbine
  - Gas turbine
  - Diesel

T2.11.64 LV system load calculation principles

Evidence shall show an understanding of the LV system load calculation principles to an extent indicated by the following aspects:

- Structure of LV systems
- Ratings of LV system components
- Methods of determining load on LV systems
- Records of load on LV systems
- Effect of added load on LV mains
  - Note: Examples include variation of current, voltage, and power factor
- Load flow in parallel operation
- Enterprise specific network coordination tools

T2.11.65 HV system load calculation principles

Evidence shall show an understanding of HV system load calculation principles to

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an extent indicated by the following aspects:

- Structure of HV systems
- Ratings of HV system components
- Relationship to HV customers
- Methods of determining load on HV systems
- Records of load on HV systems
- Effect of added load on HV feeders

  Note: Examples include variation of current, voltage, power, reactive power and power factor
- Load flows in parallel or loop operation
- Enterprise specific network coordination tools

T2.11.66 EHV transmission system load calculation principles

Evidence shall show an understanding of EHV system load calculation principles to an extent indicated by the following aspects:

- Structure of EHV transmission systems
- Ratings of EHV system components
- Relationship to EHV customers
- Relationship to generation sources
- Methods of determining load on EHV systems
- Records of load on EHV systems
- Effect of added load on EHV transmission systems

  Note: Examples include variation of current, voltage, power, reactive power and power factor
- Load flows in parallel or loop operation
- Enterprise specific network coordination tools

T2.11.67 Zone substation modification design — principles

Evidence shall show an understanding of the principles to design zone substation modifications to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, Standards, codes, supply authority regulations and or enterprise requirements applicable to the zone substation design principles
- Requirements for the use of zone substation system construction manuals, system diagrams/plans and drawings and for plans such as work method statements for the control of OHS risks
- Types of designs

  Note: Examples of substation modification design include replacement of one item or a small quantity of items of primary plant, secondary

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equipment or SCADA equipment. A further example is a full or partial retrofit of SCADA into an existing substation

- Types of zone substation primary plant

  Note: Examples include HV circuit breakers, reclosers, power, current or voltage transformers, disconnectors, surge arrestors, busbars, busbar supports, load control and frequency injection facilities

- Types of secondary equipment

  Note: Examples include batteries, battery chargers, protection relays, control devices or panels

- Types of SCADA modification

  Note: Examples include full or part implementation of SCADA retrofits, replacement of SCADA IEDs, RTUs and SMUs

T2.11.68 Management of transmission, sub-transmission and zone substation design process — principles

Evidence shall show an understanding of the principles to manage the process of transmission, sub-transmission and zone substation designs to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, Standards, codes, supply authority regulations and or enterprise requirements applicable to the substation design management principles
- Requirements for the use of the substation system construction manuals, system diagrams/plans and drawings and for plans such as work method statements for the control of OHS risks
- Type of design management

  Note: Examples include design commencement, carrying out and completion activities

- Types of design process commencement activities

  Note: Examples include acquisition of site survey, acquisition of geotechnical and resistivity details, completion of environmental considerations, acquisition of design project scope documents, component manufacturer’s details, engagement of necessary consultants/contractors

- Types of design carrying out activities

  Note: Examples include completion of checklists, signoff of checklists, general design administration/housekeeping activities

- Types of design process completion activities

  Note: Examples include the issue of design documentation to allow construction, closure of the design process, carrying out of the post delivery review and implementation of corrective actions, issue of corrected design documents reflecting field mark ups

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T2.11.69 Transmission, sub-transmission and zone Substation building design process — principles

Evidence shall show an understanding of the principles of transmission, sub-transmission and zone substation building designs to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, Standards, codes, supply authority regulations and or enterprise requirements applicable to the substation design management principles
- Requirements for the use of the substation system construction manuals, system diagrams/plans and drawings and for plans such as work method statements for the control of OHS risks
- Types of building designs

  Note: Examples include fixed and/or portable control, switchgear, frequency injection and miscellaneous building designs
- Types of building floor construction

  Note: Examples include concrete poured in situ, precast, elevated ultra floor beams with poured in situ slab, pre-manufactured steel framed floor
- Types of building walls construction

  Note: Examples include steel framed, masonry, precast tilt-up, steel framed and lined
- Types of roof construction

  Note: Examples include steel framed, sheet steel clad
- Parameters to be considered

  Note: Examples include establishment of equipment dimensions, weights and dynamic loadings, suitability of building room/compartments and door opening dimensions for the equipment to be housed, compliance with security, fire rating and safety, pressure relief, BCA and BA requirements, compliance with electrical requirements, i.e. frame leakage, earthed metal isolation, appropriateness of floor reference levels, provision of cable supports, penetrations and pulling ring requirements, building light and power design and drafting

T2.11.70 Transmission, sub-transmission and zone substation primary plant design process — principles

Evidence shall show an understanding of the principles of transmission, sub-transmission and zone substation primary plant designs to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, Standards, codes, supply authority regulations and or enterprise requirements applicable to

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the substation design management principles
- Requirements for the use of the substation system construction manuals, system diagrams/plans and drawings and for plans such as work method statements for the control of OHS risks
- Types of primary plant designs parameters

    Note: Examples include electrical equipment in accordance with the Single Line Diagram, bay spacing, busbar heights, statutory and maintenance clearances in accordance with AS2067 and organisational requirements, switchyard equipment layout, lightning protection, control and power cables routes within and outside switchyard

T2.11.71 Transmission, sub-transmission and zone substation control and protection design process — principles

Evidence shall show an understanding of the principles of transmission, sub-transmission and zone substation control and protection designs to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, Standards, codes, supply authority regulations and or enterprise requirements applicable to the substation design management principles
- Requirements for the use of the substation system construction manuals, system diagrams/plans and drawings and for plans such as work method statements for the control of OHS risks
- Types of drawings to be produced

    Note: Examples include AC and DC circuit diagrams, panel layouts, connection diagrams, label lists and control cable schedules
- Types of control and protection designs parameters

    Note: Examples include protection and control systems implemented to suit statutory and organisational requirements, AC and DC circuit diagrams correct and documented

    SCADA hardwired and serially communicated signals, metering, load control, power factor control, AC and DC supplies, protection and control panel layouts and control cable termination diagrams

T2.11.72 Transmission, sub-transmission and zone substation earthing design process — principles

Evidence shall show an understanding of the principles of transmission, sub-transmission and zone substation earthing designs to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, Standards, codes, supply authority regulations and or enterprise requirements applicable to

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the substation design management principles
- Requirements for the use of the substation system construction manuals, system diagrams/plans and drawings and for plans such as work method statements for the control of OHS risks
- Types of activities to be carried out

  Note: Examples include earth resistivity tests coordination, design of the earth grid, confirmation of control of transfer of EPR
- Types of earthing design parameters

  Note: Examples include coordination and analysis of earth resistivity tests, design and drafting of earth grid including electrodes, grid connections, equipment connections and remote earthing connections to conduct maximum earth fault currents without exceeding the maximum allowable earth potential rise (EPR), confirmation of acceptable step and touch potentials including attenuation or hazard control measures, water, telephone service and LV neutral supplies isolation to isolate local EPR

T2.11.73 Transmission, sub-transmission and zone substation civil and structural design process — principles

Evidence shall show an understanding of the principles of transmission, sub-transmission and zone substation civil and structural designs to an extent indicated by the following aspects:

- Commonwealth, State/Territory and local government legislation, Standards, codes, supply authority regulations and or enterprise requirements applicable to the substation design management principles
- Requirements for the use of the substation system construction manuals, system diagrams/plans and drawings and for plans such as work method statements for the control of OHS risks
- Types of activities to be carried out

  Note: Examples include earthworks, foundation design including relationship to geotechnical analysis, footing layout including assignment of reference levels and benchmark, conduits, pits and drainage, hydraulics including fire and safety facilities, access roads, fences and gates including implementation of EPR control measures, transformer fire and sound attenuation measures, bunding and oil containment, indoor and outdoor structural steelwork
- Types of civil and structural parameters

  Note: Examples include access road OK for low loaders and cranes (width, space turning radius, gradient), outdoor steelwork (stands) may include: strain/landing tower, surge arrestor, isolator, voltage transformer, current transformer, circuit breaker, fault thrower, lightening masts, cages/screens, sealing ends, cable supports, operating stands and busbar supports
- Indoor steelwork may include: frequency injection, cable supports,

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cages/screens, cable ladder supports

T2.11.74 Discrete protection devices

Evidence shall show an understanding of the detailed operation and setting of discrete protection devices to an extent indicated by the following aspects:

- Earth fault protection
  Note: Examples include master earth leakage relays, sensitive earth fault relays, residual earth fault relays, core balance earth fault devices, frame/structure earth leakage devices, time graded discrimination, backup protection
- Overcurrent protection
  Note: Examples include feeder overcurrent protection, instantaneous overcurrent relays, inverse timed overcurrent relays, types and location of components of an overcurrent relays, time graded discrimination, backup protection
- Protection CT application
  Note: This includes Ratio, Saturation, Polarity and Resistance checks. Also connections for basic 3 Phase and Earth fault scheme application
- Alarms and controls
  Note: Examples include auxiliary relays, voltage regulating relays, line drop compensation, gas relay types, gas relay scheme operation and setting, over temperature schemes

2.2.13 E2.1 Cables, conductors and terminations

E2.1 Cables, conductors and terminations

E2.1.1 Cable protection and support

Evidence shall show an understanding of cable protection and support method and accessories to an extent indicated by the following aspects:

a) Requirements to protect and support cables adequately

Note: Examples of protection are protection against mechanical damage, protection from adverse temperatures and corrosion and protection from magnetic field that may affect the performance of the cable.

b) Cable support and protection devices, accessories and typical applications

Note: Examples include metallic and non-metallic conduits, duct and trunking, cable ladder and tray, cable clips and ties and related

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accessories.

c) Installation techniques encompassing:

- Cable installation equipment
- Cable drawing and hauling techniques

E2.1.2 Cable types and applications

Evidence shall show an understanding of the types of cables used in electrotechnology and their application to an extent indicated by the following aspects:

a) Structural components of cables and their purpose

Note: Components include conductors and conductor material; insulation; sheathings and servings.

b) Application of various cables types

c) Cable variates

Note: Cable varieties include single cables, flexible cables, flexible cords, shielded cables, armoured cables, ribbon cables, other similar and like cables

d) Typical characteristics and use of power circuit cables and control circuit cables

E2.1.3 Cables in buildings, structures and premises

Evidence shall show an understanding of installing cables in buildings, structures and premises to an extent indicated by the following aspects:

a) Building construction method and construction sequence.

b) Typical cable routes through buildings, structures and premises.

c) Building codes affecting the installation of cables in buildings, structures and premises

Note: Building codes include limitation on penetration structural elements and maintenance of fire protection interiority

d) Cable segregation requirements

E2.1.4 Basic cable and conductor terminations

Evidence shall show an understanding of basic cable and conductor terminations to an extent indicated by the following aspects:

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a) Insulation removal and replacement

b) Conductor handling and cable terminations encompassing:

- 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.

E2.1.5.1 Power cable and conductor terminations

Evidence shall show an understanding of power cable and conductor terminations to an extent indicated by the following aspects:

a) Types of cable glands and their application

Note: Types include glands for circular sheathed cables; steel wire armoured (SWA) cables and mineral-insulated metal-sheathed (MIMS) cables.

- Cable termination techniques

b) Terminal types and applications

c) Conductor termination techniques encompassing:

- Need for sound termination
- Consequences of poor conductor termination
- Conductor and terminal preparation

Note: Conductors include copper and aluminium

E2.1.5.2 Bus bar techniques

Evidence shall show an understanding of bus bar techniques to an extent indicated by the following aspects:

a) Materials and applications

b) Shaping techniques

c) Terminations and connections

E2.1.6.1 Telecommunication cable and conductor terminations

Evidence shall show an understanding of telecommunication cable and conductor terminations to an extent indicated by the following aspects:

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a) Approved termination devices and sockets.

b) Special termination tools and their use.

c) Cable colour coding up to 100 pair indoor and outdoor cable

d) End to end testing

e) Methods of terminating cables encompassing:

- Cables less than twenty pair
- Twenty pair cable and greater

f) Cable labelling devices

g) Colour coding of cables, sockets and termination modules and standard connectors used with twisted pair, optical fibre and coaxial cables

E2.1.6.2 Telecommunication aerial cabling

Evidence shall show an understanding of telecommunication aerial cabling to an extent indicated by the following aspects:

a) Hazard and control measures in aerial cabling working environment

b) Soundness of pole for aerial cabling

c) Aerial safety equipment

d) Procedure to applying pole top rescue

e) Aerial construction methods and regulations

f) Joining of an aerial cables

E2.1.6.3 Telecommunication below ground cabling

Evidence shall show an understanding of telecommunication below ground to an extent indicated by the following aspects:

a) Hazard and control measures in underground cabling working environment

b) Types and purposes of mechanical and manual aids.

c) Purpose, location, and capacity of man holes and pits.

d) Types of underground cable

e) Procedure for the excavation of a site for the installation of a man hole, pit, pipe and conduit

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E2.1.7.1 Performance (copper) data cable installation and terminations

Evidence shall show an understanding of performance data cabling and conductor installation and terminations to an extent indicated by the following aspects:

a) High performance cable types encompassing:

- High performance transmission parameters
- Electrical characteristics
- Structure of UTP, FTP, and STP higher performance cables

b) High performance cabling installation and termination encompassing:

- Separation and segregation requirements and techniques
- Requirements for connecting hardware as defined in current Standards
- Installation requirements and techniques applicable to high performance cable

E2.1.7.2 Coaxial cable installation and terminations

Evidence shall show an understanding of coaxial cabling installation and terminations to an extent indicated by the following aspects:

a) Coaxial cable types encompassing:

- Structure of qualshield and trishield coaxial cables armour plated coaxial cable
- Typical applications

b) Coaxial cabling installation and termination encompassing:

- Separation and segregation requirements and techniques.
- Coaxial cable connectors compatible with the cable type and the environment
- Installation requirements and techniques applicable to coaxial cables
- Coaxial cable connectors and termination techniques

E2.1.7.3 Optical fibre cabling installation and terminations

Evidence shall show an understanding of optical fibre cabling installation and terminations to an extent indicated by the following aspects:

a) Operating principles of optical fibre transmission encompassing:

- Types of optical fibre types available for telecommunications voice and data transmission.

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- Difference between multimode and single mode transmission.
- Advantages of optical fibre cable compared to other cables.
- Applications of optical fibre cables.
- Requirements of optical fibre cables as specified in current Standards
- Hazards associated with working with optical fibre.

b) Installation techniques encompassing:

- Purpose and procedures for pre-testing optical fibre cable prior to installation.
- Regulations, standards and codes applicable to optical fibre installation
- Bending radii and hauling requirements.
- Cable support and securing mechanisms
- Safety precautions

c) Termination and splicing techniques

- Risk control measures applied in the preparation of fibre for termination.
- Termination devices and method
- Preparation and splicing techniques.
- Devices used to protect terminations and splices against mechanical damage and prevent contamination.

E2.1.8 Electronic cable and conductor terminations

Evidence shall show an understanding of terminating cable and conductor used in electronic equipment to an extent indicated by the following aspects:

a) Cable and conductor types and characteristics encompassing:

- Insulated wire
- Harness wiring,
- High performance cables

Note: 1. Examples of characteristics are transmission performance parameters and electrical characteristics
2. Types include UTP, FTP, and STP

b) Coaxial cables types and characteristics

Note: Types include qualshield, trishield coaxial are armour plated coaxial cables

c) Cable anchoring and support methods

d) Termination methods

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2.2.14 E2.3 Control technologies

E2.3 Control technologies

E2.3.13 Using supervisory control and data acquisition systems

Evidence shall show an understanding of supervisory control and data acquisition systems to an extent indicated by the following aspects:

a) SCADA system features and applications encompassing:

- Industries in which SCADA systems are used and
- Associate benefits of the package.
- Features and facilities of different SCADA packages.
- Hardware requirements

b) Reading mimics and animated graphics

c) Trending encompassing:

- Analysis of process to select data,
- Viewing data and graphical representation of selected information
- Trend graphs and data matching

d) Alarm logging encompassing:

- Analysing select data,
- Corrective action of alarm status

E2.3.14 Supervisory control and data acquisition systems programming

Evidence shall show an understanding of supervisory control and data acquisition systems to an extent indicated by the following aspects:

a) SCADA system networking encompassing:

- PLC interface requirements
- Networking requirements of the system
- SCADA system differences from DCS
- Costs of different software packages.

b) Mimics and animated graphics encompassing:

- Graphic designs balance of layout
- Assessment of data required to be entered in software package

c) Trending encompassing:

- Analysis of process to select data, i.e., sampling of the process in terms of

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temperatures, time, weight, etc.

- Viewing data and graphical representation of selected information
- Trend graphs and data matching

d) Alarm logging encompassing:

- Analysing select data, applying limits and specification applied to processes
- Corrective action of alarm status

e) Recipes and scheduling encompassing:

- Methods of producing libraries for different process conditions, required for varied production runs
- Analysis of different production runs i.e., amounts of materials required, raw materials, pressure, temperature, weights, colour required in the process.
- Alarm limits/material specifications
- Scheduling, setting limits and evoking program changes.

f) Data Collection and data basing encompassing:

- Producing a data base of variables, and limit specifications involved in the process, i.e., individual items manufactures, or global manufactured products
- Conversion of raw data into appropriate data basing software package Paradox, Lotus, Excel
- Note.
  Examples of software packages are Paradox, Lotus, Excel and the like.
- Reports encompassing:
- Types and layout of reports
- Aims of the reports, i.e., customer, manager/s, or accountant reports. The report may include information on statistical process control for quality assurance etc.
- Analysis of data in report i.e., graphs, design, layout, balance of layout etc.
- Assessment of data required for the report.

g) Programming language encompassing:

- Automate tasks within the software package.
- Provide complex processing, where field equipment does not have the facilities.

h) Implementation and applications encompassing:

- Overview of implementation of SCADA systems i.e. summary of points required for implementation.
- Typical application in manufacturing and data control i.e., food processing, packaging, automotive industry, energy management, steel production etc.

i) Networking encompassing:

- Types of networks available

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- Coordinate and access of networking by linking to factory network.

E2.3.19 Control programming fundamentals

Evidence shall show an understanding of control programming fundamentals to an extent indicated by the following aspects:

a) Control applications of software

b) Software terminology

c) Programming languages currently used by industry

d) Program development:

Note:
Examples may include flowcharts, pseudocode, algorithms

e) Programming concepts encompassing:

- programming structure
- documentation
- compiling source code
- generating executable files
- scalar and structured data types
- constants and variables
- reading from keyboard and writing to screen
- arithmetic, relational and logical operations
- making decisions
- looping operations
- programming to access external devices via I/O boards
- functions
- Note: Examples may include macros; global and local variables, auto and static variables; Intrinsic functions used in control; Writing functions; Linking in external functions to control hardware
- numerical and character arrays

E2.3.20 Microcontroller programming basics

Evidence shall show an understanding of microcontroller control system programming methods to an extent indicated by the following aspects:

a) Programming terms

b) Language levels and their features

c) Language simulators and emulators

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d) Language programming basics encompassing:

- Programming input/output functions
- Timing loops

2.2.15 E2.4 Communications and computer technologies

E2.4 Communications and computer technologies

E2.4.3.2 Networking fundamentals

Evidence shall show an understanding of networking fundamentals to an extent indicated by the following aspects:

a) Analogue and digital signals encompassing:

- How information is carried
- Signal distortion

  Note: Examples include attenuation, reflection, noise, dispersion, jitter, latency and collisions

b) Types of networks, network components and hardware

c) Local Area Network (LAN) architectures

d) Networking protocols and the OSI model

e) Network signal propagation

f) Transmission Control Protocol / Internet Protocol (TCP/IP)

g) Basics of Encoding Networking Signals

h) Internet services

E2.4.11 Personal computers, hardware structure

Evidence shall show an understanding of personal computers, hardware structure to an extent indicated by the following aspects:

a) Structure and components and their function

Note: Examples include motherboards, memory modules, video modules, connecting buses, storage devices and the like.

b) Assembling and dismantling techniques

c) Hardware faults and troubleshooting techniques

Note: Confined to subsystem level

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d) Basic network hardware and components

e) Connection of network media

f) Set up of standard network configuration

E2.4.12.1 Computer hardware sub-assemblies

Evidence shall show an understanding of computers, hardware components to an extent indicated by the following aspects:

a) Sub-assemblies architecture and their function

b) Sub-assemblies faults and troubleshooting techniques

c) Repair techniques

E2.4.14 Personal computer operating systems, basics

Evidence shall show an understanding of personal computer operating systems to an extent indicated by the following aspects:

a) Basic function, components and concepts

b) Operating systems in use

c) System installation and configuration

E2.4.16 Personal computers, engineering applications software basic

Evidence shall show an understanding of computers applications to an extent indicated by the following aspects:

a) Application software types

b) Configurations and preferences

c) Use of particular software packages

> Note: Examples include word processor, spreadsheet, database, presentation software, web/document publisher, CAD/drawing packages, email client, business management

E2.4.21 Client side programming

Evidence shall show an understanding of client side programming to an extent

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indicated by the following aspects:

a) Client server architecture

b) Hyper Text Markup Language (HTML) encompassing:

- Forms
- Table
- Cascading style sheets

c) Hyper Text Markup Language (HTML) scripting encompassing:

- Exposed object model
- Events and event handling
- Objects methods, properties, events
- Window, document, form, and form elements
- String object, methods, properties
- Form field validation

  Note: Examples of scripting language are JavaScript and Visual Basic (VB) Script

d) Extendable Markup Language (XML) encompassing:

- Syntax
- Structure (well formed XML)
- Schemas
- Transformations
- Parsing Document Object Model (DOM) and Simple API (SAX)
- Scripting to Document Object Model (DOM)

e) Extendible Stylesheet Language (XSL) generating HTML from XML

f) Wireless thin client programming

Note: Examples include Java2 Micro Edition (JEME), Mobile Information Device Profile (MIDP), Windows CE and Palm OS

g) Consideration for system architecture

h) Configurations and profile overview

E2.4.22 Server scripting

Evidence shall show an understanding of server scripting the to an extent indicated by the following aspects:

a) Client server architecture

b) Web and Application Servers

c) Server scripting languages e.g. JSP, ASP, PHP, Perl

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d) Server script Tags

e) Integrating script with HTML

f) Server script object model

g) Request, Response, Session, Application

h) Using server objects

i) Server components

j) Using components in server scripts

k) Scope of server components e.g. session, page, application

l) Component get / set methods

m) Deploying server components

n) Advanced server scripting concepts

E2.4.39 Internet, network basics

Evidence shall show an understanding of network basics to an extent indicated by the following aspects:

a) Workstation Configuration

b) The function and interaction of workstation sub systems

c) The OSI Model

d) Network Devices at Layers 2 and 3

e) Physical Layer

f) Data Link Layer

g) Layer 2 Trouble Shooting

h) IP addressing and subnetting

i) Network Layer

j) TCP and UDP

- Purpose of the transport layer
- Comparing TCP and IP
- TCP and UDP
- TCP segment format
- UDP segment format
- TCP Connection Methods

k) The Session Layer

l) The Presentation Layer

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m) The Application Layer

E2.4.40 Internet, network routing

Evidence shall show an understanding of network routing to an extent indicated by the following aspects:

a) Subnetting encompassing:

- The purpose of IP address
- The role of host address on a routed network
- The role of broadcast addresses on a routed network
- Calculating sub-net addresses
- Calculating host addresses on a sub-netted network
- Calculating the sub-net mask
- Reserved addresses and reserved sub-nets

b) Layer 3 and 4 Protocols encompassing:

- Compare the Internet TCP/IP protocols and the OSI model
- TCP and UDP operation and segment format
- TCP and UDP port numbers
- The Internet Layer and IP datagrams

c) Routing encompassing:

- Path determination
- Routed versus routing protocol
- Network-layer protocol operations
- Multi-protocol routing
- Static and dynamic routes
- Applications of static routing
- Default routes
- Dynamic routing operations
- Network metrics
- Time to convergence
- Distance-Vector Routing
- Routing loops, their cause and control
- Link-State Routing
- Unsynchronised link-state advertisements (LSAs) problems
- Hybrid routing protocols
- LAN-to-LAN routing

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- LAN-to-WAN routing
- Path selection and switching of multiple protocols and media

d) Basic Router Configuration encompassing:

- WAN standards, devices and technologies
- Router functions
- Router user interface
- Router access modes
- Help functions
- Editing functions
- Router programming modes
- Basic router interface configuration
- Basic routing configuration
- Basic router diagnostic commands

e) Neighbour Discovery Techniques encompassing:

- Examining router status using diagnostic commands, e.g. show and debug commands
- Using and interpreting a router's neighbour discovery features, e.g. CDP neighbour commands
- Basic networking testing using ping and trace route commands
- Checking real-time traffic with debug
- Operating telnet sessions to explore other routers
- Setting router names to enable the identification of routers when telneting
- Setting passwords and names to provide access for telnet sessions

f) Router Security encompassing:

- Router entry points
- Basic line and user security features of a router
- Setting up the router Web interface
- Browsing to a router

g) Router Boot Sequence encompassing:

- Functional components of a router
- Internal router's configuration components
- External router configuration sources
- Router booting modes
- Configuration and systems files
- Router boot sequence
- Varying boot sequence through the configuration register
- Varying the boot sequence through software commands, e.g. boot system commands
- Basic features of a deployment tool like ConfigMaker

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- Configuration practice
- Web server set up

h) IOS Management encompassing:

- Locating the Cisco IOS software
- Configuration register values
- Commands for revealing system file status and requirements
- Bootstrap Options in Software
- TFTP server set up and operation
- Procedures for TFTP transfer of router IOS
- Back up and recover router IOS
- Sources and versions of router IOS from vendor
- Update a router IOS
- Vendor IOS installation tools

i) Password Recovery encompassing:

- Modifying the boot sequence to gain entry to a protected router (e.g. 1600 series and 2500 series)
- Re-configuring the router after entry with and without loss of previous configuration

j) DNS Configuration encompassing:

- The Role of DNS in Router Configurations
- Setting up DNS on a router
- Verifying DNS operation

k) Troubleshooting encompassing:

- Typical layer 1 errors
- Typical layer 2 errors
- Typical layer 3 errors
- Network troubleshooting strategies.

2.2.16 E2.5 Drawings, diagrams, schedules, manuals, standards and regulations

E2.5 Drawings, diagrams, schedules, manuals, standards and regulations

E2.5.1.1 Drawings interpretation and sketching

Evidence shall show an understanding of drawings interpretation and sketching to an extent indicated by the following aspects:

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a) Basic technical drawing conventions and symbols

b) Freehand technical sketching techniques

E2.5.1.2 Drawings and diagrams

Evidence shall show an understanding of drawings, diagrams and schedules used in electrotechnology work to an extent indicated by the following aspects:

a) Drawing types and applications encompassing:

- Drawing layouts and conventions

  Note: Examples include mechanical drawings, electrical/electronic schematics, wiring diagrams, PC boards, location diagrams (architectural drawings), cable routes and switching arrangements and building details.
- Drawing symbols

  Note: Examples include symbols representing electrotechnology circuit components, equipment location and cable routes and control arrangements.

b) Cable/wiring/connection and equipment/component/schedules.

E2.5.2.1 Technical standards, regulations and codes for general electrical installations

Evidence shall show an understanding of technical standards and regulations that apply to electrical installations to an extent indicated by the following aspects:

a) Regulation for undertaking electrical work

b) Standards philosophy and format

- How to read and apply a standard.
- Standards and Codes that apply to all types of electrical installations

  Note: 1. Standards include Standards mandated under regulation or by an authority, deemed-to-comply standard and local service requirements.
  2. Codes include those applicable to electrical safe working practices.

c) Applying standards, regulations and codes to general electrical installation encompassing:

- Protection for safety
- Installation design
- Selection of electrical equipment
- Installation of electrical equipment

d) Testing and verification

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E2.5.2.2 Technical standards, regulations and codes for special electrical installations

Evidence shall show an understanding of technical standards and regulations that apply to special electrical installations to an extent indicated by the following aspects:

a) Additional requirements for special installations

b) Applying standards, regulations and codes to special electrical installation

Note: Special installations are those in caravan parks, construction and demolition sites, marinas, medical treatment areas and moveable premises

E2.5.2.3 Technical standards, regulations and codes for testing and tagging portable and cord connected electrical apparatus

Evidence shall show an understanding of technical standards and regulations that apply to testing and tagging portable and cord connected electrical apparatus to an extent indicated by the following aspects:

a) Regulation for undertaking testing and tagging work

b) Standards and Codes that apply to testing and tagging

- How to read and apply a standard
- Standards and Codes that apply to testing and tagging

Note: 1. Standards include Standards mandated under regulation or by an authority, deemed-to-comply standard and local service requirement

2. Codes include those applicable to electrical safe working practices

c) Applying standards, regulations and codes to testing and tagging encompassing:

- Apparatus and cord inspection and testing
- Tests and testing methods
- Test results and compliance requirements

d) Tagging system methods and requirements.

E2.5.3 Technical standards, regulations and codes for lifts and escalators

Evidence shall show an understanding of technical standards and regulations that apply to lifts and escalators to an extent indicated by the following aspects:

a) Standards philosophy and format

b) How to read and apply a standard

c) Standards and Codes that apply to lifts and escalators

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d) Applying standards, regulations and codes

E2.5.4 Technical standards, regulations and codes rail networks

Evidence shall show an understanding of technical standards and regulations that apply to rail networks and escalators to an extent indicated by the following aspects:

a) Standards philosophy and format

b) How to read and apply a standard

c) Standards and Codes that apply to rail networks

d) Regulations

E2.5.5 Technical standards, regulations and codes for extra low voltage work

Evidence shall show an understanding of technical standards, regulations and codes related to extra-low voltage work to an extent indicated by the following aspects:

a) Limitation imposed by regulations

b) How to read and apply a standard

c) Aspects of technical Standards that apply to extra-low voltage work

E2.5.6 Technical standards, regulations and codes for refrigeration and air conditioning

Evidence shall show an understanding of technical standards and regulations that apply to refrigeration and air conditioning to an extent indicated by the following aspects:

a) Standards philosophy and format

b) How to read and apply a standard

c) Standards and Codes that apply to refrigeration and air conditioning

d) Regulations

e) Equipment manufactures specifications

E2.5.7 Technical standards, regulations and codes for telecommunications cabling

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Evidence shall show an understanding of technical standards and regulations that apply to telecommunications cabling to an extent indicated by the following aspects:

a) Role of Australian Communications Authority (ACA) under the Telecommunication Act 1997

b) Penalties for non compliance

c) Standards and Codes that apply to telecommunications cabling encompassing:

- Current technical standards applicable to cabling
- Aspects of other technical standards or codes of practice called up by regulation
- Cabling Provider Rules' requirements
- Certified components

d) Application of Standards, Codes and regulations encompassing:

- Cabling installation, protection and segregation
- Earthing and protection
- Cable connections
- Certification
- Labelling and documentation of cabling and active communication equipment

e) Cabler Registration requirements and processes

E2.5.11 Environmental and heritage awareness

Evidence shall show an understanding of environmental and heritage regulation effecting electrotechnology work to an extent indicated by the following aspects:

a) Purpose of environmental and heritage regulation

b) Typical issues affecting electrotechnology services and systems

c) Meeting requirements

2.2.17 E2.8 Electrical principles

E2.8 Electrical principles

E2.8.1.1 Basic electrical principles

Evidence shall show an understanding of electrical principles to an extent indicated

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by the following aspects:

E2.8.10.3 Advanced engineering maths

Evidence shall show an understanding of advanced engineering maths to an extent indicated by the following aspects:

a) Differentiation Calculus encompassing:

Integration, integration by parts,
Numerical methods,
Partial and total differentiation.

b) Linear Algebra encompassing:

Matrices and inverse matrices;
Linear mapping,
Determinants,
Solution of linear equations.

c) Vectors encompassing:

Geometrical representation,
Addition and scalar multiplication,
Dot and cross products,
Equations of lines and planes.

d) Variables encompassing:

Graphs, level curves and surfaces
Partial derivatives; chain rule; directional derivative;
Maxima and minima.

e) Sequences and Series encompassing:

Algebraic and Fourier series, convergence; Taylor’s Theorem
Power series manipulation.

f) Differential Equations encompassing:

First order and separable linear equations
Second order linear equations.
Partial differential equations.
Numerical Techniques.

g) Number encompassing:

Integer, irrational and complex numbers.
Number systems.
Arithmetic operations.

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Accuracy and stability.

h) Statistics encompassing:

Assembly, representation and analysis of data.

Fitting distributions to data.

Non-parametric statistics.

Tests of significance for means, variances and extreme values.

Correlation

2.8.11 Power engineering computations

Evidence shall show an understanding of electrical computations to an extent indicated by the following aspects:

a) Graph functions and applications encompassing:

- linear, non linear
- parabolic
- hyperbolic
- logarithmic
- exponential

b) Complex numbers encompassing:

- Polar form
- Rectangular form

c) Simultaneous equations

d) Quadratic equations

e) Phasor diagrams

f) Star-delta transformations

E2.8.12 Electrical concepts and applications

Evidence shall show an understanding of electrical concepts to an extent indicated by the following aspects:

a) Electrical supply and distribution within a building or premises

b) Arrangement of circuits

c) Protection for safety requirements and their practice

d) Difference between alternating and direct current

e) Measurement and calculation of voltage, current, resistance and power in

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practical circuits.

f) Concepts and applications of magnetism and electromagnetic induction

g) Transformer operating principles and their application

h) Hazards associated with electrical systems and apparatus.

2.2.18 E2.9 Electronic principles and applications

E2.9 Electronic principles and applications

E2.9.1.1 Electronic component basics

Evidence shall show an understanding of the electronic components to an extent indicated by the following aspects:

a) Types of components

Note: Examples of types are resistors, inductors, capacitors, diodes, transistor, integrated circuits, printed circuit boards, sub-assemblies, and mounting/enclosing, connection and termination hardware.

b) The physical features and primary characteristic of components.

Note: 1. Features include shape, size and connections
2. Characteristics include parameter and power ratings and polarity.

c) Methods of identifying and marking of component ratings.

d) Identifying and handling static sensitive components.

E2.9.4.1 Digital electronic fundamentals

Evidence shall show an understanding of the characteristics and applications of the fundamentals of digital electronics to an extent indicated by the following aspects:

a) Comparison of analogue and digital signals

b) Conversion between hexadecimal, binary and decimal number systems

c) Precautions when handling electronic devices due to electrostatic discharge

d) Basic operation and characteristics of current logic devices.
Note: examples are: logic gates, mux’s, counters, etc

e) Techniques for the analysis of simple digital systems encompassing: understanding of timing diagrams, prediction of the output state of logic devices for various input combinations, interfacing between logic families, etc

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f) Comparison of the operation and characteristics of current display devices
Note: examples are: LEDs, LCDs, etc.

Basic operation and characteristics of current A/D and D/A converters

E2.9.5.1 Micro programming fundamentals

Evidence shall show an understanding of the characteristics and applications of microcontrollers/microprocessors to an extent indicated by the following aspects:

a) Memory organisation, operation and addressing methods

b) Programmer's model encompassing:

- register structure
- instruction register/decoder
- arithmetic logic unit (ALU)
- accumulator and flags
- instruction cycle timing
- control lines
- stack pointer
- index register

c) System clock circuits fetch and execute encompassing:

- timing cycle
- timing relationship to system clock
- logic levels of system buses for each clock period of an instruction cycle

d) Input/Output port programming

e) Structured assembly programming

E2.9.5.2 Microcontroller fundamentals

Evidence shall show an understanding of microcontroller fundamentals to an extent indicated by the following aspects:

a) Microcontroller architecture

b) Program storage types

c) Data storage types

d) I/O Ports: analogue/ digital

e) Integrated Peripherals: timers, interrupts etc

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f) Control circuitry: system clock, reset etc

g) Industry standard programming environment

E2.9.8 Amplifier fundamentals

Evidence shall show an understanding of amplifier fundamentals to an extent indicated by the following aspects:

a) The purpose and application of amplifiers

b) The basic characteristics of small signal amplifiers

Note:

Features and characteristics include input and output impedance, current and voltage gain

and bandwidth

c) Various operational amplifier circuit configurations and where they are used.

d) Measures and calculated values of gain and output voltage for various operational amplifier configurations

Note:

Circuit configurations include inverting, non-inverting, voltage follower, summing,

comparators and Schmitt trigger differential configurations

E2.9.12 Electronic fault finding

Evidence shall show an understanding of electronic fault finding techniques to an extent indicated by the following aspects:

a) Factors to consider in clarifying the nature of a fault encompassing:

- Initial fault report
- Confirmation of symptoms of the fault
- Comparison of symptoms with normal operation

b) Effect to cause reasoning — assumptions of possible causes

c) Methods for testing assumptions encompassing:

- Visual inspection
- Sectional testing
- Split-half tests
- Component isolation

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d) Dealing with intermittent faults

Note: Typical causes of intermittent faults are vibration, shock, changes in temperature and electromagnetic interference.

E2.9.63 Direct current power supplies

Evidence shall show an understanding of DC power supplies to an extent indicated by the following aspects:

a) Operating principles and application of DC power supplies

b) Output waveforms of various rectification circuits

c) Ripple an output DC voltage for capacitive power supply filter circuits

d) Operation of a Zener diode shunt voltage regulator

e) Selection of 3 terminal regulators from data sheets

2.2.19 E2.11 Equipment and tools

E2.11 Equipment and tools

E2.11.1 Hand tools

Evidence shall show an understanding of hand tools and their use to an extent indicated by the following aspects:

a) Hand tools for cutting, shaping, drilling, threading, tapping, and finishing metallic and non-metallic components encompassing:

- types of tools and their purpose
- techniques for the correct and safe use of these tools
- hazards associated with their use
- care and maintenance of hand tools

b) Tools for measuring and marking out.

- types of tools and their purpose
- techniques for the correct and safe use of these tools
- hazards associated with their use
- care and maintenance of hand tools

c) Tools for dismantling and assembling electrical and electronic components encompassing:

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- types of tools and their purpose
- techniques for the correct and safe use of these tools
- hazards associated with their use
- care and maintenance of hand tools

E2.11.2.1 Power tools

Evidence shall show an understanding of fixed and portable tools and their use to an extent indicated by the following aspects:

a) Fixed power tools for cutting, shaping, drilling, and finishing metallic and non-metallic components encompassing:

- types of tools and their purpose
- techniques for the correct and safe use of these tools
- hazards associated with their use
- care and maintenance of fixed power tools

b) Portable power tools for cutting, shaping, drilling, and structural components encompassing:

- types of tools and their purpose
- techniques for the correct and safe use of these tools
- hazards associated with their use
- care and maintenance of fixed power tools
- requirements for use on construction sites.

E2.11.3.1 Fixing and support devices and 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:

a)
Electrical/electronic/instumentation/refrigeration/airconditioning/telecommunicatio ns accessories for supporting, fixing and protecting wiring/cabling/piping and functional accessories.

b) Device for securing and mounting electrical/electronic accessories encompassing:

- types and safe application of screws, bolts, rivets and similar devices
- types and safe application of devices for fixing to timber, metal, hollow structures and masonry and concrete
- types and safe application of fixing adhesives and tapes
- hazards and safety measures when working with adhesives and chemical

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fixing devices
- regulatory requirements for use of powder fixing tools.

E2.11.3.2 Mobile plant, tools and equipment

Evidence shall show an understanding of tools and equipment for use with mobile plant to an extent indicated by the following aspects:

a) Types of plant and their use

b) Regulatory requirements for use of specific plant and equipment

E2.11.4 Dismantling and assembling techniques

Evidence shall show an understanding of techniques for assembling and dismantling electrotechnology apparatus to an extent indicated by the following aspects:

a) Purpose of sequencing dismantling and assembling.

b) Importance of marking/labelling and storing parts

c) Techniques for dismantling and assembling close fitting parts.

d) Use of gasket and seals.

E2.11.5 Basic electrical testing and measuring devices and techniques

Evidence shall show an understanding of the safe use and care of portable voltage testers, voltmeters, ammeters and resistance measuring instruments to an extent indicated by the following aspects:

a) Types of voltage testers, multimeters, clamp meters, continuity testers and insulation resistance testers and their application.

b) Features of testing/measuring devices

Note: Features include safety, user calibration and parameter and range settings.

c) Connection of test/measuring devices into a circuit encompassing:

safety procedures

circuit arrangement of test/measuring devices

d) Taking readings

e) Storage, maintenance and care of test/measuring devices.

f) Australian Standard quality assurance requirements for test equipment calibration

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certification.

E2.11.6.1 Advance electrical testing and measuring devices

Evidence shall show an understanding of the safe use and care of advance measuring instruments to an extent indicated by the following aspects:

a) Test/measuring devices and their application

b) Connection of test/measuring devices into a circuit encompassing:

- safety procedures
- circuit arrangement of test/measuring devices

c) Taking readings

d) Storage, maintenance and care of test/measuring devices

E2.11.7.1 Electronic testing and measuring devices and techniques

Evidence shall show an understanding of the safe use and care of electronic measuring instruments to an extent indicated by the following aspects:

a) Test/measuring devices and their application

Note: Examples are analogue and digital multimeters, voltage and digital testers, signal generators and oscilloscopes

b) Connection of test/measuring devices into a circuit encompassing:

- safety procedures
- circuit arrangement of test/measuring devices

c) Taking readings

d) Storage, maintenance and care of test/measuring devices

E2.11.7.2 Advanced electronic testing and measuring devices and techniques

Evidence shall show an understanding of the safe use and care of advance electronic measuring instruments to an extent indicated by the following aspects:

a) Test/measuring devices and their application

Note: Examples are frequency counters, and synthesisers, spectrum analysers, noise and distortion meters and RF communications service monitor.

b) Connection of test/measuring devices into a circuit encompassing:

- safety procedures

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- loading and matching
- storage and delay
- circuit arrangement of test/measuring devices

c) Taking and interpreting readings

d) Notion of decibels including dBm, dBr, dBu, dBo

E2.11.11. Electronic soldering equipment and techniques 1

Evidence shall show an understanding of electronic soldering equipment and their use to an extent indicated by the following aspects:

a) Electronic soldering equipment encompassing:

- types of equipment and their purpose
- hazards associated with their use
- care and maintenance of brazing and soldering equipment

b) Electronic soldering techniques encompassing:

- safe use of equipment
- preparation of surfaces
- adjusting heat
- application
- basic principles of lead free soldering techniques

E2.18 Safety

E2.18.1 Occupational Health and Safety principles

Evidence shall show an understanding of Occupational Health and Safety to an extent indicated by the following aspects

a) The basic legal requirements covering occupational health and safety in the workplace encompassing:

- general aims and objectives of the relevant state or territory legislation relating to OHS.
- employer and employee responsibilities, rights and obligations
- major functions of safety committees and representatives
- powers give to Occupational Health and Safety Inspectors

b) The requirements for personal safety in the workplace encompassing:

- the safety precautions that are required to ensure personal safety in the

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workplace
- potential hazards in relation to improper industrial housekeeping
- sources of pollution in an engineering environment and outline control measures

c) Workplace safety check, identifying potential workplace hazards and suggested measures for accident prevention encompassing:

- safety checklist for a typical workplace environment
- identifying and reporting potential workplace hazards
- methods of prevention of safety hazards within a typical workplace environment

d) working safely with electrical tools or equipment encompassing:

- causes of electrical accidents and state the effects that electric shock can cause
- purpose of circuit protection devices, such as fuses, circuit breakers and Residual Current Devices (RCDs)
- safe isolation of an electrical supply

e) emergency procedures for the rescue of an electric shock victim equipment

f) emergency First Aid for an electric shock victim

Note: Emergency First Aid is limited to first-on-the scene assistance to a victim of electric shock , and basics of CPR.

E2.18.2 Electrical safe working practices

Evidence shall show an understanding of working safely on or around electrical equipment through the application of risk management principles and control measures for dealing with non-electrical hazards and extra-low voltage, low-voltage and high-voltage hazards and high-current hazards. The following aspects indicate the extent of understanding required:

a) Risk management and assessment of risk encompassing:

- Principle and purpose of risk management
- Processes for conducting a risk assessment

b) Hazards associated with low-voltage, extra-low voltage and high-currents encompassing:

- Arrangement of power distribution and circuits in an 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.

c) Risks and control measures associated with high-voltage encompassing:

- Parts of an electrical system and equipment that operate at high-voltage,

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- 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

d) Optical fibre safety encompassing:

Coherent optical sources and joining procedures

Laser safety class 3a devices or their replacement

e) Risks and control measures associated with low voltage encompassing:

- Risks associated with 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

f) Risks and control measures associated with harmful dusts and airborne contaminants.

Note: Sources include thermal insulation, fibrous cement materials and asbestos and other fibre reinforced switchboard materials.

g) Safety, selection, use, maintenance and care of test equipment encompassing:

- Safety characteristics of electrical testing devices
- Safe use of electrical testing device
- Checks and storage methods for maintaining the safety of testing devices

E2.18.8.2 Occupational Health and Safety, enterprise responsibilities

Evidence shall show an understanding of OHS enterprise responsibilities to an extent indicated by the following aspects:

a) Provisions of relevant health and safety legislation

b) Principles and practice of effective occupational health and safety management

c) Management arrangements relating to regulatory compliance

d) Enterprise hazards and risks, control measures and relevant expertise required

e) Characteristics and composition of workforce and their impact on occupational health and safety management

f) Relevance of enterprise management systems to occupational health and safety management

g) Analysis of working environment and design of appropriate occupational health and safety management systems

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h) Analysis of relevant data and evaluation of occupational health and safety system effectiveness

i) Assess resources to establish and maintain occupational health and safety management systems.

E2.18.9 Electronic safe working practices

Evidence shall show an understanding of working safely on or around electronic equipment through the application of risk management principles and control measures for dealing with non-electrical hazards and extra-low voltage, low-voltage and high-voltage hazards and high-current hazards. The following aspects indicate the extent of understanding required.

a) Risk management and assessment of risk encompassing:

- Principle and purpose of risk management
- Processes for conducting a risk assessment

b) Hazards associated with low-voltage, extra-low voltage and high-currents encompassing:

- Parts of an electronic systems and equipment that operate at low-voltage and extra-low voltage
- Parts of an electronic systems and equipment where high-currents are likely

c) Risks and control measures associated with high-voltage encompassing:

- Parts of an electronic systems and equipment that operate at high-voltage
- The terms used - ‘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

d) Risks and control measures associated with low voltage encompassing:

- Risks associated with installation, fault finding, maintenance and repair
- Control measures before, while and after working on electronic systems or equipment
- Isolation and tagging-off procedures
- Risks and restrictions in working live
- Control measures for working live

e) Risks and control measures associated with the high levels of radiation encompassing:

- RF hazards
- Maximum exposure levels to RF
- Maximum exposure to microwave radiation

f) Optical fibre safety encompassing:

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- Coherent optical sources and joining procedures
- Laser safety class 3a devices or their replacement

g) Safety, selection, use, maintenance and care of test equipment encompassing:

- Safety characteristics of electrical testing devices
- Chemical cleaning solvents, glues and joining wastes used in electronics
- Safe use of electrical testing device
- Checks and storage methods for maintaining the safety of testing devices

E2.20 Sustainable energy and environment

E2.20.1 Sustainable energy principles

Evidence shall show an understanding of sustainable energy principles to an extent indicated by the following aspects:

a) Notions of sustainable energy

b) Sustainable energy work practices

E2.20.2 Environmental and building regulation

Evidence shall show an understanding of environmental and building regulation effecting electrotechnology work to an extent indicated by the following aspects:

a) Types of heritage listings

b) Purpose and principles of regulations related maintaining heritage sites

c) Responsibilities of those working in and around heritage sites

d) Scope of environmental protection and related regulations

e) Purpose and principles of regulations related to environmental protection

f) Responsibilities of those working in and around environmentally protected sites

g) The protocols for working in and around protected environments and heritage sites.

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2.2.20 Essential Knowledge and Associated Skills to Unit Maps

Essential Knowledge and Associated Skills to Unit Maps

The following tables have been developed in support of the Electricity Supply Industry Transmission, Distribution and Rail Sector Training Package and consists of two mappings of the Essential Knowledge and Associated Skills:

- Competency Standard Units to Essential Knowledge and Associated Skills Relationship
- Essential Knowledge and Associated Skills to Competency Standard Units Relationship

2.2.21 Unit to Essential Knowledge and Associated Skills Relationship

Unit to Essential Knowledge and Associated Skills Relationship

2.2.22 CJ - Cable Jointing Units

CJ – Cable Jointing Units

Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
UETTDRCJ01B Lay electrical cables	T2.1.9 Stores procedures
	T2.2.1 Generation power systems
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.3 Substations, power transformers and reactors fundamentals
	T2.2.12 Underground cable installation
	T2.2.23 Underground cable construction
UETTDRCJ02B Install and maintain de-energised LV underground paper insulated cables	E2.8.2.2 Alternating current principles - power
	E2.8.5 Magnetism
	E2.8.6 Electromagnetic principles
	T2.2.19 LV Paper lead cable jointing principles

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.2.24 Aluminium and lead sheathed cable - jointing procedures
	T2.3.1 Powerline safety practices
UETTDRCJ03B Install and maintain de-energised HV underground paper insulated cables	E2.8.2.2 Alternating current principles - power
	E2.8.5 Magnetism
	E2.8.6 Electromagnetic principles
	T2.2.20 HV Paper lead cable jointing principles
	T2.2.24 Aluminium and lead sheathed cable - jointing procedures
	T2.3.1 Powerline safety practices
UETTDRCJ04B Joint and maintain energised LV underground paper insulated cables	T2.2.13 Low voltage - energised working practices for substations
	T2.3.1 Powerline safety practices
UETTDRCJ05B Perform straight through HV paper insulated to polymeric transition joints	T2.2.18 HV polymeric underground cable jointing principles
	T2.2.20 HV paper lead cable jointing principles
	T2.2.24 Aluminium and lead sheathed cable - jointing procedures
UETTDRCJ06B Install and maintain de-energised LV underground polymeric cables	E2.8.2.2 Alternating current principles - power
	E2.8.5 Magnetism
	E2.8.6 Electromagnetic principles
	T2.2.12 Underground cable installation
	T2.2.16 Fundamentals of jointing LV polymeric cables
	T2.2.17 LV polymeric cable jointing principles
	T2.3.1 Powerline safety practices
UETTDRCJ07B Install and	T2.2.18 HV polymeric underground cable

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
maintain de-energised HV underground polymeric cables	jointing principles
UETTDRCJ08B Joint and maintain energised LV underground polymeric cables	T2.2.13 Low voltage - energised working practices for substations
	T2.3.1 Powerline safety practices
UETTDRCJ09B Install oil and gas filled specialised underground cables	T2.2.12 Underground cable installation
	T2.2.23 Underground cable construction
	T2.2.40 Jointing and terminating oil and gas filled specialised cable
	T2.2.43 Installing oil and gas filled specialised underground cables
	T2.2.47 Oil and gas filled specialised underground cable principles
	T2.8.1 Enterprises specific - policies and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
	T2.8.3 Enterprises specific - technical drawing and documents
UETTDRCJ10B Maintain oil and gas filled specialised underground cables	T2.2.45 Maintaining oil and gas filled specialised underground cables
UETTDRCJ11B Install and maintain polymeric specialised underground cables	T2.2.12 Underground cable installation
	T2.2.23 Underground cable construction
	T2.2.41 Polymeric specialised underground cables principles
	T2.2.42 Jointing and terminating specialised polymeric underground cables
	T2.2.44 Installing and maintaining specialised polymeric underground cables
	T2.8.1 Enterprises specific - policies and

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
	T2.8.3 Enterprises specific - technical drawing and documents
UETTDRCJ12B Install and maintain oil & gas pressure systems for specialised underground cables	T2.2.12 Underground cable installation
	T2.2.23 Underground cable construction
	T2.2.40 Jointing and terminating oil & gas filled specialised cable
	T2.2.43 Installing oil & gas filled specialised underground cables
	T2.2.45 Maintaining oil & gas filled specialised underground cables
	T2.2.46 Install & maintain oil & gas pressurised systems
	T2.2.47 Oil & gas filled specialised underground cable principles
	T2.8.1 Enterprises specific - policies and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
	T2.8.3 Enterprises specific - technical drawing and documents
UETTDRCJ13B Install and maintain network infrastructure LV underground cables	E2.8.2.2 Alternating current principles - power
	E2.8.5 Magnetism
	E2.8.6 Electromagnetic principles
	T2.1.9 Stores procedures
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.3 Substations, power transformers and

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	reactors fundamentals
	T2.2.12 Underground cable installation
	T2.2.16 Fundamentals of jointing LV polymeric cables
	T2.2.17 LV polymeric cable jointing principles
	T2.2.23 Underground cable construction
	T2.3.1 Powerline safety practices
UETTDRCJ14B Install and maintain network infrastructure HV underground cables	T2.2.12 Underground cable installation
	T2.2.18 HV polymeric underground cable jointing principles
	T2.2.23 Underground cable construction
	T2.3.1 Powerline safety practices

2.2.23 DP - Distribution Units

DP – Distribution Units

Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
UETTDRDP01B Inspect overhead structures and electrical apparatus (poles /structures)	T2.2.8 Poles and structures inspection principles
	T2.2.9 Powerline inspection principles
UETTDRDP02B Maintain overhead energised LV conductors and cables	T2.2.13 Low voltage - energised working practices for substations
	T2.3.1 Powerline safety practices
	T2.4.2 Low voltage switching principles
UETTDRDP03B Maintain energised high voltage distribution	T2.2.35 Live lines working up to 132kV with hotstick

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
overhead electrical apparatus (stick)	T2.2.53 HV principles
	T2.3.1 Powerline safety practices
	T2.4.3 High voltage switching principles
	T2.4.4 High voltage fault switching principles
	T2.4.5 High voltage distribution transformer principles
	T2.4.6 High voltage SWER system
	T2.4.7 Feeder automation system
	T2.8.1 Enterprises specific - polices and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
	T2.8.3 Enterprises specific - technical drawing and documents
UETTDRDP04B Maintain energised high voltage distribution overhead electrical apparatus (glove)	T2.2.37 Live line working up to 33kV with glove and barrier
	T2.2.38 Working on live lines to 33kV with glove and barrier/hotstick combined
	T2.2.39 Plant, equipment and tools used for HV live line work
	T2.2.53 HV principles
	T2.3.1 Powerline safety practices
	T2.4.3 High voltage switching principles
	T2.4.4 High voltage fault switching principles
	T2.4.5 High voltage distribution transformer principles
	T2.4.6 High voltage SWER system
	T2.4.7 Feeder automation system

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
UETTDRDP05B Inspect, maintain and restore energised LV overhead distribution network infrastructure	T2.2.8 Poles and structures inspection principles
	T2.2.9 Powerline inspection principles
	T2.2.13 Low voltage - energised working practices for substations
	T2.3.1 Powerline safety practices
	T2.4.1 Switching installation
	T2.4.2 Low voltage switching principles

DS – Design Units

Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
UETTDRDS01B Draft and layout an overhead distribution extension	T2.2.4 Powerline distribution installation
	T2.2.5 Powerline installation safety
	T2.2.6 Pole and hardware installation and maintenance
	T2.2.31 Distribution overhead line component fundamentals
	T2.8.4 Enterprise specific – switching diagrams
	T2.9.1 Interpretation of power distribution network drawings and documentation
	T2.9.2 Overhead distribution extension layout principles
	T2.9.3 Surveying techniques
	T2.9.4 Introduction to computer software (Powerline) and CAD

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
UETTDRDS02B Draft and layout an underground distribution extension	T2.2.4 Powerline distribution installation
	T2.2.5 Powerline installation safety
	T2.2.12 Underground cable installation
	T2.2.23 Underground cable construction
	T2.8.4 Enterprise specific – switching diagrams
	T2.9.1 Interpretation of power distribution network drawings and documentation
	T2.9.3 Surveying techniques
	T2.9.4 Introduction to computer software (Powerline) and CAD
	T2.9.6 Underground mains layout principles
UETTDRDS03B Draft and layout a street lighting system	T2.2.4 Powerline distribution installation
	T2.2.5 Powerline installation safety
	T2.2.6 Pole and hardware installation and maintenance
	T2.2.22 Installation and maintenance of public lighting and associated equipment
	T2.2.31 Distribution overhead line component Fundamentals
	T2.8.4 Enterprise specific – switching diagrams
	T2.9.1 Interpretation of power distribution network drawings and documentation
	T2.9.2 Overhead distribution extension layout principles
	T2.9.3 Surveying Techniques
	T2.9.4 Introduction to Computer Software (Powerline) and CAD

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.9.5 Principles of lighting design
	T2.9.8 Principles in drafting street lighting system
UETTDRDS04B Draft and layout a distribution substation minor upgrade	T2.2.4 Powerline distribution installation
	T2.2.5 Powerline installation safety
	T2.2.12 Underground cable installation
	T2.2.23 Underground cable construction
	T2.8.4 Enterprise specific – switching diagrams
	T2.9.1 Interpretation of power distribution network drawings and documentation
	T2.9.3 Surveying techniques
	T2.9.4 Introduction to computer software (Powerline) and CAD
	T2.9.6 Underground mains layout principles
	T2.9.7 Distribution substation minor upgrade layout principles
UETTDRDS05B Design overhead distribution systems	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.1.1 Engineering applications of mathematical principles
	T2.1.2 Engineering applications of mechanical principles
	T2.1.3 Engineering applications of material properties
	T2.2.2 Transmission, distribution and rail power

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	systems
	T2.2.4 Powerline distribution installation
	T2.2.6 Pole and hardware installation and maintenance
	T2.2.15 Metering installations
	T2.2.31 Distribution overhead line component fundamentals
	T2.3.1 Powerline safety practices
	T2.3.2 Powerline safety implementation and monitoring
	T2.3.3 Statutory and safety considerations
	T2.3.8 Safe design principles
	T2.4.6 High voltage SWER system
	T2.7.1 Environmental fundamentals
	T2.7.4 Powerline environmental impact - implementation and monitoring
	T2.9.1 Interpretation of power distribution network drawings and documentation
	T2.9.2 Overhead distribution extension layout principles
	T2.11.1 Power system layouts
	T2.11.4 AC transmission system components
	T2.11.5 AC transmission line electrical parameters
	T2.11.6 AC transmission line equivalent circuit calculations
	T2.11.42 Design distribution systems
	T2.11.44 Design characteristics of overhead and

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	underground conductors and cables, poles and structures
UETTDRDS06B Design underground distribution systems	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	E2.18.8.2 Occupational health and safety - enterprise responsibilities
	T2.1.1 Engineering applications of mathematical principles
	T2.1.2 Engineering applications of mechanical principles
	T2.1.3 Engineering applications of material properties
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.12 Underground cable installation
	T2.2.23 Underground cable construction
	T2.3.1 Powerline safety practices
	T2.3.2 Powerline safety - implementation and monitoring
	T2.3.3 Statutory and safety considerations
	T2.3.8 Safe design principles
	T2.7.1 Environmental fundamentals
	T2.7.4 Powerline environmental impact - implementation and monitoring
	T2.8.3 Enterprises specific - technical drawing and documents
	T2.9.6 Underground mains layout principles

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.11.1 Power system layouts
	T2.11.44 Design characteristics of overhead and underground conductors and cables, poles and structures
UETTDRDS07B Design distribution substations	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.1.1 Engineering applications of mathematical principles
	T2.1.2 Engineering applications of mechanical principles
	T2.1.3 Engineering applications of material properties
	T2.2.1 Generation power systems
	T2.2.3 Substations, power transformers and reactors
	T2.2.15 Metering installations
	T2.3.3 Statutory and safety considerations
	T2.3.8 Safe design principles
	T2.4.1 Switchgear installation
	T2.4.5 High voltage distribution transformer principles
	T2.4.7 Feeder automation system
	T2.7.1 Environmental fundamentals
	T2.9.7 Distribution substation minor upgrade layout principles

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.11.46 Distribution transformer fundamentals
	T2.11.47 Distribution transformers testing
	T2.11.51 Distribution earthing system
UETTDRDS08B Design public lighting systems	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.1.1 Engineering applications of mathematical principles
	T2.1.2 Engineering applications of mechanical principles
	T2.1.3 Engineering applications of material properties
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.22 Installation and maintenance of public lighting and associated equipment
	T2.3.3 Statutory and safety considerations
	T2.3.8 Safe design principles
	T2.7.1 Environmental fundamentals
	T2.9.5 Principles of lighting design
	T2.9.8 Principles in drafting street lighting system
UETTDRDS09B Prepare and manage detailed construction plans for electrical system infrastructure	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	E2.18.8.2 Occupational Health and Safety -

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	enterprise responsibilities
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.4 Powerline distribution installation
	T2.2.6 Pole and hardware installation and maintenance
	T2.2.23 Underground cable construction
	T2.3.1 Powerline safety practices
	T2.3.2 Powerline safety - implementation and monitoring
	T2.3.8 Safe design principles
	T2.4.6 High voltage SWER system
	T2.7.1 Environmental fundamentals
	T2.8.1 Enterprises specific - policy and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
	T2.8.3 Enterprises specific - technical drawing and documents
	T2.8.4 Enterprise specific - switching diagrams
	T2.9.1 Interpretation of power distribution network drawings and documentation
	T2.11.1 Power system layouts
	T2.11.2 Circuit breaker auxiliary systems
	T2.11.3 DC transmission system principles
	T2.11.4 AC transmission system components
	T2.11.5 AC transmission line electrical parameters

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.11.6 AC transmission line equivalent circuit calculations
	T2.11.8 Voltage control devices on interconnected transmission systems
	T2.11.9 Calculation of rating of voltage control devices
	T2.11.11 Control of transient over voltages
	T2.11.12 Corona and discharge losses
	T2.11.17 Protection scheme requirements
UETTDRDS10B Prepare and appraise financial impact statements	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.3.8 Safe design principles
	T2.8.18 Enterprise specific - write management reports
	T2.11.21 Financial impact statements
	T2.11.39 Project management
UETTDRDS11B Manage electrical infrastructure projects	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.2.4 Powerline distribution installation
	T2.2.5 Powerline installation safety
	T2.2.6 Pole and hardware installation and maintenance

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.2.7 Low voltage electrical service installation
	T2.2.21 Installation and maintenance on transmission lines and associated equipment
	T2.2.22 Installation and maintenance of public lighting and associated equipment
	T2.2.31 Distribution overhead line component fundamentals
	T2.2.38 Working on live lines up to 33kV with glove and barrier/Hotstick combined
	T2.3.8 Safe design principles
	T2.4.2 Low voltage switching principles
	T2.4.3 High voltage switching principles
	T2.4.4 High voltage fault switching principles
	T2.7.4 Powerline environmental impact - implementation and monitoring
	T2.9.1 Interpretation of power distribution network drawings and documentation
	T2.9.2 Overhead distribution extension layout principles
	T2.9.3 Surveying techniques
	T2.11.39 Project management
UETTDRDS12B Investigate quality of supply issues	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.3.8 Safe design principles
	T2.11.26 Test equipment A – fundamentals

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.11.30 Test equipment E – field
	T2.11.32 Quality of supply measures
UETTDRDS13B Develop HV and LV distribution protection systems	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.3.8 Safe design principles
	T2.4.1 Switchgear installation
	T2.10.28 Electrical equipment - distribution field device protection and control schemes - substations
	T2.11.14 Fault calculation techniques
	T2.11.18 Discrete protection systems
	T2.11.49 Polyphase circuit analysis and application (pre-requisite E2.8.9 Circuit analysis)
	T2.11.53 Protection schemes
UETTDRDS14B Design substation modifications	E2.8.11 Power engineering computation
	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.2.1 Generation power systems
	T2.2.2 Transmission, Distribution and Rail power systems
	T2.2.3 Substations, power transformers and reactors

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.2.13 Low voltage - energised working practices for substations
	T2.2.15 Metering installations
	T2.3.3 Statutory and safety considerations
	T2.3.4 Electrical equipment - protection and control schemes
	T2.3.8 Safe design principles
	T2.4.1 Switchgear installation
	T2.7.1 Environmental fundamentals
	T2.7.2 Material handling and the environment
	T2.10.11 Substation safety practices
	T2.10.15 High voltage insulation system principles - substations
	T2.11.67 Substation modification design principles
UETTDRDS15B Organise and implement line and easement surveys	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.3.8 Safe design principles
	T2.9.3 Surveying techniques
	T2.11.39 Project management
UETTDRDS16B Develop planned outage strategies	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	E2.18.8.2 Occupational health and safety -

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	enterprise responsibilities
	T2.2.49 Co-ordinating permit access authority procedures
	T2.3.8 Safe design principles
	T2.4.1 Switchgear installation
	T2.4.2 Low voltage switching principles
	T2.4.3 High voltage switching principles
	T2.4.11 High voltage overhead and substation switching principles
UETTDRDS17B Review asset management strategies	E2.18.1 Occupational health and safety principles
	E2.18.2 Electrical safe working practice
	E2.18.8.2 Occupational health and safety - enterprise responsibilities
	T2.3.8 Safe design principles
	T2.8.8 Enterprise specific - data management processes
	T2.8.17 Enterprise specific - effective management and communication
	T2.8.18 Enterprise specific - write management reports
	T2.9.1 Interpretation of power distribution network drawings and documentation
	T2.9.2 Overhead distribution extension layout principles
UETTDRDS18B Analyse and appraise fault and outage data	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	E2.18.8.2 Occupational health and safety -

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	enterprise responsibilities
	T2.2.53 HV principles
	T2.3.2 Powerline safety - implementation and monitoring
	T2.3.4 Electrical equipment - protection and control schemes
	T2.3.8 Safe design principles
	T2.4.1 Switchgear installation
	T2.4.2 Low voltage switching principles
	T2.4.3 High voltage switching principles
	T2.4.4 High voltage fault switching principles
	T2.4.5 High voltage distribution transformer principles
	T2.4.6 High voltage SWER system
	T2.4.7 Feeder automation system
	T2.11.61 Analysis network event records
UETTDRDS19B Establish and manage geographical information system data	E2.5.1.2 Drawings and diagrams
	E2.18.1 Occupational health and safety principles
	E2.18.2 Electrical safe working practice
	E2.18.8.2 Occupational health and safety - enterprise responsibilities
	T2.2.4 Powerline distribution installation
	T2.2.48 Electrical equipment - HV and LV powerline
	T2.3.8 Safe design principles
	T2.8.3 Enterprises specific - Technical drawing

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	and documents
	T2.8.4 Enterprise specific – switching diagrams
	T2.8.8 Enterprise specific - data management processes
	T2.11.23 Locate and rectify faults in electrical equipment
	T2.11.33 Geographic information systems principles
UETTDRDS20B Design customer substation	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	E2.18.8.2 Occupational health and safety - enterprise responsibilities
	T2.2.1 Generation power systems
	T2.2.3 Substations, power transformers and reactors
	T2.2.15 Metering installations
	T2.3.8 Safe design principles
	T2.4.1 Switchgear installation
	T2.4.5 High voltage distribution transformer principles
	T2.4.7 Feeder automation system
	T2.9.7 Distribution substation minor upgrade layout principles
	T2.11.46 Distribution transformer fundamentals
	T2.11.47 Distribution transformers testing
UETTDRDS21B Manage transmission, sub-transmission and	E2.18.1 Occupational Health and Safety principles

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
zone substation design process	E2.18.2 Electrical safe working practice
	E2.18.9 Electronic safe working practices
	T2.3.8 Safe design principles
	T2.8.1 Enterprise specific - Policies and procedures instructions
	T2.8.2 Enterprise specific - OHS instructions
	T2.8.7 Enterprise specific - equipment installation procedures
	T2.8.8 Enterprise specific - data management processes
	T2.8.14 Enterprise specific - procedures and work practices relating to critical events
	T2.8.17 Enterprise specific - effective management and communication
	T2.8.18 Enterprise specific - write management reports
	T2.8.19 Enterprise specific - procedures and work practices relating to managing critical events
	T2.10.1 Visual inspection procedures - substations
	T2.10.7 Substation tools and equipment
	T2.11.37 Negotiation techniques
	T2.11.62 Preparing policies and procedures
	T2.11.68 Management of Transmission, Sub-transmission and Zone Substation design process principles
UETTDRDS22B Design transmission, sub-transmission and	E2.8.9.2 Electronic power circuit analysis
	E2.18.1 Occupational Health and Safety

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
zone substation buildings	principles
	E2.18.2 Electrical safe working practice
	T2.1.2 Engineering applications of mechanical principles
	T2.3.8 Safe design principles
	T2.9.5 Principles of lighting design
	T2.9.6 Underground mains layout principles
	T2.11.69 Transmission, sub – transmission and zone Substation building design process - principles
UETTDRDS23B Design transmission, sub-transmission and zone substation primary plant	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.1.3 Engineering applications of material properties
	T2.3.8 Safe design principles
	T2.10.16 Power transformer reactor principles - substations
	T2.10.17 Static reactive plant principles - substations
	T2.10.18 On load tapchanger principles - substations
	T2.10.19 Substation switching practices
	T2.10.21 Circuit breaker construction principles - substations
	T2.10.24 Rotating reactive plant principles - substations
	T2.11.1 Power system layouts
	T2.11.8 Voltage control devices on

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	interconnected transmission systems
	T2.11.11 Control of transient overvoltages
	T2.11.16 Commissioning procedures
	T2.11.22 Instrument transformers
	T2.11.24 Metering devices and principles
	T2.11.25 Communication devices and principles
	T2.11.31 Primary plant testing
	T2.11.40 Harmonics
	T2.11.44 Design characteristics of overhead and underground conductors and cables, poles and structures
	T2.11.48 Power test equipment
	T2.11.70 Transmission, sub – transmission and zone Substation primary plant design process - principles
UETTDRDS24B Design transmission, sub-transmission and zone substation protection and control systems	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.3.8 Safe design principles
	T2.4.7 Feeder automation system
	T2.10.3 Commissioning of discrete protection devices - Substations
	T2.10.12 Substation LV supply design principles
	T2.10.13 Substation control systems design principles
	T2.10.25 Commissioning of distribution protection and control systems - substations
	T2.10.26 Voltage regulation scheme principles -

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	Substations
	T2.10.27 Use of test equipment on a discrete protection scheme - Substations
	T2.10.28 Electrical equipment - distribution field device protection and control schemes - substations
	T2.11.2 Circuit breaker auxiliary systems
	T2.11.17 Protection scheme requirements
	T2.11.18 Discrete protection systems
	T2.11.19 Interdependent protection systems
	T2.11.20 Complex protection systems
	T2.11.26 Test Equipment A – fundamental
	T2.11.27 Test Equipment B – protection
	T2.11.29 Test Equipment D – control
	T2.11.53 Protection schemes
	T2.11.71 Transmission, sub – transmission and zone Substation control and protection design process - principles
UETTDRDS25B Design transmission, sub-transmission and zone substation earthing	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.3.8 Safe design principles
	T2.11.51 Distribution earthing system
	T2.11.72 Transmission, sub – transmission and zone Substation earthing design process - principles
UETTDRDS26B Design transmission, sub-transmission and	E2.18.1 Occupational Health and Safety principles

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
zone substation — civil and structural components	E2.18.2 Electrical safe working practice
	T2.3.8 Safe design principles
	T2.11.73 Transmission, sub – transmission and zone Substation civil and structural design process - principles
UETTDRDS27B Design overhead transmission systems	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.1 Generation power systems
	T2.2.2 Transmission, Distribution and Rail power systems
	T2.2.10 Transmission structures and hardware
	T2.2.11 Routine maintenance on transmission structures
	T2.2.21 Installation and maintenance on transmission lines and associated equipment
	T2.2.28 Towers and structures inspection principles
	T2.2.29 Transmission powerline inspection principles
	T2.2.39 Plant, equipment and tools used for HV live line work
	T2.3.8 Safe design principles
	T2.4.3 High voltage switching principles
	T2.4.6 High voltage SWER system
	T2.4.7 Feeder automation system
	T2.4.11 High voltage overhead and substation switching principles

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.8.1 Enterprise specific - Polices and procedure instructions
	T2.8.2 Enterprise specific - OHS instructions
	T2.11.4 AC transmission system components
	T2.11.5 AC transmission line electrical parameters
	T2.11.6 AC transmission lines equivalent circuit calculations
	T2.11.7 Basic design characteristics of transmission structures and associated equipment
	T2.11.8 Voltage control devices on interconnected transmission systems
	T2.11.12 Corona and discharge losses
	T2.11.40 Harmonics
	T2.11.65 HV system load calculation principles
	T2.11.66 EHV transmission system load calculation principles
UETTDRDS28B Design underground transmission systems	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.1 Generation power systems
	T2.2.2 Transmission, Distribution and Rail power systems
	T2.2.10 Transmission structures and hardware
	T2.2.11 Routine maintenance on transmission structures
	T2.2.21 Installation and maintenance on transmission lines and associated equipment

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.3.8 Safe design principles
	T2.4.3 High voltage switching principles
	T2.4.7 Feeder automation system
	T2.8.1 Enterprise specific - polices and procedure instructions
	T2.8.2 Enterprise specific - OHS instructions
	T2.9.6 Underground mains layout principles
	T2.11.1 Power system layouts
	T2.11.4 AC Transmission system components
	T2.11.5 AC Transmission line electrical parameters
	T2.11.6 AC Transmission lines equivalent circuit calculations
	T2.11.8 Voltage control devices on interconnected transmission systems
	T2.11.12 Corona and discharge losses
	T2.11.40 Harmonics
	T2.11.65 HV system load calculation principles
	T2.11.66 EHV transmission system load calculation principles

EL – Cross Discipline Units

Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
UETTDREL01B Apply	E2.18.1 Occupational Health and Safety

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
environmental and sustainable energy procedures	principles
	T2.7.1 Environmental Fundamentals
	T2.7.2 Material handling and the environment
	T2.7.3 Filtering and sampling oil and the environment
	T2.8.2 Enterprise specific - OHS instructions
UETTDREL02B Operate plant and equipment near live electrical conductors/apparatus	E2.8.1.1 Basic electrical principles
	E2.8.5 Magnetism
	E2.8.6 Electromagnetic principles
	E2.8.8 Electrotechnology science and materials
	E2.11.1 Hand tools
	E2.11.2.1 Power tools
	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.1.1 Engineering applications of mathematical principles
	T2.1.2 Engineering applications of mechanical principles
	T2.1.3 Engineering applications of material properties
	T2.1.5 Elevating work platform operational principles
	T2.1.6 Hydraulic and pneumatic portable equipment
	T2.1.7 Enterprise vehicles
	T2.1.8 Chain saw principles

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.2.1 Generation power systems
	T2.7.1 Environmental fundamentals
	T2.7.2 Material handling and the environment
	T2.8.1 Enterprise specific - policy and procedure instructions
	T2.8.2 Enterprise specific - OHS instructions
	T2.8.3 Enterprise specific - technical drawings and documents
UETTDREL03B Comply with environmental and incidental response procedures	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.3.1 Powerline safety practices
	T2.7.1 Environmental fundamentals
	T2.7.2 Material handling and the environment
	T2.8.1 Enterprise specific – policies and procedure instructions
	T2.8.2 Enterprise specific – OHS instructions
UETTDREL04B Working safely near live electrical apparatus as non electrical worker	E2.8.1.1 Basic electrical principles
	E2.18.1 Occupational Health and Safety principles
	T2.2.2 Transmission, distribution and rail power systems
	T2.5.3 Fundamentals for working safely near live electrical apparatus
UETTDREL05B Respond to technical enquiries and requests	E2.18.1 Occupational Health and Safety principles
	T2.1.3 Engineering applications of material properties

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.2.1. Generation power systems
	T2.2.2 Transmission, distribution and rail power systems
	T2.5.3 Fundamentals for working safely near live electrical apparatus
	T2.7.1 Environmental fundamentals
	T2.7.2 Material handling and the environment
	T2.8.1 Enterprise specific - policy and procedure instructions
	T2.8.2 Enterprise specific - OHS instructions
	T2.8.3 Enterprise specific - technical drawings and documents
	T2.8.10 Technical enquiries and requests

IS – Industry Specific Units

Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
UETTDRIS01B Install electrical equipment (network infrastructure)	E2.8.2.2 Alternating current principles - power
	E2.8.5 Magnetism
	E2.8.6 Electromagnetic principles
	T2.1.1 Engineering applications of mathematical principles
	T2.1.2 Engineering applications of mechanical principles
	T2.1.3 Engineering applications of material properties

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.1.4 Basic rigging techniques
	T2.1.9 Stores procedures
	T2.2.1 Generation power systems
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.3 Substations, power transformers and reactors
	T2.3.1 Powerline safety practices
	T2.4.1 Switchgear installation
UETTDRIS02B Maintain electrical equipment (network infrastructure)	T2.1.10 Filtering and sampling of insulating oil
	T2.7.3 Filtering and sampling oil and the environment
UETTDRIS03B Perform LV field switching operation to a given schedule	T2.4.1 Switchgear installation
	T2.4.2 Low voltage switching principles
	T2.4.9 System switching operations and authorisation procedures — LV
UETTDRIS04B Perform high voltage field switching operation to a given schedule	T2.4.3 High voltage switching principles
	T2.4.4 High voltage fault switching principles
	T2.4.5 High voltage distribution transformer principles
	T2.4.6 High voltage SWER system
	T2.4.7 Feeder automation system
	T2.4.8 System switching operations and authorisation procedures — HV
	T2.4.11 High voltage overhead and substation switching principles
UETTDRIS05B Perform substation	T2.4.1 Switchgear installation

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
switching operation to a given schedule	T2.4.2 Low voltage switching principles
	T2.4.3 High voltage switching principles
	T2.4.4 High voltage fault switching principles
	T2.4.5 High voltage distribution transformer principles
	T2.4.6 High voltage SWER system
	T2.4.7 Feeder automation system
	T2.4.11 High voltage overhead and substation switching principles
UETTDRIS06B Install and maintain network infrastructure electrical equipment	E2.8.2.2 Alternating current principles - power
	E2.8.6 Electromagnetic principles
	T2.1.1 Engineering applications of mathematical principles
	T2.1.2 Engineering applications of mechanical principles
	T2.1.3 Engineering applications of material properties
	T2.1.4 Basic rigging techniques
	T2.1.9 Stores procedures
	T2.1.10 Filtering and sampling of insulating oil
	T2.2.1 Generation power systems
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.3 Substations, power transformers and reactors
	T2.3.1 Powerline safety practices
	T2.4.1 Switchgear installation

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.7.3 Filtering and sampling oil and the environment
UETTDRIS07B Sample, test, filter and reinstate insulating oil	T2.1.10 Filtering and sampling of insulating oil
	T2.1.11 Testing of insulating oil
	T2.3.1 Powerline safety practices
	T2.7.2 Material handling and the environment
	T2.7.3 Filtering and sampling oil and the environment
	T2.7.6 Disposal procedures for insulating materials
	T2.8.1 Enterprises specific - policies and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
	T2.8.3 Enterprises specific - technical drawing and documents
	T2.8.6 Enterprise specific - specialised tools
	T2.10.11 Substation safety practices
UETTDRIS08B Develop HV switching schedule	T2.2.48 Electrical equipment - HV and LV powerline
	T2.4.3 High voltage switching principles
	T2.4.4 High voltage fault switching principles
	T2.4.5 High voltage distribution transformer principles
	T2.4.6 High voltage SWER system
	T2.4.7 Feeder automation system
	T2.4.8 System switching operations and authorisation procedures - HV
	T2.4.11 High voltage overhead and substation

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	switching principles
	T2.4.13 High voltage switching instruction preparation
	T2.8.1 Enterprises specific - polices and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
	T2.8.3 Enterprises specific - technical drawing and documents
	T2.8.4 Enterprise specific – switching diagrams
UETTDRIS09B Develop LV switching schedule	T2.2.48 Electrical equipment - HV and LV powerline
	T2.4.1 Switchgear installation
	T2.4.2 Low voltage switching principles
	T2.4.9 System switching operations and authorisation procedures - LV
	T2.4.12 Low voltage overhead and substation switching principles
	T2.4.14 Low voltage switching instruction preparation
	T2.8.1 Enterprises specific - polices and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
	T2.8.3 Enterprises specific - technical drawing and documents
UETTDRIS10B Coordinate permit procedures	T2.2.49 Co-ordinating permit access authority procedures
	T2.4.3 High voltage switching principles
	T2.4.4 High voltage fault switching principles
	T2.4.5 High voltage distribution transformer

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	principles
	T2.4.6 High voltage SWER system
	T2.4.7 Feeder automation system
	T2.4.8 System switching operations and authorisation procedures - HV
	T2.4.9 System switching operations and authorisation procedures - LV
	T2.4.11 High voltage overhead and substation switching principles
	T2.4.12 Low voltage overhead and substation switching principles
	T2.4.13 High voltage switching instruction preparation
	T2.4.14 Low voltage switching instruction preparation
	T2.8.1 Enterprises specific - polices and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
	T2.8.3 Enterprises specific - technical drawing and documents
	T2.8.4 Enterprise specific – switching diagrams
UETTDRIS11B Coordinate and direct switching schedules	T2.2.48 Electrical Equipment - HV and LV powerline
	T2.4.1 Switchgear installation
	T2.4.2 Low voltage switching principles
	T2.4.3 High voltage switching principles
	T2.4.4 High voltage fault switching principles
	T2.4.5 High voltage distribution transformer

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	principles
	T2.4.6 High voltage SWER system
	T2.4.7 Feeder automation system
	T2.4.8 System switching operations and authorisation procedures - HV
	T2.4.9 System switching operations and authorisation procedures – LV
	T2.4.10 Co-ordinating and directing switching instructions
	T2.4.11 High voltage overhead and substation switching principles
	T2.4.12 Low voltage overhead and substation switching principles
	T2.4.13 High voltage switching instruction preparation
	T2.4.14 Low voltage switching instruction preparation
	T2.8.1 Enterprises specific - polices and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
	T2.8.3 Enterprises specific - technical drawing and documents
	T2.8.4 Enterprise specific - switching diagrams
UETTDRIS12B Install and maintain poles/structures and associated hardware	E2.8.2.2 Alternating current principles - power
	E2.8.6 Electromagnetic principles
	T2.1.1 Engineering applications of mathematical principles
	T2.1.2 Engineering applications of mechanical principles

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.1.3 Engineering applications of material properties
	T2.1.4. Basic rigging techniques
	T2.1.9 Stores procedures
	T2.2.5 Powerline installation safety
	T2.2.6 Pole and hardware installation and maintenance
	T2.3.1 Powerline safety practices
UETTDRIS13B Install and maintain public lighting systems	T2.2.22 Installation and maintenance of public lighting and associated equipment
UETTDRIS14B Install and maintain overhead conductors and cables (poles and structures)	T2.2.4 Powerline distribution installation
	T2.2.5 Powerline installation safety
	T2.2.7 Low voltage electrical service installation
UETTDRIS15B Install and maintain low voltage services (underground)	T2.2.5 Powerline installation safety
	T2.2.55 Low voltage electrical underground service installation
UETTDRIS16B Install and maintain low voltage services (overhead)	T2.2.4 Powerline distribution installation
	T2.2.5 Powerline installation safety
	T2.2.54 Low voltage electrical overhead service installation
UETTDRIS17B Conduct visual checking and treatment of poles and structures	T2.2.8 Poles and structures inspection principles
	T2.2.9 Powerline inspection principles
UETTDRIS18B Locate faults in underground power cables	T2.2.12 Underground cable installation
	T2.2.14 Cable fault location principles
	T2.2.16 Fundamentals of jointing LV polymeric cable

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.2.17 LV polymeric cable jointing principles
	T2.2.18 HV polymeric underground cable jointing principles
	T2.2.19 LV paper lead cable jointing principles
	T2.2.20 HV paper lead cable jointing principles
	T2.2.23 Underground cable construction
	T2.2.24 Aluminium and lead sheathed cable - jointing procedures
UETTDRIS19B Conduct high potential testing of underground power cables	T2.2.12 Underground cable installation
	T2.2.14 Cable fault location principles
	T2.2.16 Fundamentals of jointing LV polymeric cable
	T2.2.17 LV polymeric cable jointing principles
	T2.2.18 HV polymeric underground cable jointing principles
	T2.2.19 LV Paper lead cable jointing principles
	T2.2.20 HV Paper lead cable jointing principles
	T2.2.23 Underground cable construction
	T2.2.24 Aluminium and lead sheathed cable - jointing procedures
	T2.4.2 Low voltage switching principles
UETTDRIS20B Install and replace energy meters and associated equipment	E2.1.1 Cable protection and support
	E2.1.2 Cable types and applications
	E2.1.3 Cables in buildings, structures and premises
	E2.1.4 Basic cable and conductor terminations

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	E2.1.5.1 Power cable and conductor terminations
	E2.1.6.1 Telecommunication cable and conductor terminations
	E2.1.8 Electronic cable and conductor terminations
	T2.2.15 Metering Installations
	T2.3.1 Powerline safety practices
UETTDRIS21B Install mobile generation set for synchronised genset LV	T2.2.25 Operation principles of a portable generator
	T2.2.26 Installation of a mobile generator - LV
	T2.2.27 Generator control systems -LV
	T2.3.1 Powerline safety practices
	T2.4.2 Low voltage switching principles
UETTDRIS22B Implement and monitor the organisational OHS policies, procedures and programs	T2.2.5 Powerline installation safety
	T2.3.1 Powerline safety practices
	T2.3.2 Powerline safety - implementation and monitoring
	T2.8.1 Enterprise specific - policies and procedure instructions
	T2.8.2 Enterprise specific - OHS instructions
	T2.8.3 Enterprise specific - technical drawings and documents
UETTDRIS23B Implement and monitor environmental and sustainable energy management policies and procedures	T2.7.1 Environmental fundamentals
	T2.7.4 Powerline environmental impact - implementation and monitoring
	T2.7.5 Powerline sustainable energy management – implementation and monitoring
	T2.8.1 Enterprise specific - policies and

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	procedure instructions
	T2.8.2 Enterprise specific - OHS instructions
	T2.8.3 Enterprise specific - technical drawings and documents
	T2.8.5 Enterprise specific - sustainable energy principles
UETTDRIS24B Install mobile generation set for synchronised genset HV	T2.2.33 Installation of a mobile generator – HV
	T2.2.34 Generator control systems - HV
	T2.3.1 Powerline safety practices
UETTDRIS25B Contribute to coordinated high voltage live line work	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.3.1 Powerline safety practices
	T2.3.3 Statutory and safety considerations
	T2.5.3 Fundamentals for working safely near live electrical apparatus
	T2.8.1 Enterprise Specific - policy and procedures instructions
	T2.8.2 Enterprise Specific - OHS Instructions
	T2.8.6 Enterprise specific - specialised tools
	T2.8.9 Enterprise Specific - team work high voltage live line
UETTDRIS26B Manage an electrical supply industry OHS management system	T2.2.5 Powerline installation safety
	T2.3.1 Powerline safety practices
	T2.3.2 Powerline safety - implementation and monitoring
	T2.8.1 Enterprise specific - policies and procedure instructions

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.8.2 Enterprise specific - OHS instructions
UETTDRIS27B Install and maintain overhead distribution network infrastructure	E2.8.2.2 Alternating current principles - power
	E2.8.6 Electromagnetic principles
	T2.1.1 Engineering applications of mathematical principles
	T2.1.2 Engineering applications of mechanical principles
	T2.1.3 Engineering applications of material properties
	T2.1.4 Basic rigging techniques
	T2.1.9. Stores procedures
	T2.2.1 Generation power systems
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.3 Substations, power transformers and reactors
	T2.2.4 Powerline distribution installation
	T2.2.5 Powerline installation safety
	T2.2.6 Pole and hardware installation and maintenance
	T2.2.7 Low voltage electrical service installation
	T2.3.1 Powerline safety practices
UETTDRIS28A Analyse and develop solutions for problems in extra - low voltage, single path circuits	E2.8.12 Fundamental electrical principles
	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
UETTDRIS29A Analyse and	E2.8.2.1 Direct current circuit principles

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
develop solutions for problems in multiple d.c. circuits	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
UETTDRIS30A Analyse and develop solutions for problems in electromagnetic circuits	E2.8.6 Electromagnetic principles
	E2.11.1 Hand tools
	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
UETTDRIS31A Analyse and develop solutions for problems in single and three phase low voltage circuits	E2.8.2.2 Alternating current principles - power
	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice

RT – Rail Traction Units

Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
UETTDRRT01B Install overhead traction wiring systems	T2.6.1 Electrical traction principles
	T2.6.2 Electrical traction protection requirements
	T2.6.3 Electrical overhead traction wiring systems
UETTDRRT02B Maintain overhead traction wiring systems	T2.6.1 Electrical traction principles
	T2.6.2 Electrical traction protection requirements
	T2.6.3 Electrical overhead traction wiring systems
UETTDRRT03B Install traction	T2.6.4 Traction bonding

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
bonds	
UETTDRRT04B Maintain traction bonds	T2.6.4 Traction bonding
UETTDRRT05B Install overhead traction configurations	T2.6.5 Electrical traction configurations
UETTDRRT06B Maintain overhead traction configurations	T2.6.5 Electrical traction configurations
UETTDRRT07B Install overhead traction equipment and components	T2.6.1 Electrical traction principles
	T2.6.2 Electrical traction protection requirements
	T2.6.7 Overhead traction equipment and components
UETTDRRT08B Maintain overhead traction equipment and components	T2.6.1 Electrical traction principles
	T2.6.2 Electrical traction protection requirements
	T2.6.7 Overhead traction equipment and components
UETTDRRT09B Operate road rail traction height access equipment	T2.6.6 Road rail traction height access equipment
UETTDRRT10B Perform rail traction switching operations to a given schedule	T2.2.4 Powerline distribution installation
	T2.2.5 Powerline installation safety
	T2.4.1 Switchgear installation
	T2.4.2 Low voltage switching principles
UETTDRRT11B Maintain energised direct current traction overhead wiring systems	T2.1.4. Basic rigging techniques
	T2.2.4 Powerline distribution installation
	T2.2.5 Powerline installation safety
	T2.2.13 Low voltage - energised working practices for substations
	T2.3.1 Powerline safety practices

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.4.2 Low voltage switching principles
	T2.6.8 DC traction - energised working practices
	T2.8.1 Enterprises specific - policies and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
	T2.8.3 Enterprises specific - technical drawing and documents
UETTDRRT12B Maintain energised traction overhead electrical apparatus (stick)	T2.2.35 Live line working up to 132kV with Hotstick
	T2.2.39 Plant, equipment and tools used for HV live line work
	T2.2.53 HV principles
	T2.4.3 High voltage switching principles
	T2.4.4 High voltage fault switching principles
	T2.4.5 High voltage distribution transformer principles
	T2.4.6 High voltage SWER system
	T2.4.7 Feeder automation system
	T2.6.9 Traction live line work
UETTDRRT13B Maintain energised traction overhead electrical apparatus (glove)	T2.2.37 Live line working up to 33kV with glove and barrier
	T2.2.38 Working on live lines to 33kV with glove and barrier/Hotstick combined
	T2.2.39 Plant, equipment and tools used for HV live line work
	T2.2.53 HV principles
	T2.4.3 High voltage switching principles

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.4.4 High voltage fault switching principles
	T2.4.5 High voltage distribution transformer principles
	T2.4.6 High voltage SWER system
	T2.4.7 Feeder automation system
	T2.6.9 Traction live line work
UETTDRRT14B Install and maintain traction network wiring systems	T2.6.1 Electrical traction principles
	T2.6.2 Electrical traction protection requirements
	T2.6.3 Electrical overhead traction wiring systems
UETTDRRT15B Install and maintain traction network equipment and components	T2.6.1 Electrical traction principles
	T2.6.2 Electrical traction protection requirements
	T2.6.7 Overhead traction equipment and components

2.2.24 SB - Substation Units

SB – Substation Units

Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
UETTDRSB01B Diagnose and rectify faults in power system substation environment	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.13 Low voltage — energised working practices for substation
	T2.8.1 Enterprise specific - policy and procedures and Instructions

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.8.2 Enterprise specific - OHS instructions
	T2.8.3 Enterprise specific - technical drawing and documents
	T2.8.4 Enterprise specific - switching diagrams
	T2.8.6 Enterprise specific - specialised tools
	T2.8.7 Enterprise specific - equipment installation procedures
	T2.8.8 Enterprise specific - data management processes
	T2.10.7 Substation tools and equipment
	T2.10.8 Typical fault conditions and symptoms - substations
	T2.10.9 Analyse and interpret results and measurements – substations
	T2.10.10 Equipment components and materials – substations
	T2.10.11 Substation safety practices
	T2.10.12 Substation LV supply design principles
	T2.10.13 Substation control systems design principles
	T2.10.20 Low voltage substation switching principles
UETTDRSB02B Carry out substation inspection	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.8.1 Enterprise specific - policy and procedures instructions
	T2.8.2 Enterprise specific - OHS instructions

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.8.8 Enterprise specific - data management processes
	T2.10.7 Substation tools and equipment
	T2.10.8 Typical fault conditions and symptoms - substations
	T2.10.9 Analyse and interpret results and measurements - substations
	T2.10.10 Equipment components and materials - substations
	T2.10.11 Substation safety practices
UETTDRSB03B Install and maintain substation DC systems	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.13 Low Voltage - energised working practices for substations
	T2.8.1 Enterprise specific - policy and procedures and Instructions
	T2.8.2 Enterprise specific - OHS instructions
	T2.8.3 Enterprise specific - technical drawing and documents
	T2.8.4 Enterprise specific - switching diagrams
	T2.8.6 Enterprise specific - specialised tools
	T2.8.7 Enterprise specific - equipment installation procedures
	T2.8.8 Enterprise specific - data management processes
	T2.10.7 Substation tools and equipment
	T2.10.8 Typical fault conditions and symptoms - substations

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.10.10 Equipment components and materials - Substations
	T2.10.11 Substation safety practices
	T2.10.12 Substation LV supply design principles
	T2.10.13 Substation control systems design principles
	T2.10.19 Substation switching practices
UETTDRSB04B Maintain HV power system breakers	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical Safe working practice
	T2.2.13 Low voltage - energised working practices for substations
	T2.4.2 Low voltage switching principles
	T2.8.1 Enterprise specific - policy and procedures instructions
	T2.8.2 Enterprise specific - OHS instructions
	T2.8.3 Enterprise specific - technical drawing and documents
	T2.8.4Enterprise specific - switching diagram
	T2.8.6 Enterprise specific - specialised tools
	T2.8.7 Enterprise specific - equipment installation procedures
	T2.8.8 Enterprise specific - data management processes
	T2.10.7 Substation tools and equipment
	T2.10.8 Typical fault conditions and symptoms - substations
	T2.10.9 Analyse and interpret results and

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	measurements - substations
	T2.10.10 Equipment components and materials – substations
	T2.10.11 Substation safety practices
	T2.10.12 Substation LV supply design principles
	T2.10.13 Substation control systems design principles
	T2.10.14 Hydraulic and pneumatic operating mechanism principles – Substations
	T2.10.19 Substation switching practices
	T2.10.20 Low voltage substation switching principles
	T2.10.21 Circuit breaker construction principles - substations
	T2.10.22 Circuit breaker operating principles - substations
UETTDRSB05B Maintain HV power system transformers and instrument transformers	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.13 Low voltage - energised working practices for substations
	T2.4.2 Low voltage switching principles
	T2.8.1 Enterprise specific policy and procedures and instructions
	T2.8.2 Enterprise specific - OHS instruction
	T2.8.3 Enterprise specific - technical drawing and documents
	T2.8.4 Enterprise specific - switching diagrams

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.8.6 Enterprise specific - specialised tools
	T2.8.7 Enterprise Specific - equipment installation procedures
	T2.8.8 Enterprise Specific - data management processes
	T2.10.7 Substation tools and equipment
	T2.10.8 Typical fault conditions and symptoms - substations
	T2.10.9 Analyse and interpret results and measurements - substations
	T2.10.10 Equipment components and materials - substations
	T2.10.11 Substation safety practices
	T2.10.12 Substation LV supply design principles
	T2.10.13 Substation control systems design principles
	T2.10.15 High voltage insulation system principles - substations
	T2.10.16 Power transformers and reactor principles - substations
	T2.10.19 Substation switching practices
	T2.10.20 Low voltage substation switching principles
UETTDRSB06B Install high current DC switchgear and equipment	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.13 Low voltage - energised working practices for substations
	T2.8.1 Enterprise specific - policy and

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	procedures and Instructions
	T2.8.2 Enterprise specific - OHS instruction
	T2.8.3 Enterprise specific - technical drawing and documents
	T2.8.4 Enterprise specific - switching diagrams
	T2.8.6 Enterprise specific - specialised tools
	T2.8.7 Enterprise specific - equipment installation procedures
	T2.10.4 Substation DC circuit breaker principles
	T2.10.6 Substation DC circuit breaker installation
	T2.10.7 Substation tools and equipment
	T2.10.20 Low voltage substation switching principles
UETTDRSB07B Maintain high current DC switchgear and equipment	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.13 Low Voltage - energised working practices for substations
	T2.8.1 Enterprise specific - policy and procedures and instructions
	T2.8.2 Enterprise specific - OHS instruction
	T2.8.3 Enterprise specific - technical drawing and documents
	T2.8.4 Enterprise specific - switching diagrams
	T2.8.6 Enterprise specific - specialised tools
	T2.8.7Enterprise specific - equipment installation procedure

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.8.8 Enterprise specific — data management processes
	T2.10.4 Substation DC circuit breaker principles
	T2.10.5 Substation DC circuit breaker maintenance
	T2.10.6 Substation DC circuit breaker installation
	T2.10.7 Substation tools and equipment
UETTDRSB09B Maintain voltage regulating equipment - capacitor banks	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.13 Low voltage - energised working practices for substations
	T2.8.1 Enterprise specific - policy and procedures instructions
	T2.8.2 Enterprise specific - OHS instructions
	T2.8.3 Enterprise specific - technical drawing and documents
	T2.8.4 Enterprise specific - switching diagrams
	T2.8.6 Enterprise specific - specialised tools
	T2.8.7 Enterprise specific - equipment installation procedures
	T2.8.8 Enterprise specific - data management processes
	T2.10.7 Substation tools and equipment
	T2.10.8 Typical fault conditions and symptoms - substations
	T2.10.9 Analyse and interpret results and measurements - substations

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.10.10 Equipment components and materials - substations
	T2.10.11 Substation safety practices
	T2.10.17 Static reactive plant principles - substations
	T2.10.19 Substation switching practices
UETTDRSB10B Maintain HV power system static VAR compensators	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.13 Low voltage - energised working practices for substations
	T2.4.2 Low voltage switching principles
	T2.8.1 Enterprise specific - policy and procedures instructions
	T2.8.2 Enterprise specific - OHS instructions
	T2.8.3 Enterprise specific - technical drawing and documents
	T2.8.4 Enterprise specific - switching diagrams
	T2.8.6 Enterprise specific - specialised tools
	T2.8.7 Enterprise specific - equipment installation procedures
	T2.8.8 Enterprise specific - data management processes
	T2.10.7 Substation tools and equipment
	T2.10.8 Typical fault conditions and symptoms - substations
	T2.10.9 Analyse and interpret results and measurements - substations

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.10.10 Equipment components and materials - substations
	T2.10.11 Substation safety practices
	T2.10.13 Substation control systems design principles
	T2.10.15 High voltage insulation systems principles - substations
	T2.10.16 Power transformers and reactor principles - substations
	T2.10.17 Static reactive plant principles - substations
	T2.10.19 Substation switching practices
UETTDRSB11B Maintain HV power system synchronous condensers	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.13 Low voltage - energised working practices for substations
	T2.4.2 Low voltage switching principles
	T2.8.1 Enterprise specific - policy and procedures instructions
	T2.8.2 Enterprise specific - OHS instructions
	T2.8.3 Enterprise specific - technical drawing and documents
	T2.8.4 Enterprise specific - switching diagrams
	T2.8.6 Enterprise specific - specialised tools
	T2.8.7 Enterprise specific - equipment installation procedures
	T2.8.8 Enterprise specific - data management processes

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.10.7 Substation tools and equipment
	T2.10.8 Typical fault conditions and symptoms - substations
	T2.10.9 Analyse and interpret results and measurements - substations
	T2.10.10 Equipment components and materials - substations
	T2.10.11 Substation safety practices
	T2.10.13 Substation control systems design principles
	T2.10.19 Substation switching practices
	T2.10.24 Rotating reactive plant principles - substations
UETTDRSB12B Maintain voltage regulating equipment - on load tapchangers	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.13 Low voltage - energised working practices for substations
	T2.4.2 Low voltage switching principles
	T2.8.1 Enterprise specific - policy and procedures instructions
	T2.8.2 Enterprise specific - OHS instructions
	T2.8.3 Enterprise specific - technical drawing and documents
	T2.8.4 Enterprise specific - switching diagrams
	T2.8.6 Enterprise specific - specialised tools
	T2.8.7 Enterprise specific - equipment installation procedures

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.8.8 Enterprise specific - data management processes
	T2.10.7 Substation tools and equipment
	T2.10.8 Typical fault conditions and symptoms - substations
	T2.10.9 Analyse and interpret results and measurements - substations
	T2.10.10 Equipment components and materials - substations
	T2.10.11 Substation safety practices
	T2.10.13 Substation control systems design principles
	T2.10.16 Power transformers and reactor principles - substations
	T2.10.18 On load tap changer principles - substations
	T2.10.19 Substation switching practices
UETTDRSB13B Install HV plant and equipment	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.13 Low voltage - energised working practices for substations
	T2.4.2 Low voltage switching principles
	T2.8.1 Enterprise specific - policy and procedures instructions
	T2.8.2 Enterprise specific - OHS instruction
	T2.8.3 Enterprise specific - technical drawing and documents
	T2.8.4 Enterprise specific - switching diagrams

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.8.6 Enterprise specific - specialised tools
	T2.8.7 Enterprise specific - equipment installation procedures
	T2.8.8 Enterprise specific - data management processes
	T2.10.7 Substation tools and equipment
	T2.10.8 Typical fault conditions and symptoms - substations
	T2.10.9 Analyse and interpret results and measurements - substation
	T2.10.10 Equipment components and materials - substations
	T2.10.11 Substation safety practices
	T2.10.12 Substation LV supply design principles
	T2.10.13 Substation control systems design principles
	T2.10.14 Hydraulic and pneumatic operating mechanism principles - substations
	T2.10.16 Power transformers and reactor principles - substations
	T2.10.19 Substation switching practices
	T2.10.21 Circuit breaker construction principles - substations
	T2.10.22 Circuit breaker operating principles - substations
UETTDRSB14B Carry out thermovision surveys	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.8.1 Enterprise specific - policy and

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	procedures instructions
	T2.8.2 Enterprise specific - OHS instructions
	T2.8.3 Enterprise specific - technical drawing and documents
	T2.8.4 Enterprise specific - switching diagrams
	T2.8.6 Enterprise specific - specialised tools
	T2.8.7 Enterprise specific - equipment installation procedures
	T2.8.8 Enterprise specific - data management processes
	T2.10.7 Substation tools and equipment
	T2.10.8 Typical fault conditions and symptoms - substations
	T2.10.9 Analyse and interpret results and measurements - substations
	T2.10.10 Equipment components and materials - substations
	T2.10.11 Substation safety practices
	T2.10.15 High voltage insulation systems principles - substations
	T2.10.16 Power transformers and reactor principles - substations
	T2.10.19 Substation switching practices
	T2.10.21 Circuit breaker construction principles - substations
	T2.10.22 Circuit breaker operating principles - substations
	T2.10.23 Infrared imaging principles - substations

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
UETTDRSB15B Maintain discrete protection and control systems	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.3.3 Statutory and safety considerations
	T2.3.4 Electrical equipment - protection and control schemes
	T2.3.5 Discrete protection schemes - isolation and tagging procedures
	T2.3.6 Protection devices – maintenance and commissioning principles
	T2.3.7 Protection devices -manufacturers requirements
	T2.7.6 Disposal procedures for insulating materials
	T2.10.1 Visual inspection procedures -substations
	T2.10.2 Surge relay operation and maintenance - substations
	T2.10.9 Analyse and interpret results and measurements - substations
	T2.10.26 Voltage regulation scheme principles - substations
	T2.10.27 Use of test equipment on a discrete protection scheme - substations
	T2.11.74 Discrete protection devices
UETTDRSB16B Commission discrete protection and control systems	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.3.3 Statutory and safety considerations

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.3.4 Electrical equipment - protection and control schemes
	T2.3.5 Discrete protection schemes - Isolation and tagging procedures
	T2.3.6 Protection devices - maintenance and commission principles
	T2.3.7 Protection devices - manufacturers requirements
	T2.7.6 Disposal procedures for insulating materials
	T2.10.1 Visual inspection procedures -substations
	T2.10.2 Surge relay operation and maintenance - substations
	T2.10.3 Commissioning of discrete protection devices - substations
	T2.10.9 Analyse and interpret results and measurements - substations
	T2.10.26 Voltage regulation scheme principles - substations
	T2.10.27 Use of test equipment on a discrete protection scheme - substations
	T2.11.74 Discrete protection devices
UETTDRSB17B Maintain distribution field devices	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.3.3 Statutory and safety considerations
	T2.3.4 Electrical equipment - protection and control schemes
	T2.3.5 Discrete protection schemes - isolation

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	and tagging procedures
	T2.3.6 Protection devices - maintenance and commission principles
	T2.3.7 Protection devices - manufacturers requirements
	T2.7.6 Disposal procedures for insulating materials
	T2.10.1 Visual inspection procedures - substations
	T2.10.2 Surge relay operation and maintenance - substations
	T2.10.9 Analyse and interpret results and measurements - substations
	T2.10.26 Voltage regulation scheme principles - substations
	T2.10.27 Use of test equipment on a discrete protection scheme - substations
UETTDRSB18B Commission distribution field devices	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.3.3 Statutory and safety considerations
	T2.3.4 Electrical equipment - protection and control schemes
	T2.3.5 Discrete protection schemes - isolation and tagging procedures
	T2.3.6 Protection devices - maintenance and commission principles
	T2.3.7 Protection devices - manufacturers requirements
	T2.7.6 Disposal procedures for insulating

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	materials
	T2.10.1 Visual inspection procedures -substations
	T2.10.2 Surge relay operation and maintenance - substations
	T2.10.9 Analyse and interpret results and measurements - substations
	T2.10.25 Commissioning of distribution protection and control systems - substations
	T2.10.26 Voltage regulation scheme principles - substations
	T2.10.27 Use of test equipment on a discrete protection scheme - substations

2.2.25 SO - System Operations Units

SO – System Operations Units

Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
UETTDRSO02B Manage network faults	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.8.13 Enterprise specific — procedures and work practices relating to fault restorations
	T2.11.56 Analysis protection targeting
UETTDRSO03B Manage critical events	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.8.14 Enterprise specific — procedures and work practices relating to critical events
UETTDRSO04B Control generating plant	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.8.15 Enterprise specific — procedures and work practices relating to generating plant
	T2.11.8 Voltage control devices on interconnected transmission systems
	T2.11.10 Control of power flow in interconnected transmission systems
	T2.11.13 AC generators
	T2.11.57 Analysis control and protection information
	T2.11.63 Prime mover principles
UETTDRSO05B Manage HV distribution and sub transmission network demand	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.8.16 Enterprise specific — procedures and work practices relating to managing network demand
	T2.8.17 Enterprise specific - effective management and communication
	T2.8.18 Enterprise specific - write management reports
UETTDRSO06B Develop LV distribution switching programs	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.1 Generation power systems

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.3 Substations, power transformers and reactors
	T2.2.27 Generator control systems — LV
	T2.2.31 Distribution overhead line component fundamentals
	T2.2.37 Live line work up to 33KV with glove and barrier
	T2.2.38 Working on live lines up to 33kV with glove and barrier/Hotstick Combined
	T2.2.39 Plant, equipment and tools used for HV live line work
	T2.2.48 Electrical Equipment — HV and LV powerline
	T2.2.49 Coordinating permit access authority procedures
	T2.3.1 Powerline safety practices
	T2.3.3 Statutory and safety considerations
	T3.3.5 Discrete protection schemes — isolation and tagging procedures
	T2.4.1 Switchgear installation
	T2.4.2 Low voltage switching principles
	T2.4.9 Systems switching operations and authorisation procedures — LV
	T2.4.12 Low voltage overhead and substation switching principles
	T2.4.14 Low voltage switching instruction preparation

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.5.1 Ecological principles for vegetation control
	T2.5.2 Vegetation control techniques
	T2.8.1 Enterprises specific — polices and procedure instructions
	T2.8.2 Enterprises specific — OHS instructions
	T2.8.3 Enterprises specific — technical drawing and documents
	T2.8.4 Enterprises specific – switching diagrams
	T2.9.1 Interpretation of power distribution network drawings and documentation
	T2.10.11 Substation safety practices
	T2.11.14 Fault calculation techniques
	T2.11.15 Visual inspection procedures
	T2.11.16 Commissioning procedures
	T2.11.18 Discrete protection systems
	T2.11.19 Interdependent protection systems
	T2.11.20 Complex protection systems
	T2.11.40 Harmonics
	T2.11.58 Distribution UG line component fundamentals
	T2.11.64 LV System load calculation principles
UETTDRSO07B Develop HV distribution and sub transmission switching programs	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.1 Generation power systems
	T2.2.2 Transmission, distribution and rail power

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	systems
	T2.2.3 Substations, power transformers and reactors
	T2.2.31 Distribution overhead line component fundamentals
	T2.2.34 Generator control systems — HV
	T2.2.35 Live line working up to 132KV with Hotstick
	T2.2.37 Live line working up to 33kV with glove and barrier
	T2.2.38 Working on live lines up to 33kV with glove and barrier/Hotstick combined
	T2.2.39 Plant, equipment and tools used for HV live line work
	T2.2.48 Electrical equipment — HV and LV powerline
	T2.2.49 Coordinating permit access authority procedures
	T2.3.1 Powerline safety practices
	T2.3.3 Statutory and safety considerations
	T3.3.5 Discrete protection schemes — isolation and tagging procedures
	T2.4.1 Switchgear installation
	T2.4.3 High voltage switching principles
	T2.4.4 High voltage fault switching principles
	T2.4.5 High voltage distribution transformer principles
	T2.4.6 High voltage SWER system

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.4.7 Feeder automation system
	T2.4.8 System switching operations and authorisation procedures — HV
	T2.4.11 High voltage overhead and substation switching principles
	T2.4.13 High voltage switching instruction preparation
	T2.5.1 Ecological principles for vegetation control
	T2.5.2 Vegetation control techniques
	T2.8.1 Enterprises specific — polices and procedure instructions
	T2.8.2 Enterprises specific — OHS instructions
	T2.8.3 Enterprises specific — technical drawing and documents
	T2.9.1 Interpretation of power distribution network drawings and documentation
	T2.10.9 Analyse and interpret results and measurements — substations
	T2.10.11 Substation safety practices
	T2.10.15 High voltage insulation system principles — substations
	T2.10.19 Substation switching practices
	T2.11.11 Control of transient overvoltages
	T2.11.14 Fault calculation techniques
	T2.11.15 Visual inspection procedures
	T2.11.16 Commissioning procedures
	T2.11.18 Discrete protection systems

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.11.19 Interdependent protection systems
	T2.11.20 Complex protection systems
	T2.11.31 Primary plant testing
	T2.11.40 Harmonics
	T2.11.58 Distribution UG line component fundamentals
	T2.11.65 HV system load calculation principles
UETTDRSO08B Develop and evaluate transmission switching programs	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.1 Generation power systems
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.3 Substations, power transformers and reactors
	T2.2.35 Live line working up to 132kV with Hotstick
	T2.2.36 Live line work for voltages greater than 132kV and up to 500kV with Hotstick
	T2.2.39 Plant, equipment and tools used for HV live line work
	T2.2.48 Electrical Equipment — HV and LV Powerline
	T2.2.49 Coordinating permit process authority procedures
	T2.3.1 Powerline safety practices
	T2.3.3 Statutory and safety considerations
	T3.3.5 Discrete protection schemes — isolation

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	and tagging procedures
	T2.4.1 Switchgear installation
	T2.4.3 High voltage switching principles
	T2.4.8 System switching operations and authorisation procedures — HV
	T2.4.11 High voltage overhead and substation switching principles
	T2.4.13 High voltage switching instruction preparation
	T2.5.1 Ecological principles for vegetation control
	T2.5.2 Vegetation control techniques
	T2.8.1 Enterprises specific — polices and procedure instructions
	T2.8.2 Enterprises specific — OHS instructions
	T2.8.3 Enterprises specific — technical drawing and documents
	T2.9.1 Interpretation of power distribution network drawings documentation
	T2.10.9 Analyse and interpret results and measurements — substations
	T2.10.11 Substation safety practices
	T2.10.15 High voltage insulation system principles — substations
	T2.10.19 Substation switching practices
	T2.11.11 Control of transient overvoltages
	T2.11.14 Fault calculation techniques
	T2.11.15 Visual inspection procedures

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.11.16 Commissioning procedures
	T2.11.18 Discrete protection systems
	T2.11.19 Interdependent protection systems
	T2.11.20 Complex protection systems
	T2.11.31 Primary plant testing
	T2.11.40 Harmonics
	T2.11.59 Generator control systems — EHV
	T2.11.60 Transmission line component fundamentals
	T2.11.66 EHV transmission system load calculation principles
UETTDRSO09B Coordinate LV distribution networks	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.49 Coordinating permit access authority procedures
	T2.4.9 Systems switching operations and authorisation procedures — LV
	T2.4.10 Coordinating and directing switching instructions
	T2.4.12 Low voltage overhead and substation switching principles
	T2.4.14 Low voltage switching instruction preparation
UETTDRSO10B Coordinate HV distribution and sub transmission networks	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.49 Coordinating permit access authority

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	procedures
	T2.4.8 Systems switching operations and authorisation procedures — HV
	T2.4.10 Coordinating and directing switching instructions
	T2.4.11 High voltage overhead and substation switching principles
	T2.4.13 High voltage switching instruction preparation
UETTDRSO11B Manage transmission networks	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.49 Coordinating permit access authority procedures
	T2.4.8 Systems switching operations and authorisation procedures — HV
	T2.4.10 Coordinating and directing switching instructions
	T2.4.11 High voltage overhead and substation switching principles
	T2.4.13 High voltage switching instruction preparation
UETTDRSO12B Manage transmission network demand	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.8.16 Enterprise specific — procedures and work practices relating to managing network demand
	T2.8.17 Enterprise specific — effective management and communication
	T2.8.18 Enterprise specific — write management

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	reports
UETTDRSO13B Coordinate LV distribution network demand	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.8.16 Enterprise specific — procedures and work practices relating to managing network demand
	T2.8.17 Enterprise specific — effective management and communication
	T2.8.18 Enterprise specific — write management reports
UETTDRSO14B Develop crisis management plans	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.8.14 Enterprise specific — procedures and work practices relating to critical events
	T2.11.61 Analysis network event records
	T2.11.62 Preparing policies and procedures
UETTDRSO15A Operate and monitor system equipment (SCADA)	E2.3.13 Using supervisory control and data acquisition systems
	E2.4.14 Personal computer operating systems, basics
	E2.4.16 Personal computers, engineering applications software basic
	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.1 Generation power systems
	T2.2.2 Transmission, distribution and rail power

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	systems
	T2.2.3 Substations, power transformers and reactors
	T2.8.1 Enterprises specific — polices and procedure instructions
	T2.8.2 Enterprises specific — OHS instructions
	T2.8.3 Enterprises specific — technical drawing and documents
	T2.9.1 Interpretation of power distribution network drawings and documentation
	T2.10.9 Analyse and interpret results and measurements — substations
	T2.11.18 Discrete protection systems
	T2.11.19 Interdependent protection systems
UETTDRSO16A Monitor and Control the Activities of Field Staff	E2.4.14 Personal computer operator operating systems, basic
	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.3 Substations, power transformers and reactors
	T2.2.48 Electrical Equipment – HV and LV Powerline
	T2.2.49 Coordinating permit access authority procedures
	T2.3.2 Powerline safety — implementation and monitoring

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.3.3 Statutory and safety considerations
	T2.4.8 System switching operations and authorisation procedures — HV
	T2.4.9 System switching operations and authorisation procedures — LV
	T2.4.10 Co-ordinating and directing switching instructions
	T2.4.11 High voltage overhead and substation switching principles
	T2.4.12 Low voltage overhead and substation switching principles
	T2.8.1 Enterprise specific – polices and procedure instructions
	T2.8.2 Enterprise specific – OHS instruction
	T2.8.17 Enterprise specific – effective management and communication
	T2.11.16 Commissioning procedures
UETTDRSO17A Coordinate HV transmission networks	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.29 Transmission powerline inspection principles
	T2.2.30 Powerline transmission installation safety
	T2.2.53 HV principles
	T2.4.4 High voltage fault switching principles
	T2.4.10 Coordinating and directing switching instructions
	T2.11.1 Power system layouts

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.11.4 AC transmission system components
	T2.11.5 AC transmission line electrical parameters
	T2.11.6 AC transmission lines equivalent circuit calculations
	T2.11.7 Basic design characteristics of transmission structures and associated equipment
	T2.11.10 Control of power flow in interconnected transmission systems
UETTDRSO18A Respond to discrete/interdependent protection operations	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.3 Substations, power transformers and reactors
	T2.4.4 High voltage fault switching principles
	T2.11.18 Discrete protection systems
	T2.11.19 Interdependent protection systems
UETTDRSO19A Coordinate system operations in a regulated energy market	T2.2.1 Generation power systems
	T2.8.1 Enterprises specific — polices and procedure instructions
	T2.8.16 Enterprise specific — procedures and work practices relating to managing network demand
	T2.9.1 Interpretation of power distribution network drawings and documentation
UETTDRSO20A Respond to complex protection operations	E2.18.1 Occupational Health and Safety principles

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	E2.18.2 Electrical safe working practice
	T2.11.17 Protection scheme requirements
	T2.11.56 Analysis protection targeting
UETTDRSO21A Manage network power flows	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.8.16 Enterprise specific — procedures and work practices relating to managing network demand
	T2.11.8 Voltage control devices on interconnected transmission systems
	T2.11.10 Control of power flow in interconnected transmission systems
	T2.11.13 AC generators
	T2.11.59 Generator control systems - EHV

2.2.26 TP - Transmission Units

TP – Transmission Units

Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
UETTDRTP02B Establish and reinstate a transmission tower work site	E2.11.1 Hand tools
	E2.11.2.1 Power tools
	E2.18.1 Occupational Health and Safety principles
	T2.1.3 Engineering applications of material properties

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.1.7 Enterprise vehicles
	T2.1.8 Chain saw principles
	T2.7.1 Environments fundamentals
	T2.7.2 Material handling and the environment
	T2.8.1 Enterprise specific - policies and procedure instructions
	T2.8.2 Enterprise specific - OHS instructions
	T2.8.3 Enterprise specific - technical drawings and documents
UETTDRTP03B Erect transmission towers	E2.11.1 Hand tools
	E2.11.2.1 Power tools
	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	T2.1.3 Engineering applications of material properties
	T2.2.10 Transmission structures and hardware
	T2.8.3 Enterprise specific - technical drawings and documents
UETTDRTP04B Erect transmission tower hardware	
	E2.11.1 Hand tools
	E2.11.2.1 Power tools
	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.1.7 Enterprise vehicles

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.2.1 Generation power systems
	T2.2.2 Transmission, distribution and rail power systems
	T2.3.1 Powerline safety practices
	T2.8.1 Enterprises specific - policies and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
UETTDRTP05B Pre-tension stringing transmission overhead conductors and cables	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.2.32 Stringing transmission overhead conductors and cables
	T2.3.1 Powerline safety practices
	T2.8.1 Enterprises specific - policies and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
UETTDRTP06B Erect transmission towers and associated hardware	T2.1.4 Basic rigging techniques
	T2.1.9 Stores procedures
	T2.2.1 Generation power systems
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.3 Substations, power transformers and reactors
	T2.2.10 Transmission structures and hardware
	T2.3.1 Powerline safety practices
UETTDRTP07B Maintain transmission towers and associated	E2.8.2.2 Alternating current principles - power
	E2.8.5 Magnetism

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
hardware	E2.8.6 Electromagnetic principles
	T2.2.11 Routine maintenance on transmission structures
	T2.3.1 Powerline safety practices
UETTDRTP08B Transmission tower stub setting	T2.1.1 Engineering applications of mathematical principles
	T2.1.2 Engineering applications of mechanical principles
	T2.1.3 Engineering applications of material properties
	T2.1.5 Elevator work platform operational principles
	T2.1.6 Hydraulic and pneumatic portable equipment
	T2.1.7 Enterprise vehicles
	T2.1.8 Chain saw principles
	T2.1.9 Stores procedures
	T2.2.10 Transmission structures and hardware
	T2.3.1 Powerline safety practices
	T2.7.1 Environmental fundamentals
	T2.7.2 Material handling and the environment
	T2.11.43 Survey principles
UETTDRTP09B Install and maintain overhead conductors and cables (towers)	T2.2.11 Routine maintenance on transmission structures
	T2.2.21 Installation and maintenance on transmission lines and associated equipment
	T2.2.30 Powerline transmission installation safety

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
UETTDRTP10B Inspect overhead structures and electrical apparatus (towers)	T2.2.10 Transmission structures and hardware
	T2.2.28 Towers and structures inspection principles
	T2.2.29 Transmission powerline inspection principles
UETTDRTP11B Maintain energised lines (transmission) using live line stick technique	T2.1.4 Basic rigging techniques
	T2.2.21 Installation and maintenance on transmission lines and associated equipment
	T2.2.35 Live line working up to 132kV with Hotstick
	T2.2.36 Live line working for voltages greater than 132kV and up to 500kV with hotstick
	T2.2.39 Plant, equipment and tools used for HV line work
	T2.2.53 HV principles
	T2.3.1 Powerline safety practices
	T2.4.3 High voltage switching principles
	T2.4.4 High voltage fault switching principles
	T2.4.5 High voltage distribution transformer principles
	T2.4.6 High voltage SWER system
	T2.4.7 Feeder automation system
UETTDRTP12B Maintain energised lines (transmission) using Bare Hand technique	T2.2.35 Live line working up to 132kV with hotstick
	T2.2.50 Extra high voltage - Bare-Hand live-line principles
	T2.2.51 Extra high voltage - Bare-Hand live line procedures

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.2.53 HV principles
	T2.3.1 Powerline safety practices
UETTDRTP13B Maintain energised lines (transmission) using Bare Hand technique on a helicopter platform	T2.2.52 Extra high voltage bare-hand live-line using a helicopter
	T2.2.53 HV principles
	T2.3.1 Powerline safety practices
UETTDRTP14B Install and maintain overhead transmission network infrastructure	E2.8.2.2 Alternating current principles - power
	E2.8.6 Electromagnetic principles
	T2.1.1 Engineering applications of mathematical principles
	T2.1.2 Engineering applications of mechanical principles
	T2.1.3 Engineering applications of material properties
	T2.1.4 Basic rigging techniques
	T2.1.9 Stores procedures
	T2.2.1 Generation power systems
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.3 Substations, power transformers and reactors
	T2.2.6 Pole and hardware installation and maintenance
	T2.2.10 Transmission structures and hardware
	T2.2.11 Routine maintenance on transmission structures
	T2.2.21 Installation and maintenance on transmission lines and associated equipment

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.2.30 Powerline transmission installation safety
	T2.3.1 Powerline safety practices
UETTDRTP15B Install and maintain transmission network infrastructure electrical equipment	E2.8.2.2 Alternating current principles - power
	E2.8.6 Electromagnetic principles
	T2.2.11 Routine maintenance on transmission structures
	T2.2.28 Towers and structures inspection principles
	T2.2.29 Transmission powerline inspection principles
	T2.3.1 Powerline safety practices

2.2.27 TS - Protection/Testing Units

TS – Protection/Testing Units

Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
UETTDRTS01B Maintain network protection and control systems (interdependent)	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.3.3 Statutory and safety considerations
	T2.3.4 Electrical equipment - protection and control schemes
	T2.3.5 Discrete protection devices - isolation and tagging procedures

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.3.6 Protection devices - maintenance and commissioning principles
	T2.3.7 Protection devices - manufacturers requirements
	T2.7.6 Disposal procedures for insulating materials
	T2.10.1 Visual inspection procedures - substations
	T2.10.2 Surge relay operation and maintenance - substations
	T2.10.9 Analyse and interpret results and measurements - substations
	T2.10.23 Infrared imaging principles - substations
	T2.10.25 Commissioning of distribution protection and control systems - substations
	T2.10.26 Voltage regulation scheme principles - substation
	T2.10.27 Use of test equipment on discrete protection scheme - substations
	T2.10.28 Electrical equipment - distribution field device protection and control schemes - substations
	T2.11.2 Circuit breaker auxiliary systems
	T2.11.18 Discrete protection systems
	T2.11.19 Interdependent protection systems
	T2.11.23 Locate and rectify faults in electrical equipment
	T2.11.36 Disconnect and reconnect fixed wiring electrical equipment fundaments

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.11.38 Disconnect and reconnect fixed wiring electrical equipment principles
	T2.11.40 Harmonics
UETTDRTS02B Commission network protection and control systems (interdependent)	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.3.3 Statutory and safety considerations
	T2.3.4 Electrical equipment - protection and control schemes
	T2.3.5 Discrete protection schemes - isolation and tagging procedures
	T2.3.6 Protection devices - maintenance and commissioning principles
	T2.3.7 Protection devices - manufacturers requirements
	T2.7.6 Disposal procedures for insulating materials
	T2.10.1 Visual inspection procedures - substations
	T2.10.2 Surge relay operation and maintenance - substations
	T2.10.3 Commissioning of discrete protection devices - substations
	T2.10.9 Analyse and interpret results and measurements - substations
	T2.10.17 Static reactive plant principles - substations
	T2.10.27 Use of test equipment on discrete

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	protection scheme - substation
	T2.11.18 Discrete protection systems
	T2.11.19 Interdependent protection systems
UETTDRTS03B Conduct evaluation of power system faults within a substation	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.9.1 Interpretation of power distribution network drawings and documentation
	T2.10.9 Analyse and interpret results and measurements - substations
	T2.11.1 Power system layouts
	T2.11.14 Fault calculation techniques
	T2.11.17 Protection scheme requirements
	T2.11.18 Discrete protection systems
	T2.11.19 Interdependent protection systems
	T2.11.20 Complex protection systems
UETTDRTS04B Design testing and commissioning procedures for substation and field devices	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.3.1 Powerline safety practices
	T2.3.3 Statutory and safety considerations
	T2.3.4 Electrical equipment - protection and control schemes

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.3.5 Discrete protection devices isolation and tagging procedures
	T2.3.6 Protection devices - maintenance and commissioning principles
	T2.3.7 Protection devices - manufacturers requirements
	T2.10.1 Visual inspection procedures - substations
	T2.10.2 Surge relay operation and maintenance - substations
	T2.10.9 Analyse and interpret results and measurements - substations
	T2.10.11 Substation safety practices
	T2.10.15 High voltage insulation system principles - substations
	T2.10.16 Power transformer and reactor principles - substations
	T2.10.17 Static reactive plant principles - substations
	T2.10.18 On load tap changer principles - substations
	T2.10.26 Voltage regulation scheme principles - substations
	T2.10.27 Use of test equipment on discrete protection scheme - substations
	T2.11.8 Voltage control devices on interconnected transmission systems
	T2.11.11 Control of transient over voltages
	T2.11.15 Visual inspection procedures metering
	T2.11.16 Commissioning procedures

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.11.18 Discrete protection systems
	T2.11.19 Interdependent protection systems
	T2.11.24 Metering devices and principles
	T2.11.26 Test equipment A – fundamental
	T2.11.27 Test equipment B – protection
	T2.11.28 Test equipment C – metering
	T2.11.30 Test equipment E – field
	T2.11.41 Fault finding and diagnostic techniques
UETTDRTS05B Test and maintain metering schemes	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.3.3 Statutory and safety considerations
	T2.11.15 Visual inspection procedures
	T2.11.23 Locate and rectify faults in electrical equipment
	T2.11.24 Metering devices and principles
	T2.11.28 Test equipment C – metering
	T2.11.36 Disconnect and reconnect fixed wiring electrical equipment fundaments
	T2.11.38 Disconnect and reconnect fixed wiring electrical equipment principles
	T2.11.40 Harmonics
	T2.11.41 Fault finding and diagnostic techniques
UETTDRTS06B Commission	E2.18.1 Occupational Health and Safety

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
metering schemes	principles
	E2.18.2 Electrical safe working practices
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.2.15 Metering installations
	T2.3.3 Statutory and safety considerations
	T2.11.15 Visual inspection procedures
	T2.11.16 Commissioning procedures
	T2.11.24 Metering devices and principles
	T2.11.28 Test equipment C – metering
	T2.11.41 Fault finding and diagnostic techniques
UETTDRTS07B Perform accuracy checks on instrument transformers	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.2.1 Generation power systems
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.3 Substations, power transmission and reactors
	T2.2.49 Coordinating permit access authority procedures
	T2.3.3 Statutory and safety considerations
	T2.4.8 System switching operations and authorisation procedures - HV
	T2.4.9 System switching operations and authorisation procedures - LV

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.11.22 Instrument transformers
	T2.11.53 Protection schemes
	T2.11.59 Generator control systems - EHV
UETTDRTS08B Test, repair and calibrate protection relays and meters	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.2.1 Generation power systems
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.3 Substations, power transmission and reactors
	T2.2.34 Generator control systems - HV
	T2.2.48 Electrical equipment - HV and LV powerline
	T2.2.49 Coordinating permit access authority procedures
	T2.3.3 Statutory and safety considerations
	T2.4.8 System switching operations and authorisation procedures - HV
	T2.4.9 System switching operations and authorisation procedures - LV
	T2.11.23 Locate and rectify faults in electrical equipment
	T2.11.24 Metering devices and principles
	T2.11.26 Test equipment A – fundamental
	T2.11.27 Test equipment B – protection

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.11.53 Protection schemes
	T2.11.59 Generator control systems - EHV
UETTDRTS09B Develop secondary isolation instructional documents	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.2.1 Generation power systems
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.3 Substations, power transmission and reactors
	T2.2.34 Generator control systems - HV
	T2.2.48 Electrical equipment - HV and LV powerline
	T2.2.49 Coordinating permit access authority procedures
	T2.4.8 System switching operations and authorisation procedures - HV
	T2.4.9 System switching operations and authorisation procedures - LV
	T2.11.35 Secondary switching/isolation principles and sheet preparation
	T2.11.53 Protection schemes
	T2.11.59 Generator control systems - EHV
UETTDRTS10B Design secondary isolation instructional documents	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.11.35 Secondary switching/isolation principles and sheet preparation
UETTDRTS11B Maintain, test and commission voltage regulating equipment	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.2.1 Generation power systems
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.3 Substations, power transmission and reactors
	T2.2.49 Coordinating permit access authority procedures
	T2.3.1 Powerline safety practices
	T2.3.2 Powerline safety implementation and monitoring
	T2.3.3 Statutory and safety considerations
	T2.4.8 System switching operations and authorisation procedures - HV
	T2.4.9 System switching operations and authorisation procedures - LV
	T2.8.7 Enterprise specific – equipment installation procedures
	T2.10.16 Power transformer and reactor principles - substations
	T2.10.17 Static reactive plant principles - substations

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.10.18 On load tap changer principles - substations
	T2.10.21 Circuit breaker construction principles - substations
	T2.10.24 Rotating reactive plant principles - substations
	T2.10.26 Voltage regulation scheme principles - substations
	T2.10.28 Electrical equipment - Distribution field device protection and control schemes - substations
	T2.11.8 Voltage control devices on interconnected transmission. systems
	T2.11.9 Calculation of rating of voltage control devices
	T2.11.11 Control of transient overvoltages
	T2.11.16 Commissioning procedures
	T2.11.23 Locate and rectify faults in electrical equipment
	T2.11.36 Disconnect and reconnect fixed wiring electrical equipment fundaments
	T2.11.38 Disconnect and reconnect fixed wiring electrical equipment principles
	T2.11.40 Harmonics
	T2.11.41 Fault finding and diagnostic techniques
	T2.11.53 Protection schemes
	T2.11.59 Generator control systems - EHV
UETTDRTS12B Conduct evaluation of primary plant	E2.18.1 Occupational Health and Safety principles

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	E2.18.2 Electrical safe working practices
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.11.26 Test equipment A – fundamental
	T2.11.27 Test equipment B – protection
	T2.11.28 Test equipment C – metering
	T2.11.31 Primary plant testing
UETTDRTS13B Undertake project management of substation augmentation and maintenance	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	E2.18.8.2 Occupational Health and Safety - enterprise responsibilities
	T2.3.3 Statutory and safety considerations
	T2.11.21 Financial impact statements
	T2.11.37 Negotiation techniques
	T2.11.39 Project management
	T2.11.62 Preparing polices and procedures
UETTDRTS14B Install and maintain power system communication equipment	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	T2.2.1 Generation power systems
	T2.2.2 Transmission, distribution and rail power systems
	T2.2.3 Substations, power transmission and reactors
	T2.2.49 Coordinating permit access authority procedures

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.3.3 Statutory and safety considerations
	T2.4.8 System switching operations and authorisation procedures - HV
	T2.4.9 System switching operations and authorisation procedures - LV
	T2.8.7 Enterprise specific – equipment installation procedures
	T2.11.25 Communication devices and principles
	T2.11.41 Fault finding and diagnostic techniques
	T2.11.53 Protection schemes
	T2.11.59 Generator control systems - EHV
UETTDRTS15B Maintain network protection and control systems (complex)	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	T2.3.3 Statutory and safety considerations
	T2.3.4 Electrical equip - protection and control schemes
	T2.3.5 Discrete protection devices isolation and tagging procedures
	T2.3.6 Protection devices - maintenance and commissioning principles
	T2.3.7 Protection devices - manufacturers requirements
	T2.7.6 Disposal procedures for insulating materials
	T2.10.1 Visual inspection procedures - substations
	T2.10.2 Surge relay operation and maintenance - substations

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.10.9 Analyse and interpret results and measurements - substations
	T2.10.17 Static reactive plant principles - substations
	T2.10.27 Use of test equipment on discrete protection scheme - substations
	T2.11.18 Discrete protection systems
	T2.11.19 Interdependent protection systems
	T2.11.20 Complex protection systems
UETTDRTS16B Commission network protection and control systems (complex)	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	T2.3.3 Statutory and safety considerations
	T2.3.4 Electrical equipment - protection and control schemes
	T2.3.5 Discrete protection devices - isolation and tagging procedures
	T2.3.6 Protection devices - maintenance and commissioning principles
	T2.3.7 Protection devices - manufacturers requirements
	T2.7.6 Disposal procedures for insulating materials
	T2.10.1 Visual inspection procedures - substations
	T2.10.2 Surge relay operation and maintenance - substations
	T2.10.3 Commissioning of discrete protection devices - substations

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.10.9 Analyse and interpret results and measurements - substations
	T2.10.17 Static reactive plant principles - substations
	T2.10.27 Use of test equipment on discrete protection scheme - substations
	T2.11.18 Discrete protection systems
	T2.11.19 Interdependent protection systems
	T2.11.20 Complex protection systems

2.2.28 VC - Vegetation Units

VC – Vegetation Units

Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
UETTDRVC01B Cut vegetation above ground outside live work zone near live electrical apparatus (climbing)	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical Safe working practice
	T2.3.1 Powerline safety practices
	T2.5.5 Powerline clearances and approach distances
	T2.5.16 Climbing techniques
	T2.5.17 Emergency procedures for climbers
	T2.8.1 Enterprises specific - policies and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
UETTDRVC02B Operate	E2.11.1 Hand tools

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
vegetation control plant, machinery and equipment near live electrical apparatus	E2.11.2.1 Power tools
	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practice
	T2.1.3 Engineering applications of material properties
	T2.1.7 Enterprise vehicles
	T2.1.8. Chain saw principles
	T2.2.1 Generation power systems
	T2.3.1 Powerline safety practices
	T2.5.5 Powerline clearances and approach distances
	T2.8.12 Enterprise specific - vegetation control equipment
UETTDRVC03B Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus	E2.8.5 Magnetism
	E2.8.8 Electrotechnology science and materials
	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	T2.3.1 Powerline safety practices
	T2.5.5 Powerline clearances and approach distances
	T2.5.6 Basic vegetation control hazard assessment and risk management principles
	T2.5.7 Pruning principles near powerline
	T2.5.8 Establishing rigging requirements for vegetation control

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
	T2.5.9 Powerline access and isolation procedures
	T2.5.10 Tree preservation principles
	T2.5.13 Chemical control of foliage
	T2.8.1 Enterprises specific - policies and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
UETTDRVC04B Assess vegetation and recommend control measures for work near live electrical apparatus	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	T2.3.1 Powerline safety practices
	T2.5.5 Powerline clearances and approach distances
	T2.5.12 Assessment of vegetation principles
	T2.8.1 Enterprises specific - policies and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
UETTDRVC05B Cut vegetation above ground outside live work zone near live electrical apparatus (platform)	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	T2.3.1 Powerline safety practices
	T2.5.5 Powerline clearances and approach distances
	T2.5.15 Operating tools and equipment from a platform
	T2.8.1 Enterprises specific - policies and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
UETTDRVC06B Cut vegetation at	E2.18.1 Occupational Health and Safety

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Competency Standard Units (CSUs)	**Essential knowledge & Associated Skills Clause**
ground level outside ‘vegetation exclusion zone’ near live electrical apparatus	principles
	E2.18.2 Electrical safe working practices
	T2.3.1 Powerline safety practices
	T2.5.5 Powerline clearances and approach distances
	T2.8.1 Enterprises specific - policies and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
	T2.8.12 Enterprise Specific - vegetation control equipment
UETTDRVC07B Monitor safety compliance for vegetation work near live electrical apparatus	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	T2.3.1 Powerline safety practices
	T2.5.5 Powerline clearances and approach distances
	T2.5.14 Safety observer principles
	T2.8.1 Enterprises specific - policies and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
UETTDRVC08B Safe use of Elevating Work Platform (EWP) near live electrical apparatus	E2.18.1 Occupational Health and Safety principles
	E2.18.2 Electrical safe working practices
	T2.1.5 Elevating work platform operational principles
	T2.3.1 Powerline safety practices
	T2.5.5 Powerline clearances and approach distances

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Competency Standard Units (CSUs)	Essential knowledge & Associated Skills Clause
	T2.8.1 Enterprises specific - policies and procedure instructions
	T2.8.2 Enterprises specific - OHS instructions
UETTDRVC09B Control vegetation (linework)	T2.5.1 Ecological principles for vegetation control
	T2.5.2 Vegetation control techniques
UETTDRVC10B Coordinate vegetation control work	T2.2.53 HV principles
	T2.5.1 Ecological principles for vegetation control
	T2.5.2 Vegetation control techniques
	T2.5.3 Fundamentals for working safely near live electrical apparatus
	T2.5.4 Coordinate vegetation control inspection programs

2.2.29 Essential Knowledge and Associated Skills to Unit Relationship

Essential Knowledge and Associated Skills to Unit Relationship

2.2.30 T2.1 Engineering Applications

T2.1 Engineering Applications

Essential Knowledge & Associated Skills Clause	Competency Standard Units (CSUs)
T2.1.1 Engineering applications of mathematical principles	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS06B – Design underground distribution systems

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRDS07B – Design distribution substations
	UETTDRDS08B – Design public lighting systems
	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDRIS01B – Install electrical equipment (network infrastructure)
	UETTDRIS06B – Install and maintain network infrastructure electrical equipment
	UETTDRIS12B – Install and maintain poles/structures and associated hardware
	UETTDRIS27B – Install and maintain overhead distribution network infrastructure
	UETTDRTP08B – Transmission tower stub setting
	UETTDRTP14B – Install and maintain overhead transmission network infrastructure
T2.1.2 Engineering applications of mechanical principles	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS06B – Design underground distribution systems
	UETTDRDS07B – Design distribution substations
	UETTDRDS08B – Design public lighting systems
	UETTDRDS22B - Design transmission, sub-transmission and zone substation buildings
	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDRIS01B – Install electrical equipment

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	(network infrastructure)
	UETTDRIS06B – Install and maintain network infrastructure electrical equipment
	UETTDRIS12B – Install and maintain poles/structures and associated hardware
	UETTDRIS27B – Install and maintain overhead distribution network infrastructure
	UETTDRTP08B – Transmission tower stub setting
	UETTDRTP14B – Install and maintain overhead transmission network infrastructure
T2.1.3 Engineering applications of material properties	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS06B – Design underground distribution systems
	UETTDRDS07B – Design distribution substations
	UETTDRDS08B – Design public lighting systems
	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant
	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDREL05B – Respond to technical enquiries and requests
	UETTDRIS01B – Install electrical equipment (network infrastructure)
	UETTDRIS06B – Install and maintain network infrastructure electrical equipment
	UETTDRIS12B – Install and maintain

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	poles/structures and associated hardware
	UETTDRIS27B – Install and maintain overhead distribution network infrastructure
	UETTDRTP02B – Establish and reinstate a transmission tower work site
	UETTDRTP03B – Erect transmission towers
	UETTDRTP08B – Transmission tower stub setting
	UETTDRTP14B – Install and maintain overhead transmission network infrastructure
	UETTDRVC02B – Operate vegetation control plant, machinery and equipment near live electrical apparatus
T2.1.4 Basic rigging techniques	UETTDRIS01B – Install electrical equipment (network infrastructure)
	UETTDRIS06B – Install and maintain network infrastructure electrical equipment
	UETTDRIS12B – Install and maintain poles/structures and associated hardware
	UETTDRIS27B – Install and maintain overhead distribution network infrastructure
	UETTDRRT11B – Maintain energised direct current traction overhead wiring systems
	UETTDRTP06B – Erect transmission towers and associated hardware
	UETTDRTP11B – Maintain energised lines (transmission) using live line stick technique
	UETTDRTP14B – Install and maintain overhead transmission network infrastructure
T2.1.5 Elevating work platform operational principles	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRTP08B – Transmission tower stub setting
	UETTDRVC08B – Safe use of Elevating Work Platform (EWP) near live electrical apparatus
T2.1.6 Hydraulic and pneumatic portable equipment	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDRTP08B – Transmission tower stub setting
T2.1.7 Enterprise vehicles	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDRTP02B – Establish and reinstate a transmission tower work site
	UETTDRTP04B – Erect transmission tower hardware
	UETTDRTP08B – Transmission tower stub setting
	UETTDRVC02B – Operate vegetation control plant, machinery and equipment near live electrical apparatus
T2.1.8 Chain saw principles	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDRTP02B – Establish and reinstate a transmission tower work site
	UETTDRTP08B – Transmission tower stub setting
	UETTDRVC02B – Operate vegetation control plant, machinery and equipment near live electrical apparatus
T2.1.9 Stores procedures	UETTDRCJ01B – Lay electrical cables
	UETTDRCJ13B – Install and maintain network infrastructure LV underground cables

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRIS01B – Install electrical equipment (network infrastructure)
	UETTDRIS06B – Install and maintain network infrastructure electrical equipment
	UETTDRIS12B – Install and maintain poles/structures and associated hardware
	UETTDRIS27B – Install and maintain overhead distribution network infrastructure
	UETTDRTP06B – Erect transmission towers and associated hardware
	UETTDRTP08B – Transmission tower stub setting
	UETTDRTP14B – Install and maintain overhead transmission network infrastructure
T2.1.10 Filtering and sampling of insulating oil	UETTDRIS02B – Maintain electrical equipment (network infrastructure)
	UETTDRIS06B – Install and maintain network infrastructure electrical equipment
	UETTDRIS07B – Sample, test, filter and reinstate insulating oil
T2.1.11 Testing of insulating oil	UETTDRIS07B – Sample, test, filter and reinstate insulating oil

2.2.31 T2.2 Power Systems

T2.2 Power Systems

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.2.1 Generation power systems	UETTDRCJ01B – Lay electrical cables

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRDS07B – Design distribution substations
	UETTDRDS14B – Design substation modifications
	UETTDRSD20B - Design customer substation
	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B - Design underground transmission systems
	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDREL05B – Respond to technical enquiries and requests
	UETTDRIS01B – Install electrical equipment (network infrastructure)
	UETTDRIS06B – Install and maintain network infrastructure electrical equipment
	UETTDRIS27B – Install and maintain overhead distribution network infrastructure
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO15A – Operate and monitor system equipment (SCADA)
	UETTDRSO19A – Coordinate system operations in a regulated energy market
	UETTDRTS07B – Perform accuracy checks on instrument transformers

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRTS08B – Test, repair and calibrate protection relays and meters
	UETTDRTS09B – Develop secondary isolation instructional documents
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
	UETTDRTS14B – Install and maintain power system communication equipment
	UETTDRTP04B – Erect transmission tower hardware
	UETTDRTP06B – Erect transmission towers and associated hardware
	UETTDRTP14B – Install and maintain overhead transmission network infrastructure
	UETTDRVC02B – Operate vegetation control plant, machinery and equipment near live electrical apparatus
T2.2.2 Transmission, distribution and rail power systems	UETTDRCJ01B – Lay electrical cables
	UETTDRCJ13B – Install and maintain network infrastructure LV underground cables
	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS06B – Design underground distribution systems
	UETTDRDS08B – Design public lighting systems
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS14B – Design substation modifications

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B - Design underground transmission systems
	UETTDREL04B – Working safely near live electrical apparatus as non electrical worker
	UETTDREL05B – Respond to technical enquiries and requests
	UETTDRIS01B – Install electrical equipment (network infrastructure)
	UETTDRIS06B – Install and maintain network infrastructure electrical equipment
	UETTDRIS27B – Install and maintain overhead distribution network infrastructure
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO15A – Operate and monitor system equipment (SCADA)
	UETTDRSO16A – Monitor and control the activities of field staff
	UETTDRSO18A – Respond to discrete/interdependent protection operations
	UETTDRTS07B – Perform accuracy checks on instrument transformers
	UETTDRTS08B – Test, repair and calibrate protection relays and meters
	UETTDRTS09B – Develop secondary isolation

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	instructional documents
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
	UETTDRTS14B – Install and maintain power system communication equipment
	UETTDRTP04B – Erect transmission tower hardware
	UETTDRTP06B – Erect transmission towers and associated hardware
	UETTDRTP14B – Install and maintain overhead transmission network infrastructure
T2.2.3 Substations, power transformers and reactors	UETTDRCJ01B – Lay electrical cables
	UETTDRCJ13B – Install and maintain network infrastructure LV underground cables
	UETTDRDS07B – Design distribution substations
	UETTDRDS14B – Design substation modifications
	UETTDRS20B - Design customer substation
	UETTDRIS01B – Install electrical equipment (network infrastructure)
	UETTDRIS06B – Install and maintain network infrastructure electrical equipment
	UETTDRIS27B – Install and maintain overhead distribution network infrastructure
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	transmission switching programs
	UETTDRSO15A – Operate and monitor system equipment (SCADA)
	UETTDRSO16A – Monitor and control the activities of field staff
	UETTDRSO18A – Respond to discrete/interdependent protection operations
	UETTDRTS07B – Perform accuracy checks on instrument transformers
	UETTDRTS08B – Test, repair and calibrate protection relays and meters
	UETTDRTS09B – Develop secondary isolation instructional documents
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
	UETTDRTS14B – Install and maintain power system communication equipment
	UETTDRTP06B – Erect transmission towers and associated hardware
	UETTDRTP14B – Install and maintain overhead transmission network infrastructure
T2.2.4 Powerline distribution installation	UETTDRDS01B – Draft and layout an overhead distribution extension
	UETTDRDS02B – Draft and layout an underground distribution extension
	UETTDRDS03B – Draft and layout a street lighting system
	UETTDRDS04B – Draft and layout a distribution substation minor upgrade
	UETTDRDS05B – Design overhead distribution systems

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRDS19B - Establish and manage geographical information system data
	UETTDRIS14B – Install and maintain overhead conductors and cables (poles and structures)
	UETTDRIS16B – Install and maintain low voltage services (overhead)
	UETTDRIS27B – Install and maintain overhead distribution network infrastructure
	UETTDRRT10B – Perform rail traction switching operations to a given schedule
	UETTDRRT11B – Maintain energised direct current traction overhead wiring systems
T2.2.5 Powerline installation safety	UETTDRDS01B – Draft and layout an overhead distribution extension
	UETTDRDS02B – Draft and layout an underground distribution extension
	UETTDRDS03B – Draft and layout a street lighting system
	UETTDRDS04B – Draft and layout a distribution substation minor upgrade
	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRIS12B – Install and maintain poles/structures and associated hardware
	UETTDRIS14B – Install and maintain overhead conductors and cables (poles and structures)

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRIS15B – Install and maintain low voltage services (underground)
	UETTDRIS16B – Install and maintain low voltage services (overhead)
	UETTDRIS22B – Implement and monitor the organisational OHS policies, procedures and programs
	UETTDRIS26B – Manage an electrical supply industry OHS management system
	UETTDRIS27B – Install and maintain overhead distribution network infrastructure
	UETTDRRT10B – Perform rail traction switching operations to a given schedule
	UETTDRRT11B – Maintain energised direct current traction overhead wiring systems
T2.2.6 Pole and hardware installation and maintenance	UETTDRDS01B – Draft and layout an overhead distribution extension
	UETTDRDS03B – Draft and layout a street lighting system
	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRIS12B – Install and maintain poles/structures and associated hardware
	UETTDRIS27B – Install and maintain overhead distribution network infrastructure
	UETTDRTP14B – Install and maintain overhead transmission network infrastructure

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.2.7 Low voltage electrical service installation	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRIS14B – Install and maintain overhead conductors and cables (poles and structures)
	UETTDRIS27B – Install and maintain overhead distribution network infrastructure
T2.2.8 Poles and structures inspection principles	UETTDRDP01B - Inspect overhead structures and electrical apparatus (poles /structures)
	UETTDRDP05B – Inspect, maintain and restore energised LV overhead distribution network infrastructure
	UETTDRIS17B – Conduct visual checking and treatment of poles and structures
T2.2.9 Powerline inspection principles	UETTDRDP01B - Inspect overhead structures and electrical apparatus (poles /structures)
	UETTDRDP05B – Inspect, maintain and restore energised LV overhead distribution network infrastructure
	UETTDRIS17B – Conduct visual checking and treatment of poles and structures
T2.2.10 Transmission structures and hardware	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B - Design underground transmission systems
	UETTDRTP03B – Erect transmission towers
	UETTDRTP06B – Erect transmission towers and associated hardware
	UETTDRTP08B – Transmission tower stub setting

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRTP10B – Inspect overhead structures and electrical apparatus (towers)
	UETTDRTP14B – Install and maintain overhead transmission network infrastructure
T2.2.11 Routine maintenance on transmission structures	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B - Design underground transmission systems
	UETTDRTP07B – Maintain transmission towers and associated hardware
	UETTDRTP09B – Install and maintain overhead conductors and cables (towers)
	UETTDRTP14B – Install and maintain overhead transmission network infrastructure
	UETTDRTP15B – Install and maintain transmission network infrastructure electrical equipment
T2.2.12 Underground cable installation	UETTDRCJ01B – Lay electrical cables
	UETTDRCJ06B – Install and maintain de-energised LV underground polymeric cables
	UETTDRCJ09B – Install oil and gas filled specialised underground cables
	UETTDRCJ11B – Install and maintain polymeric specialised underground cables
	UETTDRCJ12B – Install and maintain oil & gas pressure systems for specialised underground cables
	UETTDRCJ13B – Install and maintain network infrastructure LV underground cables
	UETTDRCJ14B – Install and maintain network infrastructure HV underground cables

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRDS02B – Draft and layout an underground distribution extension
	UETTDRDS04B – Draft and layout a distribution substation minor upgrade
	UETTDRDS06B – Design underground distribution systems
	UETTDRIS18B – Locate faults in underground power cables
	UETTDRIS19B – Conduct high potential testing of underground power cables
T2.2.13 Low voltage - energised working practices for substations	UETTDRCJ04B – Joint and maintain energised LV underground paper insulated cables
	UETTDRCJ08B – Joint and maintain energised LV underground polymeric cables
	UETTDRDP02B – Maintain overhead energised LV conductors and cables
	UETTDRDP05B – Inspect, maintain and restore energised LV overhead distribution network infrastructure
	UETTDRDS14B – Design substation modifications
	UETTDRRT11B – Maintain energised direct current traction overhead wiring systems
	UETTDRSB01B – Diagnose and rectify faults in power system substation environment
	UETTDRSB03B – Install and maintain substation DC systems
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRSB06B – Install high current DC switchgear and equipment
	UETTDRSB07B – Maintain high current DC switchgear and equipment
	UETTDRSB09B – Maintain voltage regulating equipment - capacitor banks
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers
	UETTDRSB13B – Install HV plant and equipment
T2.2.14 Cable fault locations principles	UETTDRIS18B – Locate faults in underground power cables
	UETTDRIS19B – Conduct high potential testing of underground power cables
T2.2.15 Metering installations	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS07B – Design distribution substations
	UETTDRDS14B – Design substation modifications
	UETTDRS20B Design customer substation
	UETTDRIS20B – Install and replace energy meters and associated equipment
	UETTDRTS06B – Commission metering schemes
T2.2.16 Fundamentals of jointing LV polymeric cable	UETTDRCJ06B – Install and maintain de-energised LV underground polymeric cables

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRCJ13B – Install and maintain network infrastructure LV underground cables
	UETTDRIS18B – Locate faults in underground power cables
	UETTDRIS19B – Conduct high potential testing of underground power cables
T2.2.17 LV polymeric cable jointing principles	UETTDRCJ06B – Install and maintain de-energised LV underground polymeric cables
	UETTDRCJ13B – Install and maintain network infrastructure LV underground cables
	UETTDRIS18B – Locate faults in underground power cables
	UETTDRIS19B – Conduct high potential testing of underground power cables
T2.2.18 HV polymeric underground cable jointing principles	UETTDRCJ05B – Perform straight through HV paper insulated to polymeric transition joints
	UETTDRCJ07B – Install and maintain de-energised HV underground polymeric cables
	UETTDRCJ14B – Install and maintain network infrastructure HV underground cables
	UETTDRIS18B – Locate faults in underground power cables
	UETTDRIS19B – Conduct high potential testing of underground power cables
T2.2.19 LV Paper lead cable jointing principles	UETTDRCJ02B – Install and maintain de-energised LV underground paper insulated cables
	UETTDRIS18B – Locate faults in underground power cables
	UETTDRIS19B – Conduct high potential testing of underground power cables

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.2.20 HV paper lead cable jointing principles	UETTDRCJ03B – Install and maintain de-energised HV underground paper insulated cables
	UETTDRCJ05B – Perform straight through HV paper insulated to polymeric transition joints
	UETTDRIS18B – Locate faults in underground power cables
	UETTDRIS19B – Conduct high potential testing of underground power cables
T2.2.21 Installation and maintenance on transmission lines and associated equipment	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B - Design underground transmission systems
	UETTDRTP09B – Install and maintain overhead conductors and cables (towers)
	UETTDRTP11B – Maintain energised lines (transmission) using live line stick technique
	UETTDRTP14B – Install and maintain overhead transmission network infrastructure
T2.2.22 Installation and maintenance of public lighting and associated equipment	UETTDRDS03B – Draft and layout a street lighting system
	UETTDRDS08B – Design public lighting systems
	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRIS13B – Install and maintain public lighting systems
T2.2.23 Underground cable construction	UETTDRCJ01B – Lay electrical cables
	UETTDRCJ09B – Install oil and gas filled

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	specialised underground cables
	UETTDRCJ11B – Install and maintain polymeric specialised underground cables
	UETTDRCJ12B – Install and maintain oil & gas pressure systems for specialised underground cables
	UETTDRCJ13B – Install and maintain network infrastructure LV underground cables
	UETTDRCJ14B – Install and maintain network infrastructure HV underground cables
	UETTDRDS02B – Draft and layout an underground distribution extension
	UETTDRDS04B – Draft and layout a distribution substation minor upgrade
	UETTDRDS06B – Design underground distribution systems
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRIS18B – Locate faults in underground power cables
	UETTDRIS19B – Conduct high potential testing of underground power cables
T2.2.24 Aluminium and lead cable sheathed — jointing procedures	UETTDRCJ02B – Install and maintain de-energised LV underground paper insulated cables
	UETTDRCJ03B – Install and maintain de-energised HV underground paper insulated cables
	UETTDRCJ05B – Perform straight through HV paper insulated to polymeric transition joints
	UETTDRIS18B – Locate faults in underground

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	power cables
	UETTDRIS19B – Conduct high potential testing of underground power cables
T2.2.25 Operation principles of a portable generator	UETTDRIS21B – Install mobile generation set for synchronised genset LV
T2.2.26 Installation of a mobile generator LV	UETTDRIS21B – Install mobile generation set for synchronised genset LV
T2.2.27 Generator control systems — LV	UETTDRIS21B – Install mobile generation set for synchronised genset LV
	UETTDRSO06B – Develop LV distribution switching programs
T2.2.28 Towers and structures inspection principles	UETTDRDS27B - Design overhead transmission systems
	UETTDRTP10B – Inspect overhead structures and electrical apparatus (towers)
	UETTDRTP15B – Install and maintain transmission network infrastructure electrical equipment
T2.2.29 Transmission powerline inspection principles	UETTDRDS27B - Design overhead transmission systems
	UETTDRSO17A – Cordinate HV transmission networks
	UETTDRTP10B – Inspect overhead structures and electrical apparatus (towers)
	UETTDRTP15B – Install and maintain transmission network infrastructure electrical equipment
T2.2.30 Powerline transmission installation safety	UETTDRSO17B – Cordinate HV transmission networks
	UETTDRTP09B – Install and maintain overhead conductors and cables (towers)
	UETTDRTP14B – Install and maintain overhead

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	transmission network infrastructure
T2.2.31 Distribution overhead line component fundamentals	UETTDRDS01B – Draft and layout an overhead distribution extension
	UETTDRDS03B – Draft and layout a street lighting system
	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
T2.2.32 Stringing transmission overhead conductors and cables	UETTDRTP05B – Pre-tension stringing transmission overhead conductors and cables
T2.2.33 Installation of a mobile generator – HV	UETTDRIS24B – Install mobile generation set for synchronised genset HV
T2.2.34 Generator control systems — HV	UETTDRIS24B – Install mobile generation set for synchronised genset HV
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRTS08B – Test, repair and calibrate protection relays and meters
	UETTDRTS09B – Develop secondary isolation instructional documents
T2.2.35 Live line working up to 132kV with hotstick	UETTDRDP03B – Maintain energised high voltage distribution overhead electrical apparatus (stick)
	UETTDRRT12B – Maintain energised traction overhead electrical apparatus (stick)
	UETTDRSO07B – Develop HV distribution and

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRTP11B – Maintain energised lines (transmission) using live line stick technique
	UETTDRTP12B – Maintain energised lines (transmission) using bare hand technique
T2.2.36 Live line work for voltages greater than 132kV and up to 500kV with hotstick	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRTP11B – Maintain energised lines (transmission) using live line stick technique
T2.2.37 Live line working up to 33kV with glove and barrier	UETTDRDP04B – Maintain energised high voltage distribution overhead electrical apparatus (glove)
	UETTDRRT13B – Maintain energised traction overhead electrical apparatus (glove)
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
T2.2.38 Working on live lines up to 33kV with glove and barrier/hotstick combined	UETTDRDP04B – Maintain energised high voltage distribution overhead electrical apparatus (glove)
	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRRT13B – Maintain energised traction overhead electrical apparatus (glove)
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
T2.2.39 Plant, equipment and tools	UETTDRDP04B – Maintain energised high

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
used for HV live line work	voltage distribution overhead electrical apparatus (glove)
	UETTDRDS27B - Design overhead transmission systems
	UETTDRRT12B – Maintain energised traction overhead electrical apparatus (stick)
	UETTDRRT13B – Maintain energised traction overhead electrical apparatus (glove)
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRTP11B – Maintain energised lines (transmission) using live line stick technique
T2.2.40 Jointing and terminating oil and gas filled specialised underground cables	UETTDRCJ09B – Install oil and gas filled specialised underground cables
	UETTDRCJ12B – Install and maintain oil & gas pressure systems for specialised underground cables
T2.2.41 Polymeric specialised underground cable principles	UETTDRCJ11B – Install and maintain polymeric specialised underground cables
T2.2.42 Jointing and terminating specialised polymeric underground cables	UETTDRCJ11B – Install and maintain polymeric specialised underground cables
T2.2.43 Installing oil and gas filled specialised underground cables	UETTDRCJ09B – Install oil and gas filled specialised underground cables
	UETTDRCJ12B – Install and maintain oil & gas pressure systems for specialised underground cables
T2.2.44 Installing and maintaining	UETTDRCJ11B – Install and maintain

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
polymeric specialised underground cables	polymeric specialised underground cables
T2.2.45 Maintaining oil and gas filled specialised underground cables	UETTDRCJ10B – Maintain oil and gas filled specialised underground cables
	UETTDRCJ12B – Install and maintain oil & gas pressure systems for specialised underground cables
T2.2.46 Install and maintain oil and gas pressurised systems	UETTDRCJ12B – Install and maintain oil & gas pressure systems for specialised underground cables
T2.2.47 Oil and gas filled specialised underground cable principles	UETTDRCJ09B – Install oil and gas filled specialised underground cables
	UETTDRCJ12B – Install and maintain oil & gas pressure systems for specialised underground cables
T2.2.48 Electrical equipment — HV and LV powerline	UETTDRDS19B Establish and manage geographical information system data
	UETTDRIS08B –Develop HV switching schedule
	UETTDRIS09B – Develop LV switching schedule
	UETTDRIS11B – Coordinate and direct switching schedules
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO16B – Monitor and control the activities of field staff
	UETTDRTS08B – Test, repair and calibrate

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	protection relays and meters
	UETTDRTS09B – Develop secondary isolation instructional documents
T2.2.49 Co-ordinating permit access authority procedures	UETTDRDS16B - Develop planned outage strategies
	UETTDRIS10B – Coordinate permit procedures
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO09B – Coordinate LV distribution networks
	UETTDRSO10B – Coordinate HV distribution and sub transmission networks
	UETTDRSO11B – Manage transmission networks
	UETTDRSO16A – Monitor and control the activities of field staff
	UETTDRTS07B – Perform accuracy checks on instrument transformers
	UETTDRTS08B – Test, repair and calibrate protection relays and meters
	UETTDRTS09B – Develop secondary isolation instructional documents
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
	UETTDRTS14B – Install and maintain power system communication equipment
T2.2.50 Extra High Voltage —	UETTDRTP12B – Maintain energised lines

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
Bare hand live line principles	(transmission) using bare hand technique
T2.2.51 Extra High Voltage — Bare hand live line procedures	UETTDRTP12B – Maintain energised lines (transmission) using bare hand technique
T2.2.52 Extra High Voltage — Bare hand live line work using a helicopter	UETTDRTP13B – Maintain energised lines (transmission) using bare hand technique on a helicopter platform
T2.2.53 HV principles	UETTDRDP03B – Maintain energised high voltage distribution overhead electrical apparatus (stick)
	UETTDRDP04B – Maintain energised high voltage distribution overhead electrical apparatus (glove)
	UETTDRDS18B Analyse and appraise fault and outage data
	UETTDRRT12B – Maintain energised traction overhead electrical apparatus (stick)
	UETTDRRT13B – Maintain energised traction overhead electrical apparatus (glove)
	UETTDRSO17B – Cordinate HV transmission networks
	UETTDRTP11B – Maintain energised lines (transmission) using live line stick technique
	UETTDRTP12B – Maintain energised lines (transmission) using bare hand technique
	UETTDRTP13B – Maintain energised lines (transmission) using bare hand technique on a helicopter platform
	UETTDRVC10B – Coordinate vegetation control work
T2.2.54 Low voltage electrical overhead service installation	UETTDRIS16B – Install and maintain low voltage services (overhead)
T2.2.55 Low voltage electrical	UETTDRIS15B – Install and maintain low

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
underground service installation	voltage services (underground)

2.2.32 T2.3 Powerline safety and protection

T2.3 Powerline safety and protection

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.3.1 Powerline safety practices	UETTDRCJ02B – Install and maintain de-energised LV underground paper insulated cables
	UETTDRCJ03B – Install and maintain de-energised HV underground paper insulated cables
	UETTDRCJ04B – Joint and maintain energised LV underground paper insulated cables
	UETTDRCJ06B – Install and maintain de-energised LV underground polymeric cables
	UETTDRCJ08B – Joint and maintain energised LV underground polymeric cables
	UETTDRCJ13B – Install and maintain network infrastructure LV underground cables
	UETTDRCJ14B – Install and maintain network infrastructure HV underground cables
	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS06B – Design underground distribution systems
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDP02B – Maintain overhead energised

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	LV conductors and cables
	UETTDRDP03B – Maintain energised high voltage distribution overhead electrical apparatus (stick)
	UETTDRDP04B – Maintain energised high voltage distribution overhead electrical apparatus (glove)
	UETTDRDP05B – Inspect, maintain and restore energised LV overhead distribution network infrastructure
	UETTDREL03B – Comply with environmental and incidental response procedures
	UETTDRIS01B – Install electrical equipment (network infrastructure)
	UETTDRIS06B – Install and maintain network infrastructure electrical equipment
	UETTDRIS07B – Sample, test, filter and reinstate insulating oil
	UETTDRIS12B – Install and maintain poles/structures and associated hardware
	UETTDRIS20B – Install and replace energy meters and associated equipment
	UETTDRIS21B – Install mobile generation set for synchronised genset LV
	UETTDRIS22B – Implement and monitor the organisational OHS policies, procedures and programs
	UETTDRIS24B – Install mobile generation set for synchronised genset HV
	UETTDRIS25B – Contribute to coordinated high voltage live line work
	UETTDRIS26B – Manage an electrical supply

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	industry OHS management system
	UETTDRIS27B – Install and maintain overhead distribution network infrastructure
	UETTDRRT11B – Maintain energised direct current traction overhead wiring systems
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
	UETTDRTP04B – Erect transmission tower hardware
	UETTDRTP05B – Pre-tension stringing transmission overhead conductors and cables
	UETTDRTP06B – Erect transmission towers and associated hardware
	UETTDRTP07B – Maintain transmission towers and associated hardware
	UETTDRTP08B – Transmission tower stub setting
	UETTDRTP11B – Maintain energised lines (transmission) using live line stick technique
	UETTDRTP12B – Maintain energised lines (transmission) using bare hand technique
	UETTDRTP13B – Maintain energised lines (transmission) using bare hand technique on a

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	helicopter platform
	UETTDRTP14B – Install and maintain overhead transmission network infrastructure
	UETTDRTP15B – Install and maintain transmission network infrastructure electrical equipment
	UETTDRVC01B – Cut vegetation above ground outside live work zone near live electrical apparatus (climbing)
	UETTDRVC02B – Operate vegetation control plant, machinery and equipment near live electrical apparatus
	UETTDRVC03B – Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus
	UETTDRVC04B – Assess vegetation and recommend control measures for work near live electrical apparatus
	UETTDRVC05B – Cut vegetation above ground outside live work zone near live electrical apparatus (platform)
	UETTDRVC06B – Cut vegetation at ground level outside ‘vegetation exclusion zone’ near live electrical apparatus
	UETTDRVC07B – Monitor safety compliance for vegetation work near live electrical apparatus
	UETTDRVC08B – Safe use of Elevating Work Platform (EWP) near live electrical apparatus
T2.3.2 Powerline safety — implementation and monitoring	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS06B – Design underground distribution systems
	UETTDRDS09B – Prepare and manage detailed

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	construction plans for electrical system infrastructure
	UETTDRDS18B- Analyse and appraise fault and outage data
	UETTDRIS22B – Implement and monitor the organisational OHS policies, procedures and programs
	UETTDRIS26B – Manage an electrical supply industry OHS management system
	UETTDRSO16A – Monitor and control the activities of field staff
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
T2.3.3 Statutory and safety considerations	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS06B – Design underground distribution systems
	UETTDRDS07B – Design distribution substations
	UETTDRDS08B – Design public lighting systems
	UETTDRDS14B – Design substation modifications
	UETTDRIS25B – Contribute to coordinated high voltage live line work
	UETTDRSB15B – Maintain discrete protection and control systems
	UETTDRSB16B – Commission discrete protection and control systems
	UETTDRSB17B – Maintain distribution field devices
	UETTDRSB18B – Commission distribution

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	field devices
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO16A – Monitor and control the activities of field staff
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS02B – Commission network protection and control systems (interdependent)
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS05B – Test and maintain metering schemes
	UETTDRTS06B – Commission metering schemes
	UETTDRTS07B – Perform accuracy checks on instrument transformers
	UETTDRTS08B – Test, repair and calibrate protection relays and meters
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
	UETTDRTS13B – Undertake project management of substation augmentation and maintenance
	UETTDRTS14B – Install and maintain power system communication equipment
	UETTDRTS15B – Maintain network protection

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	and control systems (complex)
	UETTDRTS16B – Commission network protection and control systems (complex)
T2.3.4 Electrical equipment — protection and control schemes	UETTDRDS14B – Design substation modifications
	UETTDRDS18B Analyse and appraise fault and outage data
	UETTDRSB15B – Maintain discrete protection and control systems
	UETTDRSB16B – Commission discrete protection and control systems
	UETTDRSB17B – Maintain distribution field devices
	UETTDRSB18B – Commission distribution field devices
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS02B – Commission network protection and control systems (interdependent)
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS15B – Maintain network protection and control systems (complex)
	UETTDRTS16B – Commission network protection and control systems (complex)
T2.3.5 Discrete protection schemes — isolation and tagging procedures	UETTDRSB15B – Maintain discrete protection and control systems
	UETTDRSB16B – Commission discrete protection and control systems
	UETTDRSB17B – Maintain distribution field

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	devices
	UETTDRSB18B – Commission distribution field devices
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS02B – Commission network protection and control systems (interdependent)
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS15B – Maintain network protection and control systems (complex)
	UETTDRTS16B – Commission network protection and control systems (complex)
T2.3.6 Protection devices — maintenance and commissioning principles	UETTDRSB15B – Maintain discrete protection and control systems
	UETTDRSB16B – Commission discrete protection and control systems
	UETTDRSB17B – Maintain distribution field devices
	UETTDRSB18B – Commission distribution field devices
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS02B – Commission network

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	protection and control systems (interdependent)
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS15B – Maintain network protection and control systems (complex)
	UETTDRTS16B – Commission network protection and control systems (complex)
T2.3.7 Protection devices — manufacturer requirements	UETTDRSB15B – Maintain discrete protection and control systems
	UETTDRSB16B – Commission discrete protection and control systems
	UETTDRSB17B – Maintain distribution field devices
	UETTDRSB18B – Commission distribution field devices
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS02B – Commission network protection and control systems (interdependent)
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS15B – Maintain network protection and control systems (complex)
	UETTDRTS16B – Commission network protection and control systems (complex)
T2.3.8 Safe design principles	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS06B – Design underground distribution systems
	UETTDRDS07B – Design distribution

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	substations
	UETTDRDS08B – Design public lighting systems
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS10B – Prepare and appraise financial impact statements
	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRDS12B – Investigate quality of supply issues
	UETTDRDS13B – Develop HV and LV distribution protection systems
	UETTDRDS14B – Design substation modifications
	UETTDRDS15B – Organise and implement line and easement surveys
	UETTDRDS16B - Develop planned outage strategies
	UETTDRDS17B - Review asset management strategies
	UETTDRDS18B - Analyse and appraise fault and outage data
	UETTDRDS19B - Establish and manage geographical information system data
	UETTDRDS20B - Design customer substation
	UETTDRDS21B - Manage transmission, sub-transmission and zone substation design process
	UETTDRDS22B - Design transmission,

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	sub-transmission and zone substation buildings
	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant
	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
	UETTDRDS25B - Design transmission, sub-transmission and zone substation earthing
	UETTDRDS26B - Design transmission, sub-transmission and zone substation - civil and structural components
	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B - Design underground transmission systems

2.2.33 T2.4 Switching

T2.4 Switching

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.4.1 Switchgear installation	UETTDRDP05B – Inspect, maintain and restore energised LV overhead distribution network infrastructure
	UETTDRDS07B – Design distribution substations
	UETTDRDS13B – Develop HV and LV distribution protection systems
	UETTDRDS14B – Design substation modifications
	UETTDRDS16B - Develop planned outage

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	strategies
	UETTDRDS18B - Analyse and appraise fault and outage data
	UETTDRDS20B - Design customer substation
	UETTDRIS01B – Install electrical equipment (network infrastructure)
	UETTDRIS03B – Perform LV field switching operation to a given schedule
	UETTDRIS05B – Perform substation switching operation to a given schedule
	UETTDRIS06B – Install and maintain network infrastructure electrical equipment
	UETTDRIS09B – Develop LV switching schedule
	UETTDRIS11B – Coordinate and direct switching schedules
	UETTDRRT10B – Perform rail traction switching operations to a given schedule
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
T2.4.2 Low voltage switching principles	UETTDRDP02B – Maintain overhead energised LV conductors and cables
	UETTDRDP05B – Inspect, maintain and restore energised LV overhead distribution network infrastructure
	UETTDRDS11B – Manage electrical infrastructure projects

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRDS16B Develop planned outage strategies
	UETTDRDS18B Analyse and appraise fault and outage data
	UETTDRIS03B – Perform LV field switching operation to a given schedule
	UETTDRIS05B – Perform substation switching operation to a given schedule
	UETTDRIS09B – Develop LV switching schedule
	UETTDRIS11B – Coordinate and direct switching schedules
	UETTDRIS19B – Conduct high potential testing of underground power cables
	UETTDRIS21B – Install mobile generation set for synchronised genset LV
	UETTDRRT10B – Perform rail traction switching operations to a given schedule
	UETTDRRT11B – Maintain energised direct current traction overhead wiring systems
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers
	UETTDRSB13B – Install HV plant and equipment
	UETTDRSO06B – Develop LV distribution

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	switching programs
T2.4.3 High voltage switching principles	UETTDRDP03B – Maintain energised high voltage distribution overhead electrical apparatus (stick)
	UETTDRDP04B – Maintain energised high voltage distribution overhead electrical apparatus (glove)
	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRDS16B – Develop planned outage strategies
	UETTDRDS18B Analyse and appraise fault and outage data
	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B - Design underground transmission systems
	UETTDRIS04B – Perform high voltage field switching operation to a given schedule
	UETTDRIS05B – Perform substation switching operation to a given schedule
	UETTDRIS08B –Develop HV switching schedule
	UETTDRIS10B – Coordinate permit procedures
	UETTDRIS11B – Coordinate and direct switching schedules
	UETTDRRT12B – Maintain energised traction overhead electrical apparatus (stick)
	UETTDRRT13B – Maintain energised traction overhead electrical apparatus (glove)
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	transmission switching programs
	UETTDRTP11B – Maintain energised lines (transmission) using live line stick technique
T2.4.4 High voltage fault switching principles	UETTDRDP03B – Maintain energised high voltage distribution overhead electrical apparatus (stick)
	UETTDRDP04B – Maintain energised high voltage distribution overhead electrical apparatus (glove)
	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRDS18B Analyse and appraise fault and outage data
	UETTDRIS04B – Perform high voltage field switching operation to a given schedule
	UETTDRIS05B – Perform substation switching operation to a given schedule
	UETTDRIS08B –Develop HV switching schedule
	UETTDRIS10B – Coordinate permit procedures
	UETTDRIS11B – Coordinate and direct switching schedules
	UETTDRRT12B – Maintain energised traction overhead electrical apparatus (stick)
	UETTDRRT13B – Maintain energised traction overhead electrical apparatus (glove)
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO17B – Cordinate HV transmission networks
	UETTDRSO18B – Respond to discrete/interdependent protection operations
	UETTDRTP11B – Maintain energised lines

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	(transmission) using live line stick technique
T2.4.5 High voltage distribution transformer principles	UETTDRDP03B – Maintain energised high voltage distribution overhead electrical apparatus (stick)
	UETTDRDP04B – Maintain energised high voltage distribution overhead electrical apparatus (glove)
	UETTDRDS07B – Design distribution substations
	UETTDRDS18B - Analyse and appraise fault and outage data
	UETTDRS20B - Design customer substation
	UETTDRIS04B – Perform high voltage field switching operation to a given schedule
	UETTDRIS05B – Perform substation switching operation to a given schedule
	UETTDRIS08B –Develop HV switching schedule
	UETTDRIS10B – Coordinate permit procedures
	UETTDRIS11B – Coordinate and direct switching schedules
	UETTDRRT12B – Maintain energised traction overhead electrical apparatus (stick)
	UETTDRRT13B – Maintain energised traction overhead electrical apparatus (glove)
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRTP11B – Maintain energised lines (transmission) using live line stick technique
T2.4.6 High voltage SWER system	UETTDRDP03B – Maintain energised high voltage distribution overhead electrical apparatus (stick)
	UETTDRDP04B – Maintain energised high voltage distribution overhead electrical apparatus (glove)
	UETTDRDS05B – Design overhead distribution

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	systems
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS18B - Analyse and appraise fault and outage data
	UETTDRDS27B - Design overhead transmission systems
	UETTDRIS04B – Perform high voltage field switching operation to a given schedule
	UETTDRIS05B – Perform substation switching operation to a given schedule
	UETTDRIS08B –Develop HV switching schedule
	UETTDRIS10B – Coordinate permit procedures
	UETTDRIS11B – Coordinate and direct switching schedules
	UETTDRRT12B – Maintain energised traction overhead electrical apparatus (stick)
	UETTDRRT13B – Maintain energised traction overhead electrical apparatus (glove)
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRTP11B – Maintain energised lines (transmission) using live line stick technique
T2.4.7 Feeder automation system	UETTDRDP03B – Maintain energised high voltage distribution overhead electrical apparatus (stick)
	UETTDRDP04B – Maintain energised high voltage distribution overhead electrical apparatus (glove)
	UETTDRDS07B – Design distribution substations
	UETTDRDS18B - Analyse and appraise fault and

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	outage data
	UETTDRDS20B - Design customer substation
	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B - Design underground transmission systems
	UETTDRIS04B – Perform high voltage field switching operation to a given schedule
	UETTDRIS05B – Perform substation switching operation to a given schedule
	UETTDRIS08B –Develop HV switching schedule
	UETTDRIS10B – Coordinate permit procedures
	UETTDRIS11B – Coordinate and direct switching schedules
	UETTDRRT12B – Maintain energised traction overhead electrical apparatus (stick)
	UETTDRRT13B – Maintain energised traction overhead electrical apparatus (glove)
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRTP11B – Maintain energised lines (transmission) using live line stick technique
T2.4.8 System switching operations and authorisation procedures — HV	UETTDRIS04B – Perform high voltage field switching operation to a given schedule
	UETTDRIS08B –Develop HV switching schedule
	UETTDRIS10B – Coordinate permit procedures
	UETTDRIS11B – Coordinate and direct switching

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	schedules
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO10B – Coordinate HV distribution and sub transmission networks
	UETTDRSO11B – Manage transmission networks
	UETTDRSO16A – Monitor and control the activities of field staff
	UETTDRTS07B – Perform accuracy checks on instrument transformers
	UETTDRTS08B – Test, repair and calibrate protection relays and meters
	UETTDRTS09B – Develop secondary isolation instructional documents
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
	UETTDRTS14B – Install and maintain power system communication equipment
T2.4.9 System switching operations and authorisation procedures — LV	UETTDRIS03B – Perform LV field switching operation to a given schedule
	UETTDRIS09B – Develop LV switching schedule
	UETTDRIS10B – Coordinate permit procedures
	UETTDRIS11B – Coordinate and direct switching schedules
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO09B – Coordinate LV distribution networks

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRSO16A – Monitor and control the activities of field staff
	UETTDRTS07B – Perform accuracy checks on instrument transformers
	UETTDRTS08B – Test, repair and calibrate protection relays and meters
	UETTDRTS09B – Develop secondary isolation instructional documents
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
	UETTDRTS14B – Install and maintain power system communication equipment
T2.4.10 Co-ordinating and directing switching instructions	UETTDRIS11B – Coordinate and direct switching schedules
	UETTDRSO09B – Coordinate LV distribution networks
	UETTDRSO10B – Coordinate HV distribution and sub transmission networks
	UETTDRSO11B – Manage transmission networks
	UETTDRSO16A – Monitor and control the activities of field staff
	UETTDRSO17A – Cordinate HV transmission networks
T2.4.11 High voltage overhead and substation switching principles	UETTDRDS16B - Develop planned outage strategies
	UETTDRDS27B - Design overhead transmission systems
	UETTDRIS04B – Perform high voltage field switching operation to a given schedule
	UETTDRIS05B – Perform substation switching operation to a given schedule

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRIS08B –Develop HV switching schedule
	UETTDRIS10B – Coordinate permit procedures
	UETTDRIS11B – Coordinate and direct switching schedules
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO10B – Coordinate HV distribution and sub transmission networks
	UETTDRSO11B – Manage transmission networks
	UETTDRSO16A – Monitor and control the activities of field staff
T2.4.12 Low voltage overhead and substation switching principles	UETTDRIS09B – Develop LV switching schedule
	UETTDRIS10B – Coordinate permit procedures
	UETTDRIS11B – Coordinate and direct switching schedules
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO09B – Coordinate LV distribution networks
	UETTDRSO16A – Monitor and control the activities of field staff
T2.4.13 High voltage switching instruction preparation	UETTDRIS08B –Develop HV switching schedule
	UETTDRIS10B – Coordinate permit procedures
	UETTDRIS11B – Coordinate and direct switching schedules
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO10B – Coordinate HV distribution and sub transmission networks
	UETTDRSO11B – Manage transmission networks
T2.4.14 Low voltage switching instruction preparation	UETTDRIS09B – Develop LV switching schedule
	UETTDRIS10B – Coordinate permit procedures
	UETTDRIS11B – Coordinate and direct switching schedules
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO09B – Coordinate LV distribution networks

2.2.34 T2.5 Vegetation

T2.5 Vegetation

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.5.1 Ecological principles for vegetation control	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRVC09B – Control vegetation (linework)
	UETTDRVC10B – Coordinate vegetation control work

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.5.2 Vegetation control techniques	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRVC09B – Control vegetation (linework)
	UETTDRVC10B – Coordinate vegetation control work
T2.5.3 Fundamentals for working safely near live electrical apparatus	UETTDREL04B – Working safely near live electrical apparatus as non electrical worker
	UETTDREL05B – Respond to technical enquiries and requests
	UETTDRIS25B – Contribute to coordinated high voltage live line work
	UETTDRVC10B – Coordinate vegetation control work
T2.5.4 Coordinate vegetation control inspection programs	UETTDRVC10B – Coordinate vegetation control work
T2.5.5 Powerline clearances and approach distances	UETTDRVC01B – Cut vegetation above ground outside live work zone near live electrical apparatus (climbing)
	UETTDRVC02B – Operate vegetation control plant, machinery and equipment near live electrical apparatus
	UETTDRVC03B – Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus
	UETTDRVC04B – Assess vegetation and recommend control measures for work near live electrical apparatus

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRVC05B – Cut vegetation above ground outside live work zone near live electrical apparatus (platform)
	UETTDRVC06B – Cut vegetation at ground level outside ‘vegetation exclusion zone’ near live electrical apparatus
	UETTDRVC07B – Monitor safety compliance for vegetation work near live electrical apparatus
	UETTDRVC08B – Safe use of Elevating Work Platform (EWP) near live electrical apparatus
T2.5.6 Basic vegetation control hazard assessment and risk management principles	UETTDRVC03B – Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus
T2.5.7 Pruning principles near powerline	UETTDRVC03B – Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus
T2.5.8 Establishing rigging requirements for vegetation control	UETTDRVC03B – Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus
T2.5.9 Powerline access and isolation procedures	UETTDRVC03B – Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus
T2.5.10 Tree preservation principles	UETTDRVC03B – Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus
T2.5.11 SPARE CLAUSE	
T2.5.12 Assessment of vegetation principles	UETTDRVC04B – Assess vegetation and recommend control measures for work near live electrical apparatus
T2.5.13 Chemical control of foliage	UETTDRVC03B – Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus
T2.5.14 Safety observer principles	UETTDRVC07B – Monitor safety compliance

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	for vegetation work near live electrical apparatus
T2.5.15 Operating tools and equipment from a platform	UETTDRVC05B – Cut vegetation above ground outside live work zone near live electrical apparatus (platform)
T2.5.16 Climbing techniques	UETTDRVC01B – Cut vegetation above ground outside live work zone near live electrical apparatus (climbing)
T2.5.17 Emergency procedures for climbers	UETTDRVC01B – Cut vegetation above ground outside live work zone near live electrical apparatus (climbing)

2.2.35 T2.6 Rail Traction

T2.6 Rail Traction

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.6.1 Electrical traction principles	UETTDRRT01B – Install overhead traction wiring systems
	UETTDRRT02B – Maintain overhead traction wiring systems
	UETTDRRT07B - Install overhead traction equipment and components
	UETTDRRT08B – Maintain overhead traction equipment and components
	UETTDRRT14B – Install and maintain traction network wiring systems
	UETTDRRT15B – Install and maintain traction network equipment and components
T2.6.2 Electrical traction protection requirements	UETTDRRT01B – Install overhead traction wiring systems
	UETTDRRT02B – Maintain overhead traction

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	wiring systems
	UETTDRRT07B - Install overhead traction equipment and components
	UETTDRRT08B – Maintain overhead traction equipment and components
	UETTDRRT14B – Install and maintain traction network wiring systems
	UETTDRRT15B – Install and maintain traction network equipment and components
T2.6.3 Electrical overhead traction wiring systems	UETTDRRT01B – Install overhead traction wiring systems
	UETTDRRT02B – Maintain overhead traction wiring systems
	UETTDRRT14B – Install and maintain traction network wiring systems
T2.6 Traction bonding.4	UETTDRRT03B – Install traction bonds
	UETTDRRT04B – Maintain traction bonds
T2.6.5 Electrical traction configurations	UETTDRRT05B – Install overhead traction configurations
	UETTDRRT06B - Maintain overhead traction configurations
T2.6.6 Road rail traction height access equipment	UETTDRRT09B – Operate road rail traction height access equipment
T2.6.7 Overhead traction equipment and components	UETTDRRT07B - Install overhead traction equipment and components
	UETTDRRT08B – Maintain overhead traction equipment and components
	UETTDRRT15B – Install and maintain traction network equipment and components
T2.6.8 DC Traction — energised	UETTDRRT11B – Maintain energised direct

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
working practices	current traction overhead wiring systems
T2.6.9 Traction live line work	UETTDRRT12B – Maintain energised traction overhead electrical apparatus (stick)
	UETTDRRT13B – Maintain energised traction overhead electrical apparatus (glove)

2.2.36 T2.7 Environmental issues - powerline

T2.7 Environmental issues - powerline

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.7.1 Environmental fundamentals	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS06B – Design underground distribution systems
	UETTDRDS07B – Design distribution substations
	UETTDRDS08B – Design public lighting systems
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS14B – Design substation modifications
	UETTDREL01B – Apply environmental and sustainable energy procedures
	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDREL03B – Comply with environmental and incidental response procedures

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDREL05B – Respond to technical enquiries and requests
	UETTDRIS23B – Implement and monitor environmental and sustainable energy management policies and procedures
	UETTDRTP02B – Establish and reinstate a transmission tower work site
	UETTDRTP08B – Transmission tower stub setting
T2.7.2 Material handling and the environment	UETTDRDS14B – Design substation modifications
	UETTDREL01B – Apply environmental and sustainable energy procedures
	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDREL03B – Comply with environmental and incidental response procedures
	UETTDREL05B – Respond to technical enquiries and requests
	UETTDRIS07B – Sample, test, filter and reinstate insulating oil
	UETTDRTP02B – Establish and reinstate a transmission tower work site
	UETTDRTP08B – Transmission tower stub setting
T2.7.3 Filtering and sampling oil and the environment	UETTDREL01B – Apply environmental and sustainable energy procedures
	UETTDRIS02B – Maintain electrical equipment (network infrastructure)
	UETTDRIS06B – Install and maintain network infrastructure electrical equipment

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRIS07B – Sample, test, filter and reinstate insulating oil
T2.7.4 Powerline environmental impact - implementation and monitoring	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS06B – Design underground distribution systems
	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRIS23B – Implement and monitor environmental and sustainable energy management policies and procedures
T2.7.5 Powerline sustainable energy management Implementation and monitoring	UETTDRIS23B – Implement and monitor environmental and sustainable energy management policies and procedures
T2.7.6 Disposal procedures for insulating materials	UETTDRIS07B – Sample, test, filter and reinstate insulating oil
	UETTDRSB15B – Maintain discrete protection and control systems
	UETTDRSB16B – Commission discrete protection and control systems
	UETTDRSB17B – Maintain distribution field devices
	UETTDRSB18B – Commission distribution field devices
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS02B – Commission network protection and control systems (interdependent)
	UETTDRTS15B – Maintain network protection and control systems (complex)
	UETTDRTS16B – Commission network protection and control systems (complex)

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2.2.37 T2.8 Enterprise specific

T2.8 Enterprise specific

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.8.1 Enterprise specific — policy and procedure instructions	UETTDRCJ09B – Install oil and gas filled specialised underground cables
	UETTDRCJ11B – Install and maintain polymeric specialised underground cables
	UETTDRCJ12B – Install and maintain oil & gas pressure systems for specialised underground cables
	UETTDRDP03B – Maintain energised high voltage distribution overhead electrical apparatus (stick)
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS21B - Manage transmission, sub-transmission and zone substation design process
	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B – Design underground transmission systems
	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDREL03B – Comply with environmental and incidental response procedures
	UETTDREL05B – Respond to technical enquiries and requests
	UETTDRIS07B – Sample, test, filter and

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	reinstate insulating oil
	UETTDRIS08B –Develop HV switching schedule
	UETTDRIS09B – Develop LV switching schedule
	UETTDRIS10B – Coordinate permit procedures
	UETTDRIS11B – Coordinate and direct switching schedules
	UETTDRIS22B – Implement and monitor the organisational OHS policies, procedures and programs
	UETTDRIS23B – Implement and monitor environmental and sustainable energy management policies and procedures
	UETTDRIS25B – Contribute to coordinated high voltage live line work
	UETTDRIS26B – Manage an electrical supply industry OHS management system
	UETTDRRT11B – Maintain energised direct current traction overhead wiring systems
	UETTDRSB01B – Diagnose and rectify faults in power system substation environment
	UETTDRSB02B – Carry out substation inspection
	UETTDRSB03B – Install and maintain substation DC systems
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB06B – Install high current DC

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	switchgear and equipment
	UETTDRSB07B – Maintain high current DC switchgear and equipment
	UETTDRSB09B – Maintain voltage regulating equipment - capacitor banks
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers
	UETTDRSB13B – Install HV plant and equipment
	UETTDRSB14B – Carry out thermovision surveys
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO15A – Operate and monitor system equipment (SCADA)
	UETTDRSO16A – Monitor and control the activities of field staff
	UETTDRSO19A – Coordinate system operations in a regulated energy market
	UETTDRTP02B – Establish and reinstate a transmission tower work site
	UETTDRTP04B – Erect transmission tower hardware

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRTP05B – Pre-tension stringing transmission overhead conductors and cables
	UETTDRVC01B – Cut vegetation above ground outside live work zone near live electrical apparatus (climbing)
	UETTDRVC03B – Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus
	UETTDRVC04B – Assess vegetation and recommend control measures for work near live electrical apparatus
	UETTDRVC05B – Cut vegetation above ground outside live work zone near live electrical apparatus (platform)
	UETTDRVC06B – Cut vegetation at ground level outside ‘vegetation exclusion zone’ near live electrical apparatus
	UETTDRVC07B – Monitor safety compliance for vegetation work near live electrical apparatus
	UETTDRVC08B – Safe use of Elevating Work Platform (EWP) near live electrical apparatus
T2.8.2 Enterprises specific — OHS instructions	UETTDRCJ09B – Install oil and gas filled specialised underground cables
	UETTDRCJ11B – Install and maintain polymeric specialised underground cables
	UETTDRCJ12B – Install and maintain oil & gas pressure systems for specialised underground cables
	UETTDRDP03B – Maintain energised high voltage distribution overhead electrical apparatus (stick)
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	infrastructure
	UETTDRDS21B - Manage transmission, sub-transmission and zone substation design process
	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B - Design underground transmission systems
	UETTDREL01B – Apply environmental and sustainable energy procedures
	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDREL03B – Comply with environmental and incidental response procedures
	UETTDREL05B – Respond to technical enquiries and requests
	UETTDRIS07B – Sample, test, filter and reinstate insulating oil
	UETTDRIS08B –Develop HV switching schedule
	UETTDRIS09B – Develop LV switching schedule
	UETTDRIS10B – Coordinate permit procedures
	UETTDRIS11B – Coordinate and direct switching schedules
	UETTDRIS22B – Implement and monitor the organisational OHS policies, procedures and programs
	UETTDRIS23B – Implement and monitor environmental and sustainable energy management policies and procedures
	UETTDRIS25B – Contribute to coordinated high

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	voltage live line work
	UETTDRIS26B – Manage an electrical supply industry OHS management system
	UETTDRRT11B – Maintain energised direct current traction overhead wiring systems
	UETTDRSB01B – Diagnose and rectify faults in power system substation environment
	UETTDRSB02B – Carry out substation inspection
	UETTDRSB03B – Install and maintain substation DC systems
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB06B – Install high current DC switchgear and equipment
	UETTDRSB07B – Maintain high current DC switchgear and equipment
	UETTDRSB09B – Maintain voltage regulating equipment - capacitor banks
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers
	UETTDRSB13B – Install HV plant and equipment
	UETTDRSB14B – Carry out thermovision surveys

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO15A – Operate and monitor system equipment (SCADA)
	UETTDRSO16A – Monitor and control the activities of field staff
	UETTDRTP02B – Establish and reinstate a transmission tower work site
	UETTDRTP04B – Erect transmission tower hardware
	UETTDRTP05B – Pre-tension stringing transmission overhead conductors and cables
	UETTDRVC01B – Cut vegetation above ground outside live work zone near live electrical apparatus (climbing)
	UETTDRVC03B – Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus
	UETTDRVC04B – Assess vegetation and recommend control measures for work near live electrical apparatus
	UETTDRVC05B – Cut vegetation above ground outside live work zone near live electrical apparatus (platform)
	UETTDRVC06B – Cut vegetation at ground level outside ‘vegetation exclusion zone’ near live electrical apparatus
	UETTDRVC07B – Monitor safety compliance for vegetation work near live electrical apparatus

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRVC08B – Safe use of Elevating Work Platform (EWP) near live electrical apparatus
T2.8.3 Enterprises specific — technical drawing and documents	UETTDRCJ09B – Install oil and gas filled specialised underground cables
	UETTDRCJ11B – Install and maintain polymeric specialised underground cables
	UETTDRCJ12B – Install and maintain oil & gas pressure systems for specialised underground cables
	UETTDRDP03B – Maintain energised high voltage distribution overhead electrical apparatus (stick)
	UETTDRDS06B – Design underground distribution systems
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS19B Establish and manage geographical information system data
	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDREL05B – Respond to technical enquiries and requests
	UETTDRIS07B – Sample, test, filter and reinstate insulating oil
	UETTDRIS08B –Develop HV switching schedule
	UETTDRIS09B – Develop LV switching schedule
	UETTDRIS10B – Coordinate permit procedures
	UETTDRIS11B – Coordinate and direct switching schedules

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRIS22B – Implement and monitor the organisational OHS policies, procedures and programs
	UETTDRIS23B – Implement and monitor environmental and sustainable energy management policies and procedures
	UETTDRRT11B – Maintain energised direct current traction overhead wiring systems
	UETTDRSB01B – Diagnose and rectify faults in power system substation environment
	UETTDRSB03B – Install and maintain substation DC systems
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB06B – Install high current DC switchgear and equipment
	UETTDRSB07B – Maintain high current DC switchgear and equipment
	UETTDRSB09B – Maintain voltage regulating equipment - capacitor banks
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers
	UETTDRSB13B – Install HV plant and equipment
	UETTDRSB14B – Carry out thermovision surveys

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO15A – Operate and monitor system equipment (SCADA)
	UETTDRTP02B – Establish and reinstate a transmission tower work site
	UETTDRTP03B – Erect transmission towers
T2.8.4 Enterprise specific — switching diagrams	UETTDRDS01B – Draft and layout an overhead distribution extension
	UETTDRDS02B – Draft and layout an underground distribution extension
	UETTDRDS03B – Draft and layout a street lighting system
	UETTDRDS04B – Draft and layout a distribution substation minor upgrade
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS19B Establish and manage geographical information system data
	UETTDRIS08B –Develop HV switching schedule
	UETTDRIS10B – Coordinate permit procedures
	UETTDRIS11B – Coordinate and direct switching schedules
	UETTDRSB01B – Diagnose and rectify faults in power system substation environment

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRSB03B – Install and maintain substation DC systems
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB06B – Install high current DC switchgear and equipment
	UETTDRSB07B – Maintain high current DC switchgear and equipment
	UETTDRSB09B – Maintain voltage regulating equipment - capacitor banks
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangersUETTDRSB13B – Install HV plant and equipment
	UETTDRSB13B – Install HV plant and equipment
	UETTDRSB14B – Carry out thermovision surveys
	UETTDRSO06B – Develop LV distribution switching programs
T2.8.5 Enterprise specific — sustainable energy principles	UETTDRIS23B - Implement and monitor environmental and sustainable energy management policies and procedures
T2.8.6 Enterprise specific -— specialised tools	UETTDRIS07B – Sample, test, filter and reinstate insulating oil
	UETTDRIS25B – Contribute to coordinated high

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	voltage live line work
	UETTDRSB01B – Diagnose and rectify faults in power system substation environment
	UETTDRSB03B – Install and maintain substation DC systems
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB06B – Install high current DC switchgear and equipment
	UETTDRSB07B – Maintain high current DC switchgear and equipment
	UETTDRSB09B – Maintain voltage regulating equipment - capacitor banks
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers
	UETTDRSB13B – Install HV plant and equipment
	UETTDRSB14B – Carry out thermovision surveys
T2.8.7 Enterprise specific - equipment installation procedures	UETTDRDS21B Manage transmission, sub-transmission and zone substation design process
	UETTDRSB01B – Diagnose and rectify faults in power system substation environment
	UETTDRSB03B – Install and maintain

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	substation DC systems
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB06B – Install high current DC switchgear and equipment
	UETTDRSB07B – Maintain high current DC switchgear and equipment
	UETTDRSB09B – Maintain voltage regulating equipment - capacitor banks
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers
	UETTDRSB13B – Install HV plant and equipment
	UETTDRSB14B – Carry out thermovision surveys
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
	UETTDRTS14B – Install and maintain power system communication equipment
T2.8.8 Enterprise specific — data management processes	UTTDRDS17B Review asset management strategies
	UETTDRDS19B Establish and manage geographical information system data
	UETTDRDS21B Manage transmission, sub-transmission and zone substation design

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	process
	UETTDRSB01B – Diagnose and rectify faults in power system substation environment
	UETTDRSB02B – Carry out substation inspection
	UETTDRSB03B – Install and maintain substation DC systems
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB07B – Maintain high current DC switchgear and equipment
	UETTDRSB09B – Maintain voltage regulating equipment - capacitor banks
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers
	UETTDRSB13B – Install HV plant and equipment
	UETTDRSB14B – Carry out thermovision surveys
T2.8.9 Enterprise Specific — teamwork high voltage live line	UETTDRIS25B – Contribute to coordinated high voltage live line work
T2.8.10 Technical enquiries and requests	UETTDREL05B – Respond to technical enquiries and requests
T2.8.11 SPARE CLAUSE	
T2.8.12 Enterprise specific —	UETTDRVC02B – Operate vegetation control

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
vegetation control equipment	plant, machinery and equipment near live electrical apparatus
	UETTDRVC06B – Cut vegetation at ground level outside ‘vegetation exclusion zone’ near live electrical apparatus
T2.8.13 Enterprise specific — procedures and work practices relating to fault restorations	UETTDRSO02B – Manage network faults
T2.8.14 Enterprise specific — procedures and work practices relating to critical events	UETTDRDS21B - Manage transmission, sub-transmission and zone substation design process
	UETTDRSO03B – Manage critical events
	UETTDRSO14B – Develop crisis management plans
T2.8.15 Enterprise specific — procedures and work practices relating to generating plant	UETTDRSO04B – Control generating plant
T2.8.16 Enterprise specific — procedures and work practices relating to managing network demand	UETTDRSO05B – Manage HV distribution and sub transmission network demand
	UETTDRSO12B – Manage transmission network demand
	UETTDRSO13B – Coordinate LV distribution network demand
	UETTDRSO19B – Coordinate system operations in a regulated energy market
	UETTDRSO21B – Manage network power flows
T2.8.17 Enterprise specific — effective management and communication	UTTDRDS17B - Review asset management strategies
	UETTDRDS21B Manage transmission, sub-transmission and zone substation design process

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRSO05B – Manage HV distribution and sub transmission network demand
	UETTDRSO12B – Manage transmission network demand
	UETTDRSO13B – Coordinate LV distribution network demand
	UETTDRSO16A – Monitor and control the activities of field staff
T2.8.18 Enterprise specific — write management reports	UETTDRDS10B – Prepare and appraise financial impact statements
	UTTDRDS17B Review asset management strategies
	UETTDRDS21B Manage transmission, sub-transmission and zone substation design process
	UETTDRSO05B – Manage HV distribution and sub transmission network demand
	UETTDRSO12B – Manage transmission network demand
	UETTDRSO13B – Coordinate LV distribution network demand
T2.8.19 Enterprise specific — procedures and work practices relating to managing critical events	UETTDRDS21B Manage transmission, sub-transmission and zone substation design process

2.2.38 T2.9 Drafting and drawing

T2.9 Drafting and drawing

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.9.1 Interpretation of power distribution network drawings and documentation	UETTDRDS01B – Draft and layout an overhead distribution extension
	UETTDRDS02B – Draft and layout an underground distribution extension
	UETTDRDS03B – Draft and layout a street lighting system
	UETTDRDS04B – Draft and layout a distribution substation minor upgrade
	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRDS17B - Review asset management strategies
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO15A – Operate and monitor system equipment (SCADA)
	UETTDRSO19A– Coordinate system operations in a regulated energy market
	UETTDRTS03B – Conduct evaluation of power system faults within a substation
T2.9.2 Overhead distribution extension layout principles	UETTDRDS01B – Draft and layout an overhead distribution extension

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRDS03B – Draft and layout a street lighting system
	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRDS17B Review asset management strategies
T2.9.3 Surveying techniques	UETTDRDS01B – Draft and layout an overhead distribution extension
	UETTDRDS02B – Draft and layout an underground distribution extension
	UETTDRDS03B – Draft and layout a street lighting system
	UETTDRDS04B – Draft and layout a distribution substation minor upgrade
	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRDS15B – Organise and implement line and easement surveys
T2.9.4 Introduction to computer software (powerline) and CAD	UETTDRDS01B – Draft and layout an overhead distribution extension
	UETTDRDS02B – Draft and layout an underground distribution extension
	UETTDRDS03B – Draft and layout a street lighting system
	UETTDRDS04B – Draft and layout a distribution substation minor upgrade
T2.9.5 Principles of lighting design	UETTDRDS03B – Draft and layout a street lighting system
	UETTDRDS08B – Design public lighting

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	systems
	UETTDRDS22B - Design transmission, sub-transmission and zone substation buildings
T2.9.6 Underground mains layout principles	UETTDRDS02B – Draft and layout an underground distribution extension
	UETTDRDS04B – Draft and layout a distribution substation minor upgrade
	UETTDRDS06B – Design underground distribution systems
	UETTDRDS22B - Design transmission, sub-transmission and zone substation buildings
	UETTDRDS28B - Design underground transmission systems
T2.9.7 Distribution substation minor upgrade layout principles	UETTDRDS04B – Draft and layout a distribution substation minor upgrade
	UETTDRDS07B – Design distribution substations
	UETTDRSD20B - Design customer substation
T2.9.8 Principles in drafting street lighting system	UETTDRDS03B – Draft and layout a street lighting system
	UETTDRDS08B – Design public lighting systems

2.2.39 T2.10 Substations

T2.10 Substations

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.10.1 Visual inspection	UETTDRDS21B - Manage transmission, sub-transmission and zone substation design

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
procedures — substations	process
	UETTDRSB15B – Maintain discrete protection and control systems
	UETTDRSB16B – Commission discrete protection and control systems
	UETTDRSB17B – Maintain distribution field devices
	UETTDRSB18B – Commission distribution field devices
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS02B – Commission network protection and control systems (interdependent)
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS15B – Maintain network protection and control systems (complex)
	UETTDRTS16B – Commission network protection and control systems (complex)
T2.10.2 Surge relay operation and maintenance — substations	UETTDRSB15B – Maintain discrete protection and control systems
	UETTDRSB16B – Commission discrete protection and control systems
	UETTDRSB17B – Maintain distribution field devices
	UETTDRSB18B – Commission distribution field devices
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS02B – Commission network

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	protection and control systems (interdependent)
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS15B – Maintain network protection and control systems (complex)
	UETTDRTS16B – Commission network protection and control systems (complex)
T2.10.3 Commissioning of discrete protection devices — substations	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
	UETTDRSB16B – Commission discrete protection and control systems
	UETTDRTS02B – Commission network protection and control systems (interdependent)
	UETTDRTS16B – Commission network protection and control systems (complex)
T2.10.4 Substation DC circuit breaker principles	UETTDRSB06B – Install high current DC switchgear and equipment
	UETTDRSB07B – Maintain high current DC switchgear and equipment
T2.10.5 Substation DC circuit breaker maintenance	UETTDRSB07B – Maintain high current DC switchgear and equipment
T2.10.6 Substation DC circuit breaker installation	UETTDRSB06B – Install high current DC switchgear and equipment
	UETTDRSB07B – Maintain high current DC switchgear and equipment
T2.10.7 Substation tools and equipment	UETTDRDS21B Manage transmission, sub-transmission and zone substation design process
	UETTDRSB01B – Diagnose and rectify faults in power system substation environment

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRSB02B – Carry out substation inspection
	UETTDRSB03B – Install and maintain substation DC systems
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB06B – Install high current DC switchgear and equipment
	UETTDRSB07B – Maintain high current DC switchgear and equipment
	UETTDRSB09B – Maintain voltage regulating equipment - capacitor banks
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers
	UETTDRSB13B – Install HV plant and equipment
	UETTDRSB14B – Carry out thermovision surveys
T2.10.8 Typical fault conditions and symptoms — substations	UETTDRSB01B – Diagnose and rectify faults in power system substation environment
	UETTDRSB02B – Carry out substation inspection
	UETTDRSB03B – Install and maintain substation DC systems
	UETTDRSB04B – Maintain HV power system

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB09B – Maintain voltage regulating equipment - capacitor banks
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers
	UETTDRSB13B – Install HV plant and equipment
	UETTDRSB14B – Carry out thermovision surveys
T2.10.9 Analyse and interpret results and measurements — substations	UETTDRSB01B – Diagnose and rectify faults in power system substation environment
	UETTDRSB02B – Carry out substation inspection
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB09B – Maintain voltage regulating equipment - capacitor banks
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRSB13B – Install HV plant and equipment
	UETTDRSB14B – Carry out thermovision surveys
	UETTDRSB15B – Maintain discrete protection and control systems
	UETTDRSB16B – Commission discrete protection and control systems
	UETTDRSB17B – Maintain distribution field devices
	UETTDRSB18B – Commission distribution field devices
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO15A – Operate and monitor system equipment (SCADA)
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS02B – Commission network protection and control systems (interdependent)
	UETTDRTS03B – Conduct evaluation of power system faults within a substation
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS15B – Maintain network protection and control systems (complex)
	UETTDRTS16B – Commission network protection and control systems (complex)

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.10.10 Equipment components and materials — substations	UETTDRSB01B – Diagnose and rectify faults in power system substation environment
	UETTDRSB02B – Carry out substation inspection
	UETTDRSB03B – Install and maintain substation DC systems
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB09B – Maintain voltage regulating equipment - capacitor banks
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers
	UETTDRSB13B – Install HV plant and equipment
	UETTDRSB14B – Carry out thermovision surveys
T2.10.11 Substation safety practices	UETTDRDS14B – Design substation modifications
	UETTDRIS07B – Sample, test, filter and reinstate insulating oil
	UETTDRSB01B – Diagnose and rectify faults in power system substation environment
	UETTDRSB02B – Carry out substation inspection
	UETTDRSB03B – Install and maintain

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	substation DC systems
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB09B – Maintain voltage regulating equipment - capacitor banks
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers
	UETTDRSB13B – Install HV plant and equipment
	UETTDRSB14B – Carry out thermovision surveys
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
T2.10.12 Substation LV supply design principles	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
	UETTDRSB01B – Diagnose and rectify faults in power system substation environment
	UETTDRSB03B – Install and maintain

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	substation DC systems
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB13B – Install HV plant and equipment
T2.10.13 Substation control systems design principles	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
	UETTDRSB01B – Diagnose and rectify faults in power system substation environment
	UETTDRSB03B – Install and maintain substation DC systems
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers
	UETTDRSB13B – Install HV plant and equipment
T2.10.14 Hydraulic and pneumatic operating mechanism principles - Substations	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB13B – Install HV plant and equipment
T2.10.15 High voltage insulation	UETTDRDS14B – Design substation

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
system principles — substations	modifications
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB14B – Carry out thermovision surveys
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
T2.10.16 Power transformers and reactor principles — substations	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers
	UETTDRSB13B – Install HV plant and equipment
	UETTDRSB14B – Carry out thermovision surveys
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.10.17 Static reactive plant principles — substations	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant
	UETTDRSB09B – Maintain voltage regulating equipment - capacitor banks
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRTS02B – Commission network protection and control systems (interdependent)
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
	UETTDRTS15B – Maintain network protection and control systems (complex)
	UETTDRTS16B – Commission network protection and control systems (complex)
T2.10.18 On load tap changer principles — substations	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
T2.10.19 Substation switching practices	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant
	UETTDRSB03B – Install and maintain substation DC systems

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB09B – Maintain voltage regulating equipment - capacitor banks
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers
	UETTDRSB13B – Install HV plant and equipment
	UETTDRSB14B – Carry out thermovision surveys
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
T2.10.20 Low voltage substation switching principles	UETTDRSB01B – Diagnose and rectify faults in power system substation environment
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB06B – Install high current DC switchgear and equipment
T2.10.21 Circuit breaker construction principles — substations	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB13B – Install HV plant and equipment
	UETTDRSB14B – Carry out thermovision surveys
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
T2.10.22 Circuit breaker operating principles — substations	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB13B – Install HV plant and equipment
	UETTDRSB14B – Carry out thermovision surveys
T2.10.23 Infrared imaging principles — substations	UETTDRSB14B – Carry out thermovision surveys
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
T2.10.24 Rotating reactive plant principles — substations	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
T2.10.25 Commissioning of distribution protection and control systems — substations	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
	UETTDRSB18B – Commission distribution field devices
	UETTDRTS01B – Maintain network protection and control systems (interdependent)

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.10.26 Voltage regulation scheme principles — substations	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
	UETTDRSB15B – Maintain discrete protection and control systems
	UETTDRSB16B – Commission discrete protection and control systems
	UETTDRSB17B – Maintain distribution field devices
	UETTDRSB18B – Commission distribution field devices
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
T2.10.27 Use of test equipment on a discrete protection scheme — substations	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
	UETTDRSB15B – Maintain discrete protection and control systems
	UETTDRSB16B – Commission discrete protection and control systems
	UETTDRSB17B – Maintain distribution field devices
	UETTDRSB18B – Commission distribution field devices
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS02B – Commission network

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	protection and control systems (interdependent)
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS15B – Maintain network protection and control systems (complex)
	UETTDRTS16B – Commission network protection and control systems (complex)
T2.10.28 Electrical equipment — distribution field device protection and control schemes — substations	UETTDRDS13B – Develop HV and LV distribution protection systems
	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment

2.2.40 T2.11 Advanced power systems

T2.11 Advanced power systems

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.11.1 Power system layouts	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS06B – Design underground distribution systems
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS23B - Design Transmission,

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	Sub-transmission and Zone Substation Primary Plant
	UETTDRDS28B - Design underground transmission systems
	UETTDRSO17A – Cordinate HV transmission networks
	UETTDRTS03B – Conduct evaluation of power system faults within a substation
T2.11.2 Circuit breaker auxiliary systems	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
T2.11.3 DC transmission system principles	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
T2.11.4 AC transmission system components	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B - Design underground transmission systems
	UETTDRSO17A– Cordinate HV transmission networks
T2.11.5 AC transmission line electrical parameters	UETTDRDS05B – Design overhead distribution systems

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B - Design underground transmission systems
	UETTDRSO17A – Cordinate HV transmission networks
T2.11.6 AC transmission lines equivalent circuit calculations	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B - Design underground transmission systems
	UETTDRSO17A – Cordinate HV transmission networks
T2.11.7 Basic design characteristics of transmission structures and associated equipment	UETTDRDS27B - Design overhead transmission systems
	UETTDRSO17A – Cordinate HV transmission networks
T2.11.8 Voltage control devices on interconnected transmission systems	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant
	UETTDRDS27B - Design overhead transmission systems

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRDS28B - Design underground transmission systems
	UETTDRSO04B – Control generating plant
	UETTDRSO21B – Manage network power flows
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
T2.11.9 Calculation of rating of voltage control devices	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
T2.11.10 Control of power flow in interconnected transmission systems	UETTDRSO04B – Control generating plant
	UETTDRSO17A – Cordinate HV transmission networks
	UETTDRSO21A – Manage network power flows
T2.11.11 Control of transient overvoltages	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRTS04B – Design testing and commissioning procedures for substation and

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	field devices
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
T2.11.12 Corona and discharge losses	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B - Design underground transmission systems
T2.11.13 AC generators	UETTDRSO04B – Control generating plant
	UETTDRSO21A – Manage network power flows
T2.11.14 Fault calculation techniques	UETTDRDS13B – Develop HV and LV distribution protection systems
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRTS03B – Conduct evaluation of power system faults within a substation
T2.11.15 Visual inspection procedures	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRTS04B – Design testing and commissioning procedures for substation and

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	field devices
	UETTDRTS05B – Test and maintain metering schemes
	UETTDRTS06B – Commission metering schemes
T2.11.16 Commissioning procedures	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO16A – Monitor and control the activities of field staff
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS06B – Commission metering schemes
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
T2.11.17 Protection scheme requirements	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
	UETTDRSO20A – Respond to complex protection operations
	UETTDRTS03B – Conduct evaluation of power

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	system faults within a substation
T2.11.18 Discrete protection systems	UETTDRDS13B – Develop HV and LV distribution protection systems
	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO15A – Operate and monitor system equipment (SCADA)
	UETTDRSO18A – Respond to discrete/interdependent protection operations
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS02B – Commission network protection and control systems (interdependent)
	UETTDRTS03B – Conduct evaluation of power system faults within a substation
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS15B – Maintain network protection and control systems (complex)
	UETTDRTS16B – Commission network protection and control systems (complex)
T2.11.19 Interdependent protection systems	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO15A – Operate and monitor system equipment (SCADA)
	UETTDRSO18A – Respond to discrete/interdependent protection operations
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS02B – Commission network protection and control systems (interdependent)
	UETTDRTS03B – Conduct evaluation of power system faults within a substation
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS15B – Maintain network protection and control systems (complex)
	UETTDRTS16B – Commission network protection and control systems (complex)
T2.11.20 Complex protection systems	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRTS03B – Conduct evaluation of power system faults within a substation
	UETTDRTS15B – Maintain network protection and control systems (complex)
	UETTDRTS16B – Commission network protection and control systems (complex)
T2.11.21 Financial impact statements	UETTDRDS10B – Prepare and appraise financial impact statements
	UETTDRTS13B – Undertake project management of substation augmentation and maintenance
T2.11.22 Instrument transformers	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant
	UETTDRTS07B – Perform accuracy checks on instrument transformers
T2.11.23 Locate and rectify faults in electrical equipment	UETTDRDS19B - Establish and manage geographical information system data
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS05B – Test and maintain metering schemes
	UETTDRTS08B – Test, repair and calibrate protection relays and meters
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
T2.11.24 Metering devices and principles	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRTS05B – Test and maintain metering schemes
	UETTDRTS06B – Commission metering schemes
	UETTDRTS08B – Test, repair and calibrate protection relays and meters
T2.11.25 Communication devices and principles	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant
	UETTDRTS14B – Install and maintain power system communication equipment
T2.11.26 Test equipment A — fundamental	UETTDRDS12B – Investigate quality of supply issues
	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS08B – Test, repair and calibrate protection relays and meters
	UETTDRTS12B – Conduct evaluation of primary plant
T2.11.27 Test equipment B — protection	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS08B – Test, repair and calibrate protection relays and meters
	UETTDRTS12B – Conduct evaluation of primary plant

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.11.28 Test equipment C — metering	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS05B – Test and maintain metering schemes
	UETTDRTS06B – Commission metering schemes
	UETTDRTS12B – Conduct evaluation of primary plant
T2.11.29 Test equipment D — control	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
T2.11.30 Test equipment E — field	UETTDRDS12B – Investigate quality of supply issues
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
T2.11.31 Primary plant testing	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRTS12B – Conduct evaluation of primary plant
T2.11.32 Quality of supply measures	UETTDRDS12B – Investigate quality of supply issues
T2.11.33 Geographic information systems principles	UETTDRDS19B Establish and manage geographical information system data
T2.11.34 SPARE CLAUSE	
T2.11.35 Secondary	UETTDRTS09B – Develop secondary isolation

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
Switching/isolation principles and sheet preparation	instructional documents
	UETTDRTS10B - Design secondary isolation instructional documents
T2.11.36 Disconnect and reconnect fixed wiring electrical equipment fundamentals	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS05B – Test and maintain metering schemes
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
T2.11.37 Negotiation techniques	UETTDRDS21B Manage transmission, sub-transmission and zone substation design process
	UETTDRTS13B – Undertake project management of substation augmentation and maintenance
T2.11.38 Disconnect and reconnect fixed wiring electrical equipment procedures	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS05B – Test and maintain metering schemes
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
T2.11.39 Project management	UETTDRDS10B – Prepare and appraise financial impact statements
	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRDS15B – Organise and implement line and easement surveys
	UETTDRTS13B – Undertake project management of substation augmentation and maintenance
T2.11.40 Harmonics	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	Plant
	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B - Design underground transmission systems
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS05B – Test and maintain metering schemes
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
T2.11.41 Fault-finding and diagnosing techniques	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS05B – Test and maintain metering schemes
	UETTDRTS06B – Commission metering schemes
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
	UETTDRTS14B – Install and maintain power system communication equipment
T2.11.42 Basic design characteristics of poles/structures and associated equipment	UETTDRDS05B – Design overhead distribution systems

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.11.43 Survey principles	UETTDRTP08B – Transmission tower stub setting
T2.11.44 Design characteristics of underground and overhead conductors and cables, poles and structures	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS06B – Design underground distribution systems
	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant
T2.11.45 Voltage regulations of feeders and associated equipment	NONE
T2.11.46 Distribution transformers fundamentals	UETTDRDS07B – Design distribution substations
	UETTDRDS20B Design customer substation
T2.11.47 Distribution transformers testing	UETTDRDS07B – Design distribution substations
	UETTDRDS20B Design customer substation
T2.11.48 Power test equipment	UETTDRDS23B – Design Transmission, Sub-transmission and Zone Substation Primary Plant
T2.11.49 Polyphase circuit analysis and application (pre-requisite E2.8.9 Circuit analysis)	UETTDRDS13B – Develop HV and LV distribution protection systems
T2.11.50 Design of circuit switching	NONE
T2.11.51 Distribution earthing system	UETTDRDS07B – Design distribution substations
	UETTDRDS25B - Design transmission, sub-transmission and zone substation earthing
T2.11.52 Distribution tariff principles	NONE

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.11.53 Protection schemes	UETTDRDS13B – Develop HV and LV distribution protection systems
	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
	UETTDRTS07B – Perform accuracy checks on instrument transformers
	UETTDRTS08B – Test, repair and calibrate protection relays and meters
	UETTDRTS09B – Develop secondary isolation instructional documents
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
	UETTDRTS14B – Install and maintain power system communication equipment
T2.11.54 Distribution system planning principles	NONE
T2.11.55 Quality standard principles	NONE
T2.11.56 Analysis protection targeting	UETTDRSO02B – Manage network faults
	UETTDRSO20A – Respond to complex protection operations
T2.11.57 Analysis control and protection information	UETTDRSO04B – Control generating plant
T2.11.58 Distribution underground line component fundamentals	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
T2.11.59 Generator control systems - EHV	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO21A – Manage network power

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	flows
	UETTDRTS07B – Perform accuracy checks on instrument transformers
	UETTDRTS08B – Test, repair and calibrate protection relays and meters
	UETTDRTS09B – Develop secondary isolation instructional documents
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
	UETTDRTS14B – Install and maintain power system communication equipment
T2.11.60 Transmission line component fundamentals	UETTDRSO08B – Develop and evaluate transmission switching programs
T2.11.61 Analysis network event records	UETTDRDS18B - Analyse and appraise fault and outage data
	UETTDRSO14B – Develop crisis management plans
T2.11.62 Preparing polices and procedures	UETTDRDS21B - Manage transmission, sub-transmission and zone substation design process
	UETTDRSO14B – Develop crisis management plans
	UETTDRTS13B – Undertake project management of substation augmentation and maintenance
T2.11.63 Prime mover principles	UETTDRSO04B – Control generating plant
T2.11.64 LV system load calculation principles	UETTDRSO06B – Develop LV distribution switching programs
T2.11.65 HV system load calculation principles	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B - Design underground

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	transmission systems
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
T2.11.66 EHV transmission system load calculation principles	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B - Design underground transmission systems
	UETTDRSO08B – Develop and evaluate transmission switching programs
T2.11.67 Zone substation modification design — principles	UETTDRDS14B – Design substation modifications
T2.11.68 Management of transmission, sub-transmission and zone substation design process — principles	UETTDRDS21B Manage transmission, sub-transmission and zone substation design process
T2.11.69 Transmission, sub-transmission and zone Substation building design process — principles	UETTDRDS22B - Design transmission, sub-transmission and zone substation buildings
T2.11.70 Transmission, sub-transmission and zone substation primary plant design process — principles	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant
T2.11.71 Transmission, sub-transmission and zone substation control and protection design process — principles	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
T2.11.72 Transmission, sub-transmission and zone substation earthing design process — principles	UETTDRDS25B - Design transmission, sub-transmission and zone substation earthing
T2.11.73 Transmission, sub-transmission and zone substation civil and structural design process — principles	UETTDRDS26B - Design transmission, sub-transmission and zone substation - civil and structural components

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
T2.11.74 Discrete protection devices	UETTDRSB15B – Maintain discrete protection and control systems
	UETTDRSB16B – Commission discrete protection and control systems

2.2.41 E2.1 Cables, conductors and terminations

E2.1 Cables, conductors and terminations

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
E2.1.1 Cable protection and support	UETTDRIS20B – Install and replace energy meters and associated equipment
E2.1.2 Cable types and applications	UETTDRIS20B – Install and replace energy meters and associated equipment
E2.1.3 Cables in buildings, structures and premises	UETTDRIS20B – Install and replace energy meters and associated equipment
E2.1.4 Basic cable and conductor terminations	UETTDRIS20B – Install and replace energy meters and associated equipment
E2.1.5.1 Power cable and conductor terminations	UETTDRIS20B – Install and replace energy meters and associated equipment
E2.1.5.2 Bus bar techniques	NONE
E2.1.6.1 Telecommunication cable and conductor terminations	UETTDRIS20B – Install and replace energy meters and associated equipment
E2.1.6.2 Telecommunication aerial cabling	NONE
E2.1.6.3 Telecommunication below ground cabling	NONE
E2.1.7.1 Performance (copper) data cable installation and terminations	NONE

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
E2.1.7.2 Coaxial cable installation and terminations	NONE
E2.1.7.3 Optical fibre cabling installation and terminations	NONE
E2.1.8 Electronic cable and conductor terminations	UETTDRIS20B – Install and replace energy meters and associated equipment

2.2.42 E2.3 Control technologies

E2.3 Control technologies

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
E2.3.13 Using supervisory control and data acquisition systems	UETTDRSO15A – Operate and monitor system equipment (SCADA)
E2.3.14 Supervisory control and data acquisition systems programming	NONE
E2.3.19 Control programming fundamentals	NONE
E2.3.20 Microcontroller programming basics	NONE

2.2.43 E2.4 Communications and computer technologies

E2.4 Communications and computer technologies

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
E2.4.3.2 Networking fundamentals	NONE

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
E2.4.11 Personal computers, hardware structure	NONE
E2.4.12.1 Computer hardware sub-assemblies	NONE
E2.4.14 Personal computer operating systems, basics	UETTDRSO15A – Operate and monitor system equipment (SCADA)
	UETTDRSO16A – Monitor and control the activities of field staff
E2.4.16 Personal computers, engineering applications software basic	UETTDRSO15A – Operate and monitor system equipment (SCADA)
E2.4.21 Client side programming	NONE
E2.4.22 Server scripting	NONE
E2.4.39 Internet, network basics	NONE
E2.4.40 Internet, network routing	NONE

2.2.44 E2.5 Drawings, diagrams, schedules, manuals, standards and regulations

E2.5 Drawings, diagrams, schedules, manuals, standards and regulations

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
E2.5.1.1 Drawings interpretation and sketching	NONE
E2.5.1.2 Drawings and diagrams	UETTDRDS19B Establish and manage geographical information system data
E2.5.2.1 Technical standards, regulations and codes for general electrical installations	NONE

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
E2.5.2.2 Technical standards, regulations and codes for special electrical instalations	NONE
E2.5.2.3 Technical standards, regulations and codes for testing and tagging portable and cord connected electrical apparatus	NONE
E2.5.3 Technical standards, regulations and codes for lifts and escalators	NONE
E2.5.4 Technical standards, regulations and codes rail networks	NONE
E2.5.5 Technical standards, regulations and codes for extra low voltage work	NONE
E2.5.6 Technical standards, regulations and codes for refrigeration and air conditioning	NONE
E2.5.7 Technical standards, regulations and codes for telecommunications cabling	NONE
E2.5.11 Environmental and heritage awareness	NONE

2.2.45 E2.8 Electrical principles

E2.8 Electrical principles

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
E2.8.1.1 Basic electrical principles	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDREL04B – Working safely near live

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	electrical apparatus as non electrical worker
E2.8.1.2 Fundamental electrical principles	NONE
E2.8.2.1 Direct current circuit principles	UETTDRIS29A – Analyse and develop solutions for problems in multiple d.c. circuits
E2.8.2.2 Alternating current principles - power	UETTDRCJ02B – Install and maintain de-energised LV underground paper insulated cables
	UETTDRCJ03B – Install and maintain de-energised HV underground paper insulated cables
	UETTDRCJ06B – Install and maintain de-energised LV underground polymeric cables
	UETTDRCJ13B – Install and maintain network infrastructure LV underground cables
	UETTDRIS01B – Install electrical equipment (network infrastructure)
	UETTDRIS06B – Install and maintain network infrastructure electrical equipment
	UETTDRIS12B – Install and maintain poles/structures and associated hardware
	UETTDRIS27B – Install and maintain overhead distribution network infrastructure
	UETTDRIS31A – Analyse and develop solutions for problems in single and three phase low voltage circuits
	UETTDRTP07B – Maintain transmission towers and associated hardware
	UETTDRTP14B – Install and maintain overhead transmission network infrastructure
	UETTDRTP15B – Install and maintain transmission network infrastructure electrical

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	equipment
E2.8.3 Power factor	NONE
E2.8.4 Three phase circuits	NONE
E2.8.5 Magnetism	UETTDRCJ02B – Install and maintain de-energised LV underground paper insulated cables
	UETTDRCJ03B – Install and maintain de-energised HV underground paper insulated cables
	UETTDRCJ06B – Install and maintain de-energised LV underground polymeric cables
	UETTDRCJ13B – Install and maintain network infrastructure LV underground cables
	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDRIS01B – Install electrical equipment (network infrastructure)
	UETTDRTP07B – Maintain transmission towers and associated hardware
	UETTDRVC03B – Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus
E2.8.6 Electromagnetic principles	UETTDRCJ02B – Install and maintain de-energised LV underground paper insulated cables
	UETTDRCJ03B – Install and maintain de-energised HV underground paper insulated cables
	UETTDRCJ06B – Install and maintain de-energised LV underground polymeric cables
	UETTDRCJ13B – Install and maintain network infrastructure LV underground cables

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDRIS01B – Install electrical equipment (network infrastructure)
	UETTDRIS06B – Install and maintain network infrastructure electrical equipment
	UETTDRIS12B – Install and maintain poles/structures and associated hardware
	UETTDRIS27B – Install and maintain overhead distribution network infrastructure
	UETTDRIS30A – Analyse and develop solutions for problems in electromagnetic circuits
	UETTDRTP07B – Maintain transmission towers and associated hardware
	UETTDRTP14B – Install and maintain overhead transmission network infrastructure
	UETTDRTP15B – Install and maintain transmission network infrastructure electrical equipment
E2.8.7 Harmonic fundamentals	NONE
E2.8.8 Electrotechnology science and materials	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDRVC03B – Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus
E2.8.9.1 Circuit analysis	NONE
E2.8.9.2 Electrical power circuit analysis	UETTDRDS22B Design transmission, sub-transmission and zone substation buildings
E2.8.9.3 Polyphase power circuit analysis	NONE
E2.8.10.1 Engineering maths	NONE

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
fundamentals	
E2.8.10.2 Engineering maths	NONE
E2.8.10.3 Advanced engineering maths	NONE
E2.8.11 Power engineering computations	UETTDRDS14B – Design substation modifications
E2.8.12 Electrical concepts and applications	UETTDRIS28A – Analyse and develop solutions for problems in extra-low voltage, single path circuits

2.2.46 E2.9 Electronic principles and applications

E2.9 Electronic principles and applications

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
E2.9.1.1 Electronic component basics	NONE
E2.9.4.1 Digital electronic fundamentals	NONE
E2.9.5.1 Micro programming fundamentals	NONE
E2.9.5.2 Microcontroller fundamentals	NONE
E2.9.8 Amplifier fundamentals	NONE
E2.9.12 Electronic fault finding	NONE
E2.9.63 Direct current power supplies	NONE

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2.2.47 E2.11 Equipment and tools

E2.11 Equipment and tools

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
E2.11.1 Hand tools	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDRIS30A – Analyse and develop solutions for problems in electromagnetic circuits
	UETTDRTP02B – Establish and reinstate a transmission tower work site
	UETTDRTP03B – Erect transmission towers
	UETTDRTP04B – Erect transmission tower hardware
	UETTDRVC02B – Operate vegetation control plant, machinery and equipment near live electrical apparatus
E2.11.2.1 Power tools	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDRTP02B – Establish and reinstate a transmission tower work site
	UETTDRTP03B – Erect transmission towers
	UETTDRTP04B – Erect transmission tower hardware
	UETTDRVC02B – Operate vegetation control plant, machinery and equipment near live electrical apparatus
E2.11.3.1 Fixing and support devices and techniques	NONE
E2.11.3.2 Mobile plant, tools and equipment	NONE
E2.11.4 Dismantling and assembling techniques	NONE

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
E2.11.5 Basic electrical testing and measuring devices and techniques	NONE
E2.11.6.1 Advance electrical testing and measuring devices	NONE
E2.11.7.1 Electronic testing and measuring devices and techniques	NONE
E2.11.7.2 Advanced electronic testing and measuring devices and techniques	NONE
E2.11.11.1 Electronic soldering equipment and techniques	NONE

2.2.48 E2.18 Safety

Safety

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
E2.18.1 Occupational Health and Safety principles	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS06B – Design underground distribution systems
	UETTDRDS07B – Design distribution substations
	UETTDRDS08B – Design public lighting systems
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS10B – Prepare and appraise financial impact statements

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRDS12B – Investigate quality of supply issues
	UETTDRDS13B – develop HV and LV distribution protection systems
	UETTDRDS14B – Design substation modifications
	UETTDRDS15B – Organise and implement line and easement surveys
	UETTDRDS16B - Develop planned outage strategies
	UETTDRDS17B - Review asset management strategies
	UETTDRDS18B - Analyse and appraise fault and outage data
	UETTDRDS19B - Establish and manage geographical information system data
	UETTDRDS20B - Design customer substation
	UETTDRDS21B - Manage transmission, sub-transmission and zone substation design process
	UETTDRDS22B - Design transmission, sub-transmission and zone substation buildings
	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant
	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
	UETTDRDS25B - Design transmission, sub-transmission and zone substation earthing

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRDS26B - Design transmission, sub-transmission and zone substation - civil and structural components
	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B - Design underground transmission systems
	UETTDREL01B – Apply environmental and sustainable energy procedures
	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDREL03B – Comply with environmental and incidental response procedures
	UETTDREL04B – Working safely near live electrical apparatus as non electrical worker
	UETTDREL05B – Respond to technical enquiries and requests
	UETTDRIS25B – Contribute to coordinated high voltage live line work
	UETTDRIS28A – Analyse and develop solutions for problems in extra-low voltage, single path circuits
	UETTDRIS29A – Analyse and develop solutions for problems in multiple d.c. circuits
	UETTDRIS30A – Analyse and develop solutions for problems in electromagnetic circuits
	UETTDRIS31A – Analyse and develop solutions for problems in single and three phase low voltage circuits
	UETTDRSB01B – Diagnose and rectify faults in power system substation environment
	UETTDRSB02B – Carry out substation

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	inspection
	UETTDRSB03B – Install and maintain substation DC systems
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB06B – Install high current DC switchgear and equipment
	UETTDRSB07B – Maintain high current DC switchgear and equipment
	UETTDRSB09B – Maintain voltage regulating equipment - capacitor banks
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers
	UETTDRSB13B – Install HV plant and equipment
	UETTDRSB14B – Carry out thermovision surveys
	UETTDRSB15B – Maintain discrete protection and control systems
	UETTDRSB16B – Commission discrete protection and control systems
	UETTDRSB17B – Maintain distribution field devices
	UETTDRSB18B – Commission distribution field devices

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRSO02B – Manage network faults
	UETTDRSO03B – Manage critical events
	UETTDRSO04B – Control generating plant
	UETTDRSO05B – Manage HV distribution and sub transmission network demand
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO09B – Coordinate LV distribution networks
	UETTDRSO10B – Coordinate HV distribution and sub transmission networks
	UETTDRSO11B – Manage transmission networks
	UETTDRSO12B – Manage transmission network demand
	UETTDRSO13B – Coordinate LV distribution network demand
	UETTDRSO14B – Develop crisis management plans
	UETTDRSO15A – Operate and monitor system equipment (SCADA)
	UETTDRSO16A – Monitor and control the activities of field staff
	UETTDRSO17A – Cordinate HV transmission networks
	UETTDRSO18A – Respond to

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	discrete/interdependent protection operations
	UETTDRSO20A – Respond to complex protection operations
	UETTDRSO21A – Manage network power flows
	UETTDRTP02B – Establish and reinstate a transmission tower work site
	UETTDRTP03B – Erect transmission towers
	UETTDRTP04B – Erect transmission tower hardware
	UETTDRTP05B – Pre-tension stringing transmission overhead conductors and cables
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS02B – Commission network protection and control systems (interdependent)
	UETTDRTS03B – Conduct evaluation of power system faults within a substation
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS05B – Test and maintain metering schemes
	UETTDRTS06B – Commission metering schemes
	UETTDRTS07B – Perform accuracy checks on instrument transformers
	UETTDRTS08B – Test, repair and calibrate protection relays and meters
	UETTDRTS09B – Develop secondary isolation instructional documents

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRTS10B - Design secondary isolation instructional documents
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
	UETTDRTS12B – Conduct evaluation of primary plant
	UETTDRTS13B – Undertake project management of substation augmentation and maintenance
	UETTDRTS14B – Install and maintain power system communication equipment
	UETTDRTS15B – Maintain network protection and control systems (complex)
	UETTDRTS16B – Commission network protection and control systems (complex)
	UETTDRVC01B – Cut vegetation above ground outside live work zone near live electrical apparatus (climbing)
	UETTDRVC02B – Operate vegetation control plant, machinery and equipment near live electrical apparatus
	UETTDRVC03B – Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus
	UETTDRVC04B – Assess vegetation and recommend control measures for work near live electrical apparatus
	UETTDRVC05B – Cut vegetation above ground outside live work zone near live electrical apparatus (platform)
	UETTDRVC06B – Cut vegetation at ground level outside ‘vegetation exclusion zone’ near live electrical apparatus

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRVC07B – Monitor safety compliance for vegetation work near live electrical apparatus
	UETTDRVC08B – Safe use of Elevating Work Platform (EWP) near live electrical apparatus
E2.18.2 Electrical safe working practices	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS06B – Design underground distribution systems
	UETTDRDS07B – Design distribution substations
	UETTDRDS08B – Design public lighting systems
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS10B – Prepare and appraise financial impact statements
	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRDS12B – Investigate quality of supply issues
	UETTDRDS13B – Develop HV and LV distribution protection systems
	UETTDRDS14B – Design substation modifications
	UETTDRDS15B – Organise and implement line and easement surveys
	UETTDRDS16B - Develop planned outage strategies
	UETTDRDS17B - Review asset management strategies

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRDS18B - Analyse and appraise fault and outage data
	UETTDRDS19B - Establish and manage geographical information system data
	UETTDRDS20B - Design customer substation
	UETTDRDS21B - Manage transmission, sub-transmission and zone substation design process
	UETTDRDS22B - Design transmission, sub-transmission and zone substation buildings
	UETTDRDS23B - Design Transmission, Sub-transmission and Zone Substation Primary Plant
	UETTDRDS24B - Design transmission, sub-transmission and zone substation protection and control systems
	UETTDRDS25B - Design transmission, sub-transmission and zone substation earthing
	UETTDRDS26B - Design transmission, sub-transmission and zone substation - civil and structural components
	UETTDRDS27B - Design overhead transmission systems
	UETTDRDS28B - Design underground transmission systems
	UETTDREL02B – Operate Plant and Equipment near live electrical conductors/apparatus
	UETTDREL03B – Comply with environmental and incidental response procedures
	UETTDRIS25B – Contribute to coordinated high voltage live line work
	UETTDRIS28A – Analyse and develop solutions

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	for problems in extra-low voltage, single path circuits
	UETTDRIS29A – Analyse and develop solutions for problems in multiple d.c. circuits
	UETTDRIS30A – Analyse and develop solutions for problems in electromagnetic circuits
	UETTDRIS31A – Analyse and develop solutions for problems in single and three phase low voltage circuits
	UETTDRSB01B – Diagnose and rectify faults in power system substation environment
	UETTDRSB02B – Carry out substation inspection
	UETTDRSB03B – Install and maintain substation DC systems
	UETTDRSB04B – Maintain HV power system breakers
	UETTDRSB05B – Maintain HV power system transformers and instrument transformers
	UETTDRSB06B – Install high current DC switchgear and equipment
	UETTDRSB07B – Maintain high current DC switchgear and equipment
	UETTDRSB09B – Maintain voltage regulating equipment - capacitor banks
	UETTDRSB10B – Maintain HV power system static VAR compensators
	UETTDRSB11B – Maintain HV power system synchronous condensers
	UETTDRSB12B – Maintain voltage regulating equipment - on load tapchangers
	UETTDRSB13B – Install HV plant and

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	equipment
	UETTDRSB14B – Carry out thermovision surveys
	UETTDRSB15B – Maintain discrete protection and control systems
	UETTDRSB16B – Commission discrete protection and control systems
	UETTDRSB17B – Maintain distribution field devices
	UETTDRSB18B – Commission distribution field devices
	UETTDRSO02B – Manage network faults
	UETTDRSO03B – Manage critical events
	UETTDRSO04B – Control generating plant
	UETTDRSO05B – Manage HV distribution and sub transmission network demand
	UETTDRSO06B – Develop LV distribution switching programs
	UETTDRSO07B – Develop HV distribution and sub transmission switching programs
	UETTDRSO08B – Develop and evaluate transmission switching programs
	UETTDRSO09B – Coordinate LV distribution networks
	UETTDRSO10B – Coordinate HV distribution and sub transmission networks
	UETTDRSO11B – Manage transmission networks
	UETTDRSO12B – Manage transmission network demand

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRSO13B – Coordinate LV distribution network demand
	UETTDRSO14B – Develop crisis management plans
	UETTDRSO15A – Operate and monitor system equipment (SCADA)
	UETTDRSO16A – Monitor and control the activities of field staff
	UETTDRSO17A – Coordinate HV transmission networks
	UETTDRSO18A – Respond to discrete/interdependent protection operations
	UETTDRSO20A – Respond to complex protection operations
	UETTDRSO21A – Manage network power flows
	UETTDRTP03B – Erect transmission towers
	UETTDRTP04B – Erect transmission tower hardware
	UETTDRTP05B – Pre-tension stringing transmission overhead conductors and cables
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS02B – Commission network protection and control systems (interdependent)
	UETTDRTS03B – Conduct evaluation of power system faults within a substation
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS05B – Test and maintain metering

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	schemes
	UETTDRTS06B – Commission metering schemes
	UETTDRTS07B – Perform accuracy checks on instrument transformers
	UETTDRTS08B – Test, repair and calibrate protection relays and meters
	UETTDRTS09B – Develop secondary isolation instructional documents
	UETTDRTS10B - Design secondary isolation instructional documents
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
	UETTDRTS12B – Conduct evaluation of primary plant
	UETTDRTS13B – Undertake project management of substation augmentation and maintenance
	UETTDRTS14B – Install and maintain power system communication equipment
	UETTDRTS15B – Maintain network protection and control systems (complex)
	UETTDRTS16B – Commission network protection and control systems (complex)
	UETTDRVC01B – Cut vegetation above ground outside live work zone near live electrical apparatus (climbing)
	UETTDRVC02B – Operate vegetation control plant, machinery and equipment near live electrical apparatus
	UETTDRVC03B – Plan for the removal of vegetation up to vegetation exclusion zone near

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	live electrical apparatus
	UETTDRVC04B – Assess vegetation and recommend control measures for work near live electrical apparatus
	UETTDRVC05B – Cut vegetation above ground outside live work zone near live electrical apparatus (platform)
	UETTDRVC06B – Cut vegetation at ground level outside 'vegetation exclusion zone' near live electrical apparatus
	UETTDRVC07B – Monitor safety compliance for vegetation work near live electrical apparatus
	UETTDRVC08B – Safe use of Elevating Work Platform (EWP) near live electrical apparatus
E2.18.8.2 Occupational Health and Safety, enterprise responsibilities	UETTDRDS05B – Design overhead distribution systems
	UETTDRDS06B – Design underground distribution systems
	UETTDRDS07B – Design distribution substations
	UETTDRDS08B – Design public lighting systems
	UETTDRDS09B – Prepare and manage detailed construction plans for electrical system infrastructure
	UETTDRDS10B – Prepare and appraise financial impact statements
	UETTDRDS11B – Manage electrical infrastructure projects
	UETTDRDS12B – Investigate quality of supply issues
	UETTDRDS13B – Develop HV and LV

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	distribution protection systems
	UETTDRDS14B – Design substation modifications
	UETTDRDS15B – Organise and implement line and easement surveys
	UETTDRDS16B - Develop planned outage strategies
	UETTDRDS17B - Review asset management strategies
	UETTDRDS18B - Analyse and appraise fault and outage data
	UETTDRDS19B - Establish and manage geographical information system data
	UETTDRDS20B - Design customer substation
	UETTDRTS01B – Maintain network protection and control systems (interdependent)
	UETTDRTS02B – Commission network protection and control systems (interdependent)
	UETTDRTS03B – Conduct evaluation of power system faults within a substation
	UETTDRTS04B – Design testing and commissioning procedures for substation and field devices
	UETTDRTS05B – Test and maintain metering schemes
	UETTDRTS06B – Commission metering schemes
	UETTDRTS07B – Perform accuracy checks on instrument transformers
	UETTDRTS08B – Test, repair and calibrate protection relays and meters

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Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
	UETTDRTS09B – Develop secondary isolation instructional documents
	UETTDRTS10B - Design secondary isolation instructional documents
	UETTDRTS11B – Maintain, test and commission voltage regulating equipment
	UETTDRTS12B – Conduct evaluation of primary plant
	UETTDRTS13B – Undertake project management of substation augmentation and maintenance
E2.18.9 Electronic safe working practices	UETTDRDS21B Manage transmission, sub-transmission and zone substation design process

2.2.49 E2.20 Sustainable Energy and Environment

E2.20 Sustainable Energy and Environment

Essential Knowledge & Associated Skills **Clause**	**Competency Standard Units (CSUs)**
E2.20.1 Sustainable energy principles	NONE
E2.20.2 Environmental and building regulation	NONE

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3.1 Language, Literacy and Numeracy

Volume 2 Part 3

3.1 Language, Literacy and Numeracy

The reading, writing and numeracy skills/competencies in each Competency Standard Unit describe the recommended pre-requisite 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 in 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 organisations
- 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

Note: It is important to note what the five levels of competence interrelated with six aspects of communication of the National Reporting System is not intended to be. It 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*".

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, e.g. 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, e.g. writes a briefing and recommends purchase or use of a particular system. Uses technological principles to reduce constraints presented by environmental or physical capacity, e.g. 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, e.g. 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

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Scale	IoC*	**Indicators of Competence**	**Technical Communication**
			computer skills to prepare a report, e.g. 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 containing data which includes some abstraction, symbolism, and technicality presented in graphic, diagrammatic, formatted or visual form.	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. Uses guidelines to ensure technological equipment is used to its full capacity. Uses a computer to prepare a typed report from a had-drafted report. Compares and contrasts different technologies and their impact, e.g. 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, e.g. management committees, tri-partite committees. Reads a complex diagram to identify components and procedures for dealing with a technical fault or breakdown.
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, e.g. 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, e.g. how to use an automatic teller machine. Completes a formatted workplace test, e.g. damage or breakdown report. Writes a brief report on uses of technology, e.g. 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, e.g. 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, e.g. describes a damaged part of a machine to facilitate repair. Extracts information from a list with language and numeracy components, e.g. price lists of components for computer systems. Records simple and routine information using the telephone, e.g. takes a phone message, on a form designed for this purpose. Interprets instructions, which combine pictorial and written information, e.g. 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, e.g. 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, e.g. 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.

Note: IoC* - Indicators of Competency sub-level

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, e.g. 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, e.g. writes a briefing and recommends purchase or use of a particular system. Uses technological principles to reduce constraints presented by environmental or physical capacity, e.g. 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, e.g. 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, e.g. CV and job application letter.
4	4.4	Communicates complex	Compares and contrasts views on technology

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Scale	IoC*	**Indicators of Competence**	**Technical Communication**
	4.5	relationships between ideas by matching style of writing to purpose and audience. Generates written texts reflecting a range of genres and using appropriate structure and layout.	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. Uses guidelines to ensure technological equipment is used to its full capacity. Uses a computer to prepare a typed report from a had-drafted report. Compares and contrasts different technologies and their impact, e.g. 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, e.g. 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, e.g. 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.

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Scale	IoC*	Indicators of Competence	Technical Communication
			Uses the word processing program on a computer to produce texts. Writes simple instructions for using familiar technology, e.g. how to use an automatic teller machine. Completes a formatted workplace test, e.g. damage or breakdown report. Writes a brief report on uses of technology, e.g. 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, e.g. 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, e.g. describes a damaged part of a machine to facilitate repair. Extracts information from a list with language and numeracy components, e.g. price lists of components for computer systems. Records simple and routine information using the telephone, e.g. takes a phone message, on a form designed for this purpose. Interprets instructions, which combine pictorial and written information, e.g. 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	Recognisees very short, explicit, pictorial texts, e.g. 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, e.g. uses an automatic teller machine by following instructions given graphically on the screen. Types own name or single words into a

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Scale	IoC*	Indicators of Competence	Technical Communication
		opinion drawing from a modelled text.	computer-assisted learning program.

Note: IoC* - Indicators of Competency sub-level

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, e.g. 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, e.g. 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, e.g. simple and compound interest to calculate and contrast the interest incurred in borrowing money from financial institutions.
4	4.10 4.11	Selects and investigates appropriate mathematical information and relationships embedded in an activity, item	Uses ratio and scale to interpret dimensions on a basic plan. Applies similarity and ratio to estimate and calculate lengths, e.g. finds height of a building,

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Scale	IoC*	Indicators of Competence	Technical Communication
		or text.	a tree.
	4.12	Selects and applies an expanding range of mathematical strategies flexibly to solve problems in a variety of contexts.	Compares quality and costs of using imported vs Australian tiles, discount vs brand name paints.
	4.13	Examines and questions the appropriateness, possible interpretations and implications of aspects of a mathematical activity.	Presents information in appropriate graphical format to show different interpretations and influences, e.g. analysis of government spending on education.
		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, e.g. 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, e.g. 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

Numeracy - continued

Scale	IoC*	Indicators of Competence	Technical Communication
3	3.10	Selects appropriate mathematical information embedded in a real life activity, item or text.	Uses a distance scale to find the shortest route between two locations on a map and considers road terrain conditions in deciding preferred route.
	3.11	Selects and applies a range of mathematical strategies to solve problems in a number of contexts which are familiar and may be interrelated.	Expresses and calculates with metric quantities, e.g. interprets and costs quantities of cheese given different forms such as 350g, 0.35kg.
	3.12	Reflects on and questions reasonableness and appropriateness of the purpose, process and outcomes of a mathematical activity.	Measures common three-dimensional shapes, e.g. room, and represents the information on an appropriate diagram drawn to scale.
	3.13	Uses oral and written informal and formal language and representation including symbols and diagrams to	Calculates with common, fractions and metric measurements, e.g. adjusts the quantities in a recipe by halving or

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Scale	IoC*	Indicators of Competence	Technical Communication
		communicate mathematically.	doubling to obtain the required amount. Uses a variety of methods to analyse advertising by comparing savings on a number of different items, e.g. 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 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 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 and written informal and formal language and representation some symbols and diagrams to communicate mathematically.	Compares measurements taken with estimated lengths of familiar objects, e.g. 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 oral language and representation including familiar symbols and diagrams to communicate mathematically.	Estimates lengths of familiar objects using metric units, e.g. a person's height, height of doorway.

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List of Training Package qualifications 2

List of Training Package qualifications

The Electricity Supply Industry (ESI) – Transmission, Distribution and Rail Sector Training Package (UET09) is made up of two (2) volumes. The following qualifications are contained in this Package:

AQF	Qualification Title	Qualification code
1	Nil	
2	Certificate II in ESI — Vegetation Control Certificate II in ESI — Transmission Line Assembly Certificate II in National Broadband Network Cabling Installation and Maintenance	UET20110 UET20209 UET20511
3	Certificate III in ESI — Transmission Certificate III in ESI — Distribution Certificate III in ESI — Rail Traction Certificate III in ESI — Cable Jointing	UET30109 UET30209 UET30309 UET30409
4	Certificate IV in ESI — Power Systems Certificate IV in ESI — Substation Certificate IV in ESI — Network Infrastructure	UET40109 UET40209 UET40309
5	Diploma of ESI — Power Systems *Diploma of ESI — Network Infrastructure**	UET50109
6	Advanced Diploma of ESI — Power Systems	UET60109

* To be developed as part of continuous improvement.

Note: Qualifications in italics have been reserved and will be developed as part of EE-Oz Training Standards continuous improvement processes associated with this Training Package.

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UET20110 Certificate II in ESI - Vegetation Control

Modification History

Not Applicable

Description

Scope:

Those gaining this qualification will be able to control the growth of vegetation near powerlines. Encompassed is compliance with 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.

Pathways Information

Not Applicable

Licensing/Regulatory Information

Not Applicable

Entry Requirements

Not Applicable

Employability Skills Summary

Not Applicable

Packaging Rules

Scope:

Those gaining this qualification will be able to control the growth of vegetation near powerlines. Encompassed is compliance with 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.

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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**
- The required combination of Elective Units selected from Group A and/or Group B, where the sum of the weighting value is in accord with that assigned to this qualification and quantified below, **and**
- All the required prerequisite competency standard units have been met as required.

Core Competency Standard Units All Core competency standard units to be achieved		**Weighting Points**
UEENEEE001B	Apply OHS practices in the workplace	20
UETTDREL03B	Comply with environmental and incidental response procedures	40
UETTDREL04B	Working safely near live electrical apparatus as non electrical worker	40
UETTDRVC02B	Operate vegetation control plant, machinery and equipment near live electrical apparatus	50
UETTDRVC03B	Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus	50
UETTDRVC07B	Monitor safety compliance for vegetation work near live electrical apparatus	50
Total points in core		**250**

Elective Competency Standard Units Complete Elective units to achieve a total of weighting of 90 points from the following groups:			
Group		**Minimum points**	**Maximum points**
A	**Imported and Common Elective Units** Imported units from	0	50

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	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 in the ESI - Transmission, Distribution and Rail Sector Training Package Training Package, their weighting will be 10 points.		
B	**Qualification Electives - Schedule 2a Vegetation Control** You may select all your elective units from this Group	40	90

Group A - Imported and Common Elective Units		**Weighting Points**
	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 or higher. If units have not being assigned a weighting in the ESI - Transmission, Distribution and Rail Sector Training Package Training Package, their weighting will be 10 points. Note: For further information see *Transition to NQC Packaging Rules for Flexibility*, Page 251, UET09 ESI - Transmission, Distribution and Rail Sector Training Package, Version 2.1,Volume 1 Preliminary Information.	Up to 50 Points

Group B Qualification Electives - Schedule 2a Vegetation Control	**Weighting**

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Complete units to at least 40 points from this group. You may select all your elective units from this Group.		**Points**
UETTDRVC01B	Cut vegetation above ground outside live work zone near live electrical apparatus (climbing)	50
UETTDRVC04B	Assess vegetation and recommend control measures for work near live electrical apparatus	50
UETTDRVC05B	Cut vegetation above ground outside live work zone near live electrical apparatus (platform)	45
UETTDRVC06B	Cut vegetation at ground level outside 'vegetation exclusion zone' near live electrical apparatus	45
UETTDRVC08B	Safe use of Elevating Work Platform (EWP) near live electrical apparatus	50

Note: 1. Prerequisite pathways shall be identified and met for all elective units selected.

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UET20209 Certificate II in ESI - Transmission Line Assembly

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Not Applicable

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:

1. All the Core Units, **and**

2. A combination of Elective Units selected from Schedule 2b - Transmission Line Assembly, where the sum of the weighting value is in accord with that assigned to this qualification and quantified below, **and**

3. All of any prerequisite requirements.

Core Units All to be completed

UEENEEE001B Apply OHS practices in the workplace

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UETTDREL03B Comply with environmental and incidental response procedures

UETTDRTP03B Erect transmission towers

Elective Units: **Acquire any combination of Elective Group Units having a total sum of at least 60 weighting points from Schedule 2b - Transmission Line Assembly**.

Schedule 2b forms part of this qualification structure.

And all of any prerequisite requirements acquired.

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UET20511 Certificate II in National Broadband Network Cabling (Electricity Supply Industry Assets)

Modification History

Not Applicable

Description

Scope

This qualification provides competencies to install and maintain national broadband network communications cabling following prescribed routines.

Pathways Information

Not Applicable

Licensing/Regulatory Information

Not Applicable

Entry Requirements

Not Applicable

Employability Skills Summary

Not Applicable

Packaging Rules

Scope

This qualification provides competencies to install and maintain national broadband network communications cabling following prescribed routines.

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

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Group B, to achieve a total weighting of 120 points, **and**

All the required prerequisite competency standard units.

Core Competency Standard Units All Core competency standard units to be achieved		**Weighting Points**
UEENEEE001B	Apply OHS practices in the workplace	20
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components	40
UEENEEE005B	Fix and secure equipment	20
UEENEEE037B	Document occupational hazards and risks in electrotechnology	20
UEENEEK042B	Participate in environmentally sustainable work practices	20
UETTDREL04B	Working safely near live electrical apparatus for non electrical worker	40
UETTDRIS81A	Install and maintain telecommunications infrastructure on electricity supply industry assets	80
Total points in core		**240**

Elective Competency Standard Units

Complete Elective units to achieve a total weighting of 120 points from the following groups:

Group	**Rules**	**Minimum points**	**Maximum points**
A	**Imported and Common Elective Units**	**0**	**60**
B	**Qualification Elective Units** **You may select all your elective units from this Group**	**60**	**120**

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Group A Complete units to a maximum weighting of 60 points		**Weighting Points**
CPCCCM2007A	Use explosive power tools	15
TLID3507C	Operate a boom type elevating work platform	30
TLILIC508A	Licence to operate a boom-type elevating work platform (boom length 11 metres or more)	30
CPCCOHS1001A	Work safely in the construction industry	10
HLTCPR201A	Perform CPR	10
RIIOHS202A	Enter and work in confined spaces	30
RIIOHS204A	Work safely at heights	20
RIIOHS205A	Control traffic with stop-slow bat	10
UEENEEC001B	Maintain documentation	20
UEENEEC008B	Receive and store materials and equipment for electrotechnology work	20
UEENEEC010B	Deliver a service to customers	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 2. If units have not being assigned a weighting in the ESI Transmission, Distribution and Rail Training Package, their weighting will be 10 points. Note: For further information see *Transition to NQC Packaging Rules for Flexibility*, Page 21, UET09 ESI Transmission, Distribution and Rail Training Package, Version 2.2,Volume 1 Preliminary Information.	Up to 60 points

Group B Qualification Electives. At least 60 points to be achieved from this group. You may select all your elective units from this Group.		**Weighting Points**
ICTCBL2065A	Splice and terminate optical fibre cable for carriers and	40

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	service providers	
ICTCBL2068A	Install a telecommunications service to a building	60
UEENEEE003B	Solve problems in extra low voltage single path circuits	40
UEENEEE004B	Solve problems in multiple path d.c. circuits	40
UEENEEE051B	Transport apparatus and materials	60
UEENEEF006B	Solve problems in data and voice communications circuits	40
UEENEEF007B	Set up wireless capabilities of communications and data storage devices	40
UETTDREL02B	Operate plant and equipment near live electrical conductors/apparatus	40

Certificate III

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UET30109 Certificate III in ESI - Transmission

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Not Applicable

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:

1. All the Core Units, **and**

2. A combination of Elective Units selected from Schedule 3, where the sum of the weighting value is in accord with that assigned to this qualification and quantified below, **and**

3. All of any prerequisite requirements.

Core Units All to be completed

UETTDREL01B. Apply environmental and sustainable energy procedures

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UETTDREL02B	Operate plant and equipment near live electrical conductors/apparatus
UETTDREL04B	Working safely near live electrical apparatus as non electrical worker
UETTDRIS12B	Install and maintain poles/structures and associated hardware
UETTDRTP06B	Erect transmission towers and associated hardware
UETTDRTP07B	Maintain transmission towers and associated hardware
UETTDRTP09B	Install and maintain overhead conductors and cables (towers).
UETTDRTP10B	Inspect overhead structures and electrical apparatus (towers)
UEENEEE001B	Apply OHS practices in the workplace
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE003B	Solve problems in extra-low voltage, single path circuits
UEENEEE004B	Solve problems in multiple path DC circuits
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals
UEENEEG001B	Solve problems in electromagnetic circuits
UEENEEG002B	Solve problems in single and three phase low voltage circuits

Electives Units: **Acquire any combination of Elective Group Units having a total sum of at least 360 weighting points from Schedule 3 Certificate III Units**.

Core Units in this Qualification cannot be included.

Schedule 3 forms part of this qualification structure.

And all of any prerequisite requirements acquired.

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UET30209 Certificate III in ESI - Distribution

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Not Applicable

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:

1. All the Core Units, **and**

2. A combination of Elective Units selected from Schedule 3 Certificate III Units, where the sum of the weighting value is in accord with that assigned to this qualification and quantified below, **and**

3. All of any prerequisite requirements.

Core Units All to be completed

UETTDRDP01B	Inspect overhead structures and electrical apparatus (poles /structures)

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UETTDRDP02B	Maintain overhead energised LV conductors and cables
UETTDREL01B	Apply environmental and sustainable energy procedures
UETTDREL02B	Operate plant and equipment near live electrical conductors/apparatus
UETTDREL04B	Working safely near live electrical apparatus as non electrical worker
UETTDRIS01B	Install electrical equipment (network infrastructure)
UETTDRIS02B	Maintain electrical equipment (network infrastructure)
UETTDRIS12B	Install and maintain poles/structures and associated hardware
UETTDRIS14B	Install and maintain overhead conductors and cables (poles and structures)
UEENEEE001B	Apply OHS practices in the workplace
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE003B	Solve problems in extra-low voltage, single path circuits
UEENEEE004B	Solve problems in multiple path DC circuits
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals
UEENEEG001B	Solve problems in electromagnetic circuits
UEENEEG002B	Solve problems in single and three phase low voltage circuits

Electives Units: **Acquire any combination of Elective Group Units having a total sum of at least 360 weighting points from Schedule 3 - Certificate III Units**.

Core Units in this Qualification cannot be included. **Schedule 3 forms part of this qualification structure**.

And all of any prerequisite requirements acquired.

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UET30309 Certificate III in ESI - Rail Traction

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Not Applicable

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:

1. All the Core Units, **and**

2. A combination of Elective Units selected from Schedule 3 - Certificate III Units, where the sum of the weighting value is in accord with that assigned to this qualification and quantified below, **and**

3. All of any prerequisite requirements.

Core Units All to be completed

UETTDREL01B Apply environmental and sustainable energy procedures

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UETTDREL02B	Operate plant and equipment near live electrical conductors/apparatus
UETTDREL04B	Working safely near live electrical apparatus as non electrical worker
UETTDRIS12B	Install and maintain poles/structures and associated hardware
UETTDRIS14B	Install and maintain overhead conductors and cables (poles and structures)
UETTDRRT01B	Install overhead traction wiring systems
UETTDRRT02B	Maintain overhead traction wiring systems
UETTDRRT07B	Install overhead traction equipment and components
UETTDRRT08B	Maintain overhead traction equipment and components
UEENEEE001B	Apply OHS practices in the workplace
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE003B	Solve problems in extra-low voltage, single path circuits
UEENEEE004B	Solve problems in multiple path DC circuits
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals
UEENEEG001B	Solve problems in electromagnetic circuits
UEENEEG002B	Solve problems in single and three phase low voltage circuits

Electives Units: **Acquire any combination of Elective Group Units having a total sum of at least 360 weighting points from Schedule 3 - Certificate III Units**.

Core Units in this Qualification cannot be included. **Schedule 3 forms part of this qualification structure**.

And all of any prerequisite requirements acquired.

Certificate III in ESI Cable Jointing

National Qualification No UET30409

Completion requirements

The requirements for granting this qualification will be met when competency is

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demonstrated and achieved for:

1. All the Core Units, **and**

2. A combination of Elective Units selected from Schedule 3 Certificate III Units, where the sum of the weighting value is in accord with that assigned to this qualification and quantified below, **and**

3. All of any prerequisite requirements.

Core Units All to be completed

UETTDRCJ01B	Lay electrical cables
UETTDRCJ06B	Install and maintain de-energised LV underground polymeric cables
UETTDRCJ07B	Install and maintain de-energised HV underground polymeric cables
UETTDREL01B	Apply environmental and sustainable energy procedures
UETTDREL02B	Operate plant and equipment near live electrical conductors/apparatus
UETTDREL04B	Working safely near live electrical apparatus as non electrical worker
UETTDRIS01B	Install electrical equipment (network infrastructure)
UETTDRIS02B	Maintain electrical equipment (network infrastructure)
UEENEEE001B	Apply OHS practices in the workplace
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE003B	Solve problems in extra-low voltage, single path circuits
UEENEEE004B	Solve problems in multiple path DC circuits
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals
UEENEEG001B	Solve problems in electromagnetic circuits
UEENEEG002B	Solve problems in single and three phase low voltage circuits

Electives Units: **Acquire any combination of Elective Group Units having a total sum of at least 450 weighting points from Schedule 3 - Certificate III Units**.

Core Units in this Qualification cannot be included. **Schedule 3 forms part of this**

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qualification structure.

And all of any prerequisite requirements acquired.

Certificate IV

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UET30409 Certificate III in ESI - Cable Jointing

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Not Applicable

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:

1. All the Core Units, **and**

2. A combination of Elective Units selected from Schedule 3 Certificate III Units, where the sum of the weighting value is in accord with that assigned to this qualification and quantified below, **and**

3. All of any prerequisite requirements.

Core Units All to be completed

UETTDRCJ01B Lay electrical cables

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UETTDRCJ06B	Install and maintain de-energised LV underground polymeric cables
UETTDRCJ07B	Install and maintain de-energised HV underground polymeric cables
UETTDREL01B	Apply environmental and sustainable energy procedures
UETTDREL02B	Operate plant and equipment near live electrical conductors/apparatus
UETTDREL04B	Working safely near live electrical apparatus as non electrical worker
UETTDRIS01B	Install electrical equipment (network infrastructure)
UETTDRIS02B	Maintain electrical equipment (network infrastructure)
UEENEEE001B	Apply OHS practices in the workplace
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE003B	Solve problems in extra-low voltage, single path circuits
UEENEEE004B	Solve problems in multiple path DC circuits
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals
UEENEEG001B	Solve problems in electromagnetic circuits
UEENEEG002B	Solve problems in single and three phase low voltage circuits

Electives Units: **Acquire any combination of Elective Group Units having a total sum of at least 450 weighting points from Schedule 3 - Certificate III Units**.

Core Units in this Qualification cannot be included. **Schedule 3 forms part of this qualification structure**.

And all of any prerequisite requirements acquired.

Certificate IV

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UET40109 Certificate IV in ESI - Power Systems

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Not Applicable

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:

1. All the Core Units, **and**

2. A combination of Elective Units selected from Schedule 4a Power Systems, where the sum of the weighting value is in accord with that assigned to this qualification and quantified below, **and**

3. All of any prerequisite requirements.

Core Units - All to be completed

UETTDRIS22B	Implement and monitor the organisational OHS policies, procedures and programs

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UETTDRIS23B Implement and monitor environmental and sustainable energy management policies and procedures

Electives Units: **Acquire any combination of Elective Group Units having a total sum of at least 360 weighting points from Schedule 4a - Power Systems**.

Core Units in this Qualification cannot be included.

Schedule 4a forms part of this qualification structure.

And all of any prerequisite requirements acquired.

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UET40209 Certificate IV in ESI - Substation

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Not Applicable

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:

1. All the Core Units, **and**

2. A combination of Elective Units selected from Schedule 4b Substations, where the sum of the weighting value is in accord with that assigned to this qualification and quantified below, **and**

3. All of any prerequisite requirements including the successful completion of CIII in Electrotechnology - System Electrician or equivalent.

Core Units All to be completed

UETTDRIS05B Perform substation switching operation to a given schedule

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UETTDRIS22B	Implement and monitor the organisational OHS policies, procedures and programs
UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures
UETTDRSB01B	Diagnose and rectify faults in power system substation environment
UETTDRSB02B	Carry out substation inspection
UETTDRSB03B	Install and maintain substation DC systems
UETTDRSB04B	Maintain HV power system breakers
UETTDRSB05B	Maintain HV power system - transformers and instrument transformers

Electives Units: **Acquire any combination of Elective Group Units having a total sum of at least 360 weighting points from Schedule 4b - Substations**.

Core Units in this Qualification cannot be included.

Schedule 4b forms part of this qualification structure.

And all of any prerequisite requirements acquired.

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UET40309 Certificate IV in ESI - Network Infrastructure

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Not Applicable

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:

1. All the Core Units, **and**

2. A combination of Elective Units selected from Schedule 4c, where the sum of the weighting value is in accord with that assigned to this qualification and quantified below, **and**

3. All of any prerequisite requirements including the successful completion of CIII in Electrotechnology - System Electrician or equivalent.

Core Units All to be completed

UETTDREL01B. Apply environmental and sustainable energy procedures

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UETTDREL02B	Operate plant and equipment near live electrical conductors/apparatus
UETTDREL04B	Working safely near live electrical apparatus as non electrical worker
UETTDRIS22B	Implement and monitor the organisational OHS policies, procedures and programs
UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures

Electives Units: **Acquire any combination of Elective Group Units having a total sum of at least 360 weighting points from Schedule 4c -Network Infrastructure**.

Core Units in this Qualification cannot be included.

Schedule 4c forms part of this qualification structure.

And all of any prerequisite requirements acquired.

Diploma

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UET50109 Diploma of ESI - Power Systems

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Not Applicable

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:

1. All the Core Units, **and**

2. A combination of Elective Units selected from Schedule 5 Diploma, where the sum of the weighting value is in accord with that assigned to this qualification and quantified below, **and**

3. All of any prerequisite requirements.

Core Units

All Core Units are deemed to be achieved by completing all of the following or by completing the Industry Pathway.

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Core

UEENEED004B	Use engineering application software
UEENEEE001B	Apply OHS practices in the workplace
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE003B	Solve problems in extra-low voltage single path electrical circuits
UEENEEE004B	Solve problems in multiple path d.c. circuits
UEENEEE007B	Use drawings, diagrams, schedules and manuals
UEENEEE024B	Compile and produce an electrotechnology report
UEENEEG001B	Solve problems in electromagnetic circuits
UEENEEG002B	Solve problems in single and three phase low voltage circuits
UEENEEG047B	Provide computational solutions to power engineering problems
UEENEEG048B	Solve problems in complex multiple path power circuits
UEENEEG049B	Solve problems in complex polyphase power circuits
UETTDREL01B	Apply environmental and sustainable energy procedures
UETTDREL04B	Working safely near live electrical apparatus as a non electrical worker
UETTDRIS22B	Implement and monitor the organisation's OHS policies procedures and programs
UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures

Note. This core is intended for those seeking an outcome through an approved program with structured work experience; as typically applied to cadetship arrangements.

OR

Industry Pathway

UEENEED004B	Use engineering application software

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UEENEEE024B	Compile and produce an electrotechnology report
UEENEEG047B	Provide computational solutions to power engineering problems
UEENEEG048B	Solve problems in complex multiple path power circuits
UEENEEG049B	Solve problems in complex polyphase power circuits
UETTDRIS22B	Implement and monitor the organisation's OHS polices procedures and programs
UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures

Note. This Industry Pathway is intended for those seeking an outcome that have a; Certificate III in ESI - Distribution, Certificate III in ESI - Transmission, Certificate III in ESI - Rail Traction, Certificate III in ESI - Cable Jointing or a Certificate III in Electrotechnology Electrician or equivalent.

Electives Units: **Acquire any combination of Elective Group Units having a total sum of at least 900 weighting points from Schedule 5**.

Core or Industry Pathway Units in this Qualification cannot be included.

Schedule 5 forms part of this qualification structure.

And all of any prerequisite requirements acquired.

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UET60109 Advanced Diploma of ESI - Power Systems

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Not Applicable

Licensing/Regulatory Information

Not Applicable

Entry Requirements

Not Applicable

Employability Skills Summary

Not Applicable

Packaging Rules

a) **Completion requirements**

b) The requirements for granting this qualification will be met when competency is demonstrated and achieved for:

c) 1. All the Core Units, **and**

d) 2. A combination of Elective Units selected from Schedule 5 and Schedule 6 - Advanced Diploma, where the sum of the weighting value is in accord with that assigned to this qualification and quantified below, **and**

e) 3. All of any prerequisite requirements.

f) **Core Units All to be completed**

g) UEENEED004B h) Use engineering application software

i) j) Apply OHS practices in the workplace

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	UEENEEE 001B	
k)		l) Dismantle, assemble and fabricate electrotechnology components
	UEENEEE 002B	
m)		n) Use drawings, diagrams, schedules and manuals
	UEENEEE 007B	
o)		p) Compile and produce an electrotechnology report
	UEENEEE 024B	
q)		r) Provide computational solutions to power engineering problems
	UEENEEG 047B	
s)		t) Solve problems in complex multiple path power circuits
	UEENEEG 048B	
u)		v) Solve problems in complex polyphase power circuits
	UEENEEG 049B	
w)		x) Apply environmental and sustainable energy procedures
	UETTDRE L01B	
y)		z) Working safely near live electrical apparatus as a non electrical worker
	UETTDRE L04B	
aa)		bb) Implement and monitor the organisation's OHS policies procedures and programs
	UETTDRI S22B	
cc)		dd) Implement and monitor environmental and sustainable energy management policies and procedures
	UETTDRI S23B	
ee)		ff) Analyse and develop solutions for problems in extra-low voltage, single path circuits
	UETTDRI S28A	
gg)		hh) Analyse and develop solutions for problems in multiple path d.c. circuits
	UETTDRI S29A	
ii)		jj) Analyse and develop solutions for problems in electromagnetic circuits
	UETTDRI S30A	
kk)		ll) Analyse and develop solutions for problems in single and

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UETTDRI S31A three phase low voltage circuits

mm) **Electives Units**:

nn) **Acquire any combination of Elective Group Units having a total sum of at least 1800 points, of which at least 830 points must be completed from schedule 6. The remaining points can come from schedule 5.**

oo) **Core Units in this Qualification cannot be included.**

pp) **Schedules 5 to 6 form part of this qualification structure.**

qq) **And all of any prerequisite requirements acquired.**

rr)

ss)

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UETSS00001 Skill Set - Apply Access Procedures to Work On or Near Electrical Network Infrastructure

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Pathway	This skill set does not provide any articulation to any qualification or other competency standard unit. The skill set has been developed by industry to provide for the mobility of ESI workers particularly with respect to mutual aid in times of emergency. ESI employees are required to maintain currency in the Unit(s) in this skill set for authorisation/approval to work on ESI Networks.

Licensing/Regulatory Information

Not Applicable

Skill Set Requirements

Units	UETTDRRF09A	Apply access procedures to work on or near electrical network infrastructure

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Target Group

Target Group	Electricity Supply Industry workers who undertake the installation and/or maintenance of network infrastructure which requires the application of access procedures to work on or near electrical network infrastructure, to meet OHS, mobility and mutual aid requirements.

Suggested words for Statement of Attainment

Suggested form of words for Statement of Attainment	This Skill Set from the UET09 ESI - Transmission, Distribution and Rail Training Package meets the industry requirements for Apply access procedures to work on or near electrical network infrastructure.

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UETSS00002 Skill Set - Apply ESI Safety Rules, Codes of Practice and Procedures for Work On or Near Electrical Apparatus

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Pathway	This skill set does not provide any articulation to any qualification or other competency standard unit. The skill set has been developed by industry to provide for the mobility of ESI workers particularly with respect to mutual aid in times of emergency. ESI employees are required to maintain currency in the Unit(s) in this skill set for authorisation/approval to work on ESI Networks.

Licensing/Regulatory Information

Not Applicable

Skill Set Requirements

Units	UETTDRRF01A	Apply ESI safety rules, codes of practice and procedures for work on or near electrical apparatus

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Target Group

Target Group	Electricity Supply Industry workers who undertake the installation and/or maintenance of network infrastructure which requires the Application of ESI safety rules, codes of practice and procedures for work on or near electrical apparatus, to meet OHS, mobility and mutual aid requirements.

Suggested words for Statement of Attainment

Suggested form of words for Statement of Attainment	This Skill Set from the UET09 ESI - Transmission, Distribution and Rail Training Package meets the industry requirements for Apply ESI safety rules, codes of practice and procedures for work on or near electrical apparatus.

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UETSS00003 Skill Set - Perform Cable Pit/Trench/Excavation Rescue

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Pathway	This skill set does not provide any articulation to any qualification or other competency standard unit. The skill set has been developed by industry to provide for the mobility of ESI workers particularly with respect to mutual aid in times of emergency. ESI employees are required to maintain currency in the Unit(s) in this skill set for authorisation/approval to work on ESI Networks.

Licensing/Regulatory Information

Not Applicable

Skill Set Requirements

Units	UETTDRRF07A	Perform cable pit/trench/excavation rescue

Target Group

Target Group	Electricity Supply Industry workers who undertake the

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installation and/or maintenance of network infrastructure which requires workers to Perform cable pit/trench/excavation rescue, to meet OHS, mobility and mutual aid requirements.

Those undertaking this skill set should hold the competency:

HLTCPR201A	Perform CPR.

Suggested words for Statement of Attainment

Suggested form of words for Statement of Attainment	This Skill Set from the UET09 ESI - Transmission, Distribution and Rail Training Package meets the industry requirements for Perform cable pit/trench/excavation rescue.

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UETSS00004 Skill Set - Perform Cable Pit/Trench/Excavation Rescue and CPR

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Pathway	This skill set does not provide any articulation to any qualification or other competency standard unit. The skill set has been developed by industry to provide for the mobility of ESI workers particularly with respect to mutual aid in times of emergency. ESI employees are required to maintain currency in the Unit(s) in this skill set for authorisation/approval to work on ESI Networks.

Licensing/Regulatory Information

Not Applicable

Skill Set Requirements

Units	UETTDRRF07A HLTCPR201A

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Target Group

Target Group	Electricity Supply Industry workers who undertake the installation and/or maintenance of network infrastructure which requires workers to Perform cable pit/trench/excavation rescue and CPR, to meet OHS, mobility and mutual aid requirements.

Suggested words for Statement of Attainment

Suggested form of words for Statement of Attainment	This Skill Set from the UET09 ESI - Transmission, Distribution and Rail Training Package meets the industry requirements for Perform cable pit/trench/excavation rescue and CPR.

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UETSS00005 Skill Set - Perform CPR

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Pathway

This skill set does not provide any articulation to any qualification or other competency standard unit. The skill set has been developed by industry to provide for the mobility of ESI workers particularly with respect to mutual aid in times of emergency.

ESI employees are required to maintain currency in the Unit(s) in this skill set for authorisation/approval to work on ESI Networks.

Licensing/Regulatory Information

Not Applicable

Skill Set Requirements

Units	HLTCPR201A	Perform CPR

Target Group

Target Group

Electricity Supply Industry workers who undertake the installation and/or maintenance of network infrastructure which requires workers to Perform CPR, to meet OHS, mobility and mutual aid requirements.

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Suggested words for Statement of Attainment

Suggested form of words for Statement of Attainment	This Skill Set from the UET09 ESI - Transmission, Distribution and Rail Training Package meets the industry requirements for Perform CPR.

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UETSS00006 Skill Set - Perform EWP Controlled Descent Escape

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Pathway	This skill set does not provide any articulation to any qualification or other competency standard unit. The skill set has been developed by industry to provide for the mobility of ESI workers particularly with respect to mutual aid in times of emergency. ESI employees are required to maintain currency in the Unit(s) in this skill set for authorisation/approval to work on ESI Networks.

Licensing/Regulatory Information

Not Applicable

Skill Set Requirements

Units	UETTDRRF08A	Perform EWP controlled descent escape

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Target Group

Target Group	Electricity Supply Industry workers who undertake the installation and/or maintenance of network infrastructure which requires workers to Perform EWP controlled descent escapes, to meet OHS, mobility and mutual aid requirements.

Suggested words for Statement of Attainment

Suggested form of words for Statement of Attainment	This Skill Set from the UET09 ESI - Transmission, Distribution and Rail Training Package meets the industry requirements for Perform EWP controlled descent escape.

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UETSS00007 Skill Set - Perform EWP Rescue

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Pathway	This skill set does not provide any articulation to any qualification or other competency standard unit. The skill set has been developed by industry to provide for the mobility of ESI workers particularly with respect to mutual aid in times of emergency. ESI employees are required to maintain currency in the Unit(s) in this skill set for authorisation/approval to work on ESI Networks.

Licensing/Regulatory Information

Not Applicable

Skill Set Requirements

Units	UETTDRRF03A	Perform EWP rescue

Target Group

Target Group	Electricity Supply Industry workers who undertake the installation and/or maintenance of network infrastructure which requires workers to Perform EWP rescue, to meet OHS, mobility and mutual aid requirements.

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Those undertaking this skill set should hold the competency:

HLTCPR201A Perform CPR.

Suggested words for Statement of Attainment

Suggested form of words for Statement of Attainment	This Skill Set from the UET09 ESI - Transmission, Distribution and Rail Training Package meets the industry requirements for Perform EWP rescue.

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UETSS00008 Skill Set - Perform EWP Rescue and CPR

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Pathway

This skill set does not provide any articulation to any qualification or other competency standard unit. The skill set has been developed by industry to provide for the mobility of ESI workers particularly with respect to mutual aid in times of emergency.

ESI employees are required to maintain currency in the Unit(s) in this skill set for authorisation/approval to work on ESI Networks.

Licensing/Regulatory Information

Not Applicable

Skill Set Requirements

Units

UETTDRRF03A

HLTCPR201A

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Target Group

Target Group	Electricity Supply Industry workers who undertake the installation and/or maintenance of network infrastructure which requires workers to Perform EWP rescue and CPR, to meet OHS, mobility and mutual aid requirements.

Suggested words for Statement of Attainment

Suggested form of words for Statement of Attainment	This Skill Set from the UET09 ESI - Transmission, Distribution and Rail Training Package meets the industry requirements for Perform EWP rescue.

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UETSS00009 Skill Set - Perform Pole Top Rescue

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Pathway

This skill set does not provide any articulation to any qualification or other competency standard unit. The skill set has been developed by industry to provide for the mobility of ESI workers particularly with respect to mutual aid in times of emergency.

ESI employees are required to maintain currency in the Unit(s) in this skill set for authorisation/approval to work on ESI Networks.

Licensing/Regulatory Information

Not Applicable

Skill Set Requirements

Units	UETTDRRF02A	Perform pole top rescue

Target Group

Target Group

Electricity Supply Industry workers who undertake the installation and/or maintenance of network infrastructure which requires the workers to Perform pole top rescues, to meet OHS, mobility and mutual aid requirements.

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Suggested words for Statement of Attainment

Suggested form of words for Statement of Attainment	This Skill Set from the UET09 ESI - Transmission, Distribution and Rail Training Package meets the industry requirements for Perform pole top rescue.

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UETSS00010 Skill Set - Perform Pole Top Rescue and CPR

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Pathway

This skill set does not provide any articulation to any qualification or other competency standard unit. The skill set has been developed by industry to provide for the mobility of ESI workers particularly with respect to mutual aid in times of emergency.

ESI employees are required to maintain currency in the Unit(s) in this skill set for authorisation/approval to work on ESI Networks.

Licensing/Regulatory Information

Not Applicable

Skill Set Requirements

Units

UETTDRRF02A

HLTCPR201A

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Target Group

Target Group	Electricity Supply Industry workers who undertake the installation and/or maintenance of network infrastructure which requires Perform Pole Top Rescue and CPR, to meet OHS, mobility and mutual aid requirements.

Suggested words for Statement of Attainment

Suggested form of words for Statement of Attainment	This Skill Set from the UET09 ESI - Transmission, Distribution and Rail Training Package meets the industry requirements for Perform Pole Top Rescue and CPR.

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UETSS00011 Skill Set - Perform Rescue from a Live LV Panel

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Pathway	This skill set does not provide any articulation to any qualification or other competency standard unit. The skill set has been developed by industry to provide for the mobility of ESI workers particularly with respect to mutual aid in times of emergency. ESI employees are required to maintain currency in the Unit(s) in this skill set for authorisation/approval to work on ESI Networks.

Licensing/Regulatory Information

Not Applicable

Skill Set Requirements

Units	UETTDRRF06A	Perform rescue from a live LV panel

Target Group

Target Group	Electricity Supply Industry workers who undertake the installation and/or maintenance of network infrastructure which requires workers to Perform rescue from a live LV

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panel, to meet OHS, mobility and mutual aid requirements.

Those undertaking this skill set should hold the competency:

HLTCPR201A Perform CPR.

Suggested words for Statement of Attainment

Suggested form of words for Statement of Attainment	This Skill Set from the UET09 ESI - Transmission, Distribution and Rail Training Package meets the industry requirements for Perform rescue from a live LV panel.

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UETSS00012 Skill Set - Perform Rescue from a Live LV Panel and CPR

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Pathway

This skill set does not provide any articulation to any qualification or other competency standard unit. The skill set has been developed by industry to provide for the mobility of ESI workers particularly with respect to mutual aid in times of emergency.

ESI employees are required to maintain currency in the Unit(s) in this skill set for authorisation/approval to work on ESI Networks.

Licensing/Regulatory Information

Not Applicable

Skill Set Requirements

Units

UETTDRRF06A

HLTCPR201A

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Target Group

Target Group	Electricity Supply Industry workers who undertake the installation and/or maintenance of network infrastructure which requires workers to Perform rescue from a live LV panel and CPR, to meet OHS, mobility and mutual aid requirements.

Suggested words for Statement of Attainment

Suggested form of words for Statement of Attainment	This Skill Set from the UET09 ESI - Transmission, Distribution and Rail Training Package meets the industry requirements for Perform rescue from a live LV panel and CPR.

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UETSS00013 Skill Set - Perform Rescue from Switchyard Structures at Heights

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Pathway

This skill set does not provide any articulation to any qualification or other competency standard unit. The skill set has been developed by industry to provide for the mobility of ESI workers particularly with respect to mutual aid in times of emergency.

ESI employees are required to maintain currency in the Unit(s) in this skill set for authorisation/approval to work on ESI Networks.

Licensing/Regulatory Information

Not Applicable

Skill Set Requirements

Units	UETTDRRF05A	Perform rescue from switchyard structures at heights

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Target Group

Target Group	Electricity Supply Industry workers who undertake the installation and/or maintenance of network infrastructure which requires workers to Perform rescue from switchyard structures at heights, to meet OHS, mobility and mutual aid requirements.

Suggested words for Statement of Attainment

Suggested form of words for Statement of Attainment	This Skill Set from the UET09 ESI - Transmission, Distribution and Rail Training Package meets the industry requirements for Perform rescue from switchyard structures at heights.

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UETSS00014 Skill Set - Perform Switchyard Rescue at Heights and Provide First Aid

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Pathway	This skill set does not provide any articulation to any qualification or other competency standard unit. The skill set has been developed by industry to provide for the mobility of ESI workers particularly with respect to mutual aid in times of emergency. ESI employees are required to maintain currency in the Unit(s) in this skill set for authorisation/approval to work on ESI Networks.

Licensing/Regulatory Information

Not Applicable

Skill Set Requirements

Units	UETTDRRF05A
	UETTDRRF10A

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Target Group

Target Group	Electricity Supply Industry workers who undertake the installation and/or maintenance of network infrastructure which requires Perform Switchyard Rescue at Heights and Provide First Aid, to meet OHS, mobility and mutual aid requirements.

Suggested words for Statement of Attainment

Suggested form of words for Statement of Attainment	This Skill Set from the UET09 ESI - Transmission, Distribution and Rail Training Package meets the industry requirements for Perform Switchyard Rescue at Heights and Provide First Aid.

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UETSS00015 Skill Set - Perform Tower Rescue

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Pathway

This skill set does not provide any articulation to any qualification or other competency standard unit. The skill set has been developed by industry to provide for the mobility of ESI workers particularly with respect to mutual aid in times of emergency.

ESI employees are required to maintain currency in the Unit(s) in this skill set for authorisation/approval to work on ESI Networks.

Licensing/Regulatory Information

Not Applicable

Skill Set Requirements

Units	UETTDRRF04A	Perform tower rescue

Target Group

Target Group

Electricity Supply Industry workers who undertake the installation and/or maintenance of network infrastructure which requires the workers to Perform tower rescue, to meet OHS, mobility and mutual aid requirements.

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Suggested words for Statement of Attainment

Suggested form of words for Statement of Attainment	This Skill Set from the UET09 ESI - Transmission, Distribution and Rail Training Package meets the industry requirements for Perform tower rescu.

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UETSS00016 Skill Set - Perform Tower Rescue and Provide First Aid

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Pathway	This skill set does not provide any articulation to any qualification or other competency standard unit. The skill set has been developed by industry to provide for the mobility of ESI workers particularly with respect to mutual aid in times of emergency. ESI employees are required to maintain currency in the Unit(s) in this skill set for authorisation/approval to work on ESI Networks.

Licensing/Regulatory Information

Not Applicable

Skill Set Requirements

Units	UETTDRRF04A
	UETTDRRF10A

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Target Group

Target Group	Electricity Supply Industry workers who undertake the installation and/or maintenance of network infrastructure which requires Perform Tower Rescue and Provide First Aid, to meet OHS, mobility and mutual aid requirements.

Suggested words for Statement of Attainment

Suggested form of words for Statement of Attainment	This Skill Set from the UET09 ESI - Transmission, Distribution and Rail Training Package meets the industry requirements for Perform Tower Rescue and Provide First Aid.

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UETSS00017 Skill Set - Provide First Aid in an ESI Environment

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Pathway	This skill set does not provide any articulation to any qualification or other competency standard unit. The skill set has been developed by industry to provide for the mobility of ESI workers particularly with respect to mutual aid in times of emergency. ESI employees are required to maintain currency in the Unit(s) in this skill set for authorisation/approval to work on ESI Networks.

Licensing/Regulatory Information

Not Applicable

Skill Set Requirements

Units	UETTDRRF10A	Provide first aid in an ESI environment

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Target Group

Target Group	Electricity Supply Industry workers who undertake the installation and/or maintenance of network infrastructure which requires workers to Provide first aid in an ESI environment, to meet OHS, mobility and mutual aid requirements.

Suggested words for Statement of Attainment

Suggested form of words for Statement of Attainment	This Skill Set from the UET09 ESI - Transmission, Distribution and Rail Training Package meets the industry requirements for Provide first aid in an ESI environment.

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UETTDRCJ01B Lay electrical cables

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1)**

1.1) Descriptor

This Competency Standard Unit covers the laying of cables for electrical purposes and includes the laying of ducts and/or conduit for such cables. It could include direct laying of cables in trenches, on racks, in troughs and /or in conduit or ducts. It also encompasses cable pulling methods, pulling tensions, minimum bending radii, reduction of frictional forces, use of supporting plant (e.g. dynamometers, rigging, winches), working on FRC, PVC, A/C ducted systems and the sealing of cables.

Application of the Unit

Application of the Unit **4)**

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDREL01B	Apply environment and sustainable energy procedures
and	UETTDREL02B	Operate plant and equipment near energised and exposed electrical conductors/apparatus
and	UETTDREL04B	Working safely near live electrical apparatus as a non-electrical worker
and	UEENEEE001B	Apply OHS practices in the workplace
and	UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
and	UEENEEE004B	Solve problems in multiple path d.c. circuits
and	UEENEEE005B	Fix and secure equipment
and	UEENEEE007B	Use drawing, diagrams, schedules and service manuals
and	UEENEEG001B	Solve problems in electromagnetic circuits
and	UEENEEG002B	Solve problems in single and three phase low voltage

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Prerequisite Unit(s) **2)**

circuits

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to lay electrical cables	1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received and confirmed, if necessary, by site inspection
	1.2 Relevant requirements and established procedures for the work are discussed with other personnel and identified for all work sites
	1.3 OHS policies and procedures related to requirements and established procedures for the laying of electrical cables are obtained and confirmed for the purposes of the work to be

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ELEMENT	PERFORMANCE CRITERIA	
		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 work permits are obtained to access and 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 work site 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 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	Traffic management plan is identified and implemented.
2 Carry out the laying of electrical cables	2.1	OHS, sustainable energy and environmental principles and practices to reduce the incidents of accidents and minimise waste are followed in accordance with requirements and/or established

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ELEMENT	PERFORMANCE CRITERIA	
		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 in the safe laying of electrical cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.4	Electrical cables are laid in accordance with the work schedule and requirements/established procedures.
	2.5	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.
	2.6	Unplanned events in the laying of electrical cables are undertaken within the scope of established procedures.
	2.7	Known solutions to a variety of problems are applied using routine procedures.
	2.8	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the laying of electrical cables	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 or disposed of in

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ELEMENT	PERFORMANCE CRITERIA	
		accordance with established procedures.
	3.5	Relevant work permit(s), works completion records, reports, drawings and/or documentation and information are actually completed and appropriate personnel notified.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 laying electrical cables.

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 is given Volume 2 Part 2, Clauses:

T2.1.9.	Stores procedures
T2.2.1	Generation power systems
T2.2.2	Transmission, distribution and rail power systems
T2.2.3	Substations, power transformers and reactors fundamentals.
T2.2.12	Underground cable installation
T2.2.23	Underground cable construction

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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 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 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

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 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 - UET09". 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	At least one of the following:	HV polymeric HV paper insulated

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EVIDENCE GUIDE

B	At least one of the following:	LV polymeric LV paper insulated
C	At least one of the following:	Direct lay On racks In conduits
D	At least one cable pulling methods of the following:	Stocking pulling Bond pulling Armour pulling Nose pull attachments
E	At least two cable sealing methods of the following:	Heat shrinkable Pre-stretched materials Tin/lead wiping Pre-moulded components
F	At least one cable cutting methods of the following:	Hydraulic cutters Electric reciprocating Motorised Hand tools
G	At least four of the following:	Drum jacks Winches Spindles Capstans Bollards Cable trailers Rollers Lubricants Ropes Bell mouths Draw wires/rods
H	At least one	Dealing with an unplanned event by

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EVIDENCE GUIDE

	occasion	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 work as prescribed by this Competency Standard Unit.

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 may be assessed concurrently with the following units:

UETTDRCJ02B Install and maintain de-energised LV underground paper insulated cables

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EVIDENCE GUIDE

UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables
UETTDRCJ06B	Install and maintain de-energised LV underground polymeric cables

Range Statement

RANGE STATEMENT

8) 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 the laying of cables for electrical purposes and includes the laying of ducts and/or conduit for electrical cables.

The unit includes the laying of cables direct in trenches, on racks, in troughs and /or in conduit or ducts.

It also encompasses cable pulling methods, pulling tensions, minimum bending radii, reduction of frictional forces, use of supporting plant (e.g. dynamometers, rigging, winches, etc), working on FRC, PVC, A/C ducted systems and the cutting and sealing of cables.

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
- Assessment
- Authorisation
- Confined space
- Documenting detail work events, record keeping and or storage of information.
- Drawings and specifications
- Emergency
- Environmental and sustainable energy procedures
- Environmental legislation

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RANGE STATEMENT

- 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

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5)**

Cable Jointing

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UETTDRCJ02B Install and maintain de-energised LV underground paper insulated cables.

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation and maintenance of de-energised low voltage underground paper insulated cables and covers the jointing, terminating, repair and replacement of cables. It includes the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning tests and the updating of system data/maintenance records.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRCJ01B Lay electrical cables

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare for the installation and maintenance of de-energised LV underground paper insulated cables	1.1	Works 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 the installation and maintenance of de-energised LV underground paper insulated cables 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 work permits are obtained to access and 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 work site 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,

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ELEMENT		PERFORMANCE CRITERIA	
			commerce, and individuals in accordance with 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	Traffic management plan is identified and implemented.
2	Carry out installation and maintenance of de-energised LV underground paper insulated cables	2.1	OHS, sustainable energy and environmental 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	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures
		2.4	Essential knowledge and associated skills are applied in the safe installation and maintenance of de-energised LV underground paper insulated cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements
		2.5	De-energised LV underground paper insulated cables are installed according to the work schedule and requirements/established procedures
		2.6	Maintenance, including repair and/or replacement of de-energised LV underground paper insulated cables is carried out, in accordance with the work schedule and requirements/established procedures
		2.7	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.

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ELEMENT		PERFORMANCE CRITERIA	
		2.8	Unplanned events in the installation and maintenance of de-energised LV underground paper insulated cables are undertaken within the scope of established procedures
		2.9	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills
		2.10	On going checks of quality of the work are undertaken in accordance with instructions and established procedures
3	Complete the installation and maintenance of de-energised LV underground paper insulated cables	3.1	Work undertaken is visually checked/tested against works schedule for confirmation of phasing and 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 or disposed of in accordance with established procedures
		3.5	Relevant work permit(s) are signed off and, the LV underground paper insulated cables are returned to service in accordance with requirements
		3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing and maintaining de-energised LV underground paper insulated cables.

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 is given Volume 2 Part 2, Clauses:

E2.8.2.2	Alternating current principles - power
E2.8.5	Magnetism
E2.8.6	Electromagnetic principles
T2.2.19	LV Paper lead cable jointing principles
T2.2.24	Aluminium and lead sheathed cable - jointing procedures
T2.3.1	Powerline safety practices.

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

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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 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 - UET09". 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 or other variables**		
Group No	**The minimum number of items on which skill is to be demonstrated**	**Item List**
A	At least one of the following:	LV paper/lead sheathed LV paper/aluminium sheathed
B	At least two of the following:	Tee-off joints Straight through joints Parallel branch joints Parallel joints
C	At least two of the following:	Transformers LV switchboards Pillars/turrets Lighting columns Ring main units Chamber substations UG/OH terminations

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		Circuit breakers
D	At least one of the following:	Busbar/termination boxes Links/Fuses Disconnect boxes Termination boxes Control gear
E	At least one of the following:	Resin filled boxes Polymeric tape Heat shrink 'slip-on' moulds Pre-stretched polymeric Compound filled boxes
F	At least one of the following:	Compression lugs Soldered lugs Mechanical connectors
G	At least one of the following:	Voltage detectors Insulation resistance testers
H	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 work as prescribed by this

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Competency Standard Unit.

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 may be assessed concurrently with the following units:

UETTDRCJ01B	Lay electrical cables
UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables

Range Statement

RANGE STATEMENT

8) 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 the installation and maintenance of de-energised low voltage underground paper insulated cables and covers the jointing, terminating, repair and replacement of cables.

Installation and Maintenance may include the repair and replacement of cables and

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RANGE STATEMENT

associated hardware.

Types of cables includes: Paper-Insulated which refers to LV solid paper insulated metal sheathed.

Underground equipment may include links, fuses, disconnect boxes, ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations, LV switchboards, pillars/turrets, busbar/termination boxes, street lighting control gear and street lighting columns.

Test and recording equipment may include voltage detectors, tong ammeters, cable identification equipment, cable fault locating equipment and insulation resistance testers.

Jointing and terminating materials may include compound and resin filled boxes, paper tape materials, polymeric tape materials, polymeric heat shrink materials, "slip-on" moulded components and pre-stretched polymeric materials, compression, mechanical, welded and solder lugs and ferrules.

Jointing and terminating locations may include links, fuses, disconnect boxes, ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations, LV switchboards, pillars/turrets, busbar/termination boxes, street lighting control points and street lighting columns.

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
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5)**

Cable Jointing

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UETTDRCJ03B Install and maintain de-energised HV underground paper insulated cables.

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation and maintenance of de-energised high voltage underground paper insulated cables and covers the jointing, terminating, repair and replacement of cables. It includes the isolation and earthing of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning tests as per enterprise established procedures and the updating of system data/maintenance records.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

UETTDRCJ01B Lay electrical cables

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare for the installation and maintenance of de-energised HV underground paper insulated cables	1.1	Works 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 the installation and maintenance of de-energised HV underground paper insulated cables 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 work permits are obtained to access and 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 work site 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

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ELEMENT	PERFORMANCE CRITERIA	
		and to minimise risk and damage to property, commerce, and individuals in accordance with 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	Traffic management plan is identified and implemented.
2 Carry out installation and maintenance of de-energised HV underground paper insulated cables	2.1	OHS, sustainable energy and environmental 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	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures
	2.4	Essential knowledge and associated skills are applied in the safe installation and maintenance of de-energised HV underground paper insulated cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements
	2.5	De-energised HV underground paper insulated cables are installed according the work schedule and requirements/established procedures
	2.6	Maintenance, including repair and/or replacement of de-energised HV underground paper insulated cables is carried out, in accordance with the work schedule and requirements/established procedures
	2.7	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are reported to the immediate authorised persons for directions

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ELEMENT	PERFORMANCE CRITERIA	
		according to established procedures
	2.8	Unplanned events in the installation and maintenance of de-energised HV underground paper insulated cables are undertaken within the scope of established procedures
	2.9	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills
	2.10	On going checks of quality of the work are undertaken in accordance with instructions and established procedures
3 Complete the installation and maintenance of de-energised HV underground paper insulated cables	3.1	Work undertaken is visually checked/tested against works schedule for confirmation of phasing and 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 or disposed of in accordance with established procedures
	3.5	Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage or disposed of in accordance with established procedures
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing and maintaining de-energised HV underground paper insulated cables.

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 is given Volume 2 Part 2, Clauses:

E2.8.2.2	Alternating current circuit principles
E2.8.5	Magnetism
E2.8.6	Electromagnetic principles
T2.2.20	HV Paper lead cable jointing principles
T2.2.24	Aluminium and lead sheathed cable - jointing procedures
T2.3.1	Powerline safety practices.

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

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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 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 - UET09". 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 or other variables**		
Group No	**The minimum number of items on which skill is to be demonstrated**	**Item List**
A	At least one of the following:	Paper/lead sheathed HV Paper/Aluminium sheathed
B	At least one of the following:	Straight through joint Parallel branch joint
C	At least one of the following:	Transformers Ring main units Chamber substations
D	At least one of the following:	Busbar/termination boxes Links/ Fuses Termination boxes Control gear

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E	At least two of the following:	Resin filled boxes Polymeric tape Heat shrink Slip-on' moulds Pre-stretched polymeric Compound filled boxes
F	At least two of the following:	Lugs, Ferrules Compression joints Soldered joints Mechanical Connectors
G	All of the following:	Cable Identification devices Cable Spiking Devices
H	All of the following:	Insulation resistance testers Moisture testing equipment
I	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 work as prescribed by this Competency Standard Unit.

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.

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EVIDENCE GUIDE

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 may be assessed concurrently with the following units:

UETTDRCJ01B	Lay electrical cables
UETTDRCJ02B	Install and maintain de-energised LV underground paper insulated cables

Range Statement

RANGE STATEMENT

8) 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 the installation and maintenance of de-energised high voltage underground paper insulated cables and covers the jointing, terminating, repair and replacement of cables.

Installation and Maintenance may include the repair and replacement of cables and associated hardware.

Types of cables includes: Paper-Insulated which refers to HV solid paper insulated metal sheathed.

Underground equipment may include links, fuses, , ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations, busbar/termination

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RANGE STATEMENT

boxes.

Test and recording equipment includes voltage detectors, tong ammeters, cable identification equipment, Cable spiking equipment and insulation resistance testers.

Jointing and terminating materials include compound and resin filled boxes, paper tape materials, polymeric tape materials, polymeric heat shrink materials, "slip-on" moulded components and pre-stretched polymeric materials, compression, mechanical and solder lugs and ferrules.

Jointing and terminating locations include links, fuses, , ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations, , busbar/termination boxes.

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
- 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.

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RANGE STATEMENT

- Quality assurance systems.
- Requirements.
- Testing procedures
- Work clearance systems.

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Cable Jointing

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UETTDRCJ04B Joint and maintain energised LV underground paper insulated cables

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the jointing and maintenance of energised low voltage underground paper insulated cables according to established enterprise procedures. It covers the use of specialised live working equipment, tools and devices, the issuing and/or accepting electrical access permits and/or relevant working documentation and the undertaking of authorised cable testing procedures. It also encompasses the pre-commissioning tests and the updating of system data/maintenance records.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed: **Competencies**

UETTDRCJ02B	Install and maintain de-energised LV underground paper insulated cables

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare for the jointing and maintenance of energised LV underground paper insulated cables	1.1	Works 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 the jointing and maintenance of energised LV underground paper insulated cables 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 work permits are obtained to access and 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	Specialist equipment for live working is inspected and confined in working order as per requirements and established procedures
	1.9	Relevant personnel at work site are confirmed current in First Aid and other related work procedures according to requirements
	1.10	Liaison and communication issues with other/authorised personnel, authorities, clients and

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ELEMENT		PERFORMANCE CRITERIA	
			land owners are resolved to carry out work where necessary.
		1.11	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures
		1.12	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures
2	Carry out jointing and maintenance of energised LV underground paper insulated cables	2.1	OHS, sustainable energy and environmental 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 in the safe jointing and maintenance of energised LV underground paper insulated cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements
		2.4	Cable(s), underground equipment, associated hardware and surrounds are prepared in accordance with established procedures
		2.5	Joint and termination procedures of energised LV cable(s) are carried out in accordance with the work schedule and requirements/established procedures
		2.6	Authorised cable testing procedures and fault identification and location process are implemented in accordance with requirements and established procedures
		2.7	Maintenance, including repair and/or replacement

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ELEMENT	PERFORMANCE CRITERIA	
		of energised LV underground paper insulated cables is carried out, in accordance with the work schedule and requirements/established procedures
	2.8	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.
	2.9	Unplanned events in the jointing and maintenance of energised LV underground paper insulated cables are undertaken within the scope of established procedures
	2.10	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills
	2.11	On going checks of quality of the work are undertaken in accordance with instructions and established procedures
	2.12	OHS, sustainable energy and environmental principles and practices to reduce the incidents of accidents and minimise waste are monitored and followed in accordance with requirements and/or established procedures
3 Complete the jointing and maintenance of energised LV underground paper insulated cables	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	Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage or disposed of in accordance with established procedures
	3.4	Relevant work permit(s) are signed off and, jointing and maintenance of energised LV underground paper insulated cables are returned to service in accordance with requirements

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ELEMENT	PERFORMANCE CRITERIA
	3.5 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 jointing and maintaining energised LV underground paper insulated cables.

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 is given Volume 2 Part 2, Clauses:

T2.2.13 Low voltage - energised working practices for substations

T2.3.1 Powerline safety practices

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

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in a 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 the "Assessment Guidelines - UET09". 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:

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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; 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 or other variables**		
Group No	**The minimum number of items on which skill is to be demonstrated**	**Item List**
A	At least one of the following:	LV paper/lead LV paper/aluminium
B	At least two of the following:	Tee-off joints Straight through joints Parallel branch
C	At least one of the following:	Transformers LV switchboards Pillars/turrets Lighting columns Ring main units

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		Chamber substations Busbar/termination boxes Links Termination boxes Control gear
D	At least one of the following:	Resin filled boxes Compound filled boxes Polymeric tape Heat shrink 'slip-on' moulds Pre-stretched polymeric
E	At least two of the following:	Compression joints Soldered joints Mechanical connectors Soldered lugs Compression lugs
F	All of the following:	Voltage detecting instruments Insulation resistance testers Cable identification equipment Moisture testing equipment Phase rotation instruments Specialised live working equipment/tools
G	All of the following:	Temporary earth bonding/bridging, Insulating covers/matting Insulating tooling/ gloves
H	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

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		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.

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 may be assessed concurrently with the following units:

UETTDRCJ08B	Joint and maintain energised LV underground polymeric cables

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Range Statement

RANGE STATEMENT

8) 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 the jointing and maintenance of energised low voltage underground paper insulated cables and covers the jointing, repair and replacement of cables using specialised live working equipment, tools and devices.

Installation and Maintenance may include the repair and replacement of cables and associated hardware.

Types of cables includes: Paper-Insulated which refers to LV solid paper insulated metal sheathed.

Underground equipment may include straight and branch joints, ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations, LV switchboards, pillars/turrets, busbar/termination boxes, street lighting control gear and street lighting columns.

Test and recording equipment includes voltage detectors, tong ammeters, cable identification equipment and insulation resistance testers.

Jointing and terminating materials include compound and resin filled boxes, paper tape materials, polymeric tape materials, polymeric heat shrink materials, "slip-on" moulded components and pre-stretched polymeric materials, compression and solder lugs and ferrules and mechanical connectors.

Jointing and terminating locations include, ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations, LV switchboards, pillars/turrets, busbar/termination boxes, street lighting control points and street lighting columns.

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
- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration.
- Documenting detail work events, record keeping and or storage of information.
- Drawings and specifications

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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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Competency Field

Competency Field **5**)

Cable Jointing

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UETTDRCJ05B Perform straight through HV paper insulated to polymeric transition joint

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the formation of a HV/LV transition joint(s) from paper insulated to polymeric cable on belted and screened cables and covers the; determination of electrical values of belt papers and core insulation, protection of core and belt papers prior to setting, core setting, termination of belt papers, construction of bell mouth and moisture testing. It includes the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning and/or re-commissioning tests and the updating of system data/maintenance records.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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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1.2) License to practice

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) **2)**

2.1) CSU(s): Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRCJ07B	Install and maintain de-energised HV underground polymeric cables

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare for the formation of a paper insulated to polymeric transition joint.	1.1	Works 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 the formation of a paper insulated to polymeric transition joint 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 work permits are obtained to access and 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 work site 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

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ELEMENT	PERFORMANCE CRITERIA	
		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 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 the formation of a paper insulated to polymeric transition joint	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	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures
	2.4	Essential knowledge and associated skills are applied in the safe formation of a transition paper insulated to polymeric cable joint to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements
	2.5	A transition paper insulated to polymeric cable joint is formed according the work schedule and requirements/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.

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ELEMENT		PERFORMANCE CRITERIA	
		2.7	Unplanned events in the formation of a transition paper insulated to polymeric cable joint are undertaken within the scope of established procedures
		2.8	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills
		2.9	On going checks of quality of the work are undertaken in accordance with instructions and established procedures
3	Complete the formation of a paper insulated to polymeric transition joint	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 work permit(s) are signed off and, HV/LV underground paper insulated/polymeric cables are returned to service in accordance with requirements
		3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

7) **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 straight through HV paper insulated to polymeric transition joints.

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 is given Volume 2 Part 2, Clauses:

T2.2.18	HV polymeric underground cable jointing principles
T2.2.20	HV paper lead cable jointing principles
T2.2.24	Aluminium and lead sheathed cable - jointing 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 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 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 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 - UET09". 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

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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	At least two of the following:	HV polymeric to PLY HV polymeric to Paper/Al sheathed LV Transition
B	At least two of the following:	Straight through joint Straight through trifurcating joint Parallel branch joint Parallel Trifurcating Transition Parallel Transition
C	At least two of the following:	Polymeric tape Heat shrink 'Slip-on' moulds Pre-stretched polymeric resin
D	At least two of the following:	Compression joints Soldered joints

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		Mechanical connectors Welding conductors Insulating piercing connectors
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 to undertake actual work as prescribed by this Competency Standard Unit.

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

9.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following

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other units	units:	
	UETTDRCJ07B	Install and maintain de-energised HV underground polymeric cables

Range Statement

RANGE STATEMENT

8) 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 the creation of a transition joint for paper insulated to polymeric cables and covers the jointing, repairing and replacement of cables used in systems and circuits and the issuing/accepting of relevant permits.

Types of cables includes: Polymeric cables (i.e. HV/LV de-energised - rigid or flexible) and Paper-Insulated Lead and Aluminium sheathed cables (screened or unscreened) (copper or aluminium conductors).

Jointing and terminating materials include compound and resin filled boxes, paper tape materials, polymeric tape materials, polymeric heat shrink materials, "slip-on" moulded components and pre-stretched polymeric materials, compression, and mechanical connectors.

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
- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration.
- Documenting detail work events, record keeping and or storage of information.
- Drawings and specifications
- Emergency

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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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Competency Field

Competency Field **5**)

Cable Jointing

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UETTDRCJ06B Install and maintain de-energised LV underground polymeric cables.

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation and maintenance of de-energised low voltage underground polymeric cables and covers the jointing, terminating, repair and replacement of cables. It includes the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning and/or re-commissioning tests and the updating of system data/maintenance records.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) CSU(s): Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRCJ01B Lay electrical cables

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare for the installation and maintenance of de-energised LV underground polymeric cables	1.1	Works 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 the installation and maintenance of de-energised LV underground polymeric cables 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 work permits are obtained to access and 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 work site 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

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ELEMENT	PERFORMANCE CRITERIA	
		and to minimise risk and damage to property, commerce, and individuals in accordance with 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 the installation and maintenance of de-energised LV underground polymeric cables	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 working aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed
	2.3	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures
	2.4	Essential knowledge and associated skills are applied for the safe installation and maintenance of de-energised LV underground polymeric cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements
	2.5	De-energised LV underground polymeric cables are installed according to the work schedule and requirements/established procedures
	2.6	Maintenance, including repair and/or replacement of LV underground polymeric cables is carried out, in accordance with the work schedule and requirements/established procedures
	2.7	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are reported to the immediate authorised persons for directions

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ELEMENT	PERFORMANCE CRITERIA	
		according to established procedures.
	2.8	Unplanned events in the installation and maintenance of de-energised LV underground polymeric cables are undertaken within the scope of established procedures
	2.9	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills
	2.10	On going checks of quality of the work are undertaken in accordance with instructions and established procedures
3 Complete the installation and maintenance of de-energised LV underground polymeric cables	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 work permit(s) are signed off and LV underground polymeric cables are returned to service in accordance with requirements
	3.6	Works completion records, reports, drawings and/or documentation and information are finalised and processed and appropriate personnel notified

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing and maintaining de-energised LV underground polymeric cables.

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 is given Volume 2 Part 2, Clauses:

E2.8.2.2	Alternating current circuit principles
E2.8.5	Magnetism
E2.8.6	Electromagnetic principles
T2.2.12	Underground cable installation
T2.2.16	Fundamentals of jointing LV polymeric cables.
T2.2.17	LV polymeric cable jointing principles
T2.3.1	Powerline safety practices

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

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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 the "Assessment Guidelines - UET09". 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:

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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; 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:	LV polymeric cable
B	Any two of the following:	Tee-off joints Straight through joints Parallel branch joints Parallel joints
C	At least one of the following:	Transformers, LV switchboards Pillars/turrets Lighting columns Ring main units

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		Chamber substations
D	At least two of the following:	Busbar/termination boxes Links/Fuses Disconnect boxes Termination boxes Control gear UG/OH terminations Circuit breakers
E	At least one of the following:	Resin filled boxes, Compound filled boxes Polymeric tape Heat shrink Slip-on' moulds Pre-stretched polymeric
F	At least one of the following:	Compression lugs Welded connections Mechanical connectors Insulation piercing connectors
G	All of the following:	Insulation resistance testers Voltage detectors
H	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

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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 installation and maintenance on de-energised low voltage underground polymeric cables.

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 may be assessed concurrently with the following units:

UETTDRCJ02B	Install and maintain de-energised LV underground paper insulated cables
UETTDRCJ07B	Install and maintain de-energised HV underground polymeric insulated cables

Range Statement

RANGE STATEMENT

8) 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.

This Competency Standard Unit shall/may be demonstrated in relation to the installation and maintenance of de-energised low voltage underground polymeric cables and covers the jointing, terminating, repair and replacement of cables used in systems and circuits and the issuing/accepting of relevant permits.

Test and recording equipment may include voltage detectors, tong ammeters, cable identification equipment, and insulation resistance testers.

Jointing and terminating materials may include compound and resin filled boxes, polymeric tape materials, polymeric heat shrink materials, "slip-on" moulded components and pre-stretched polymeric materials, compression, welded and mechanical connectors.

Jointing and terminating equipment and locations may include links, fuses, disconnect boxes, ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations, LV switchboards, pillars/turrets, busbar/termination boxes, street lighting control points and street lighting columns.

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
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5)**

Cable Jointing

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UETTDRCJ07B Install and maintain de-energised HV underground polymeric cables.

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation and maintenance of de-energised high voltage underground polymeric cables and covers the jointing, terminating, repair and replacement of cables. It includes the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning and/or re-commissioning tests and the updating of system data/maintenance records.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) CSU(s): Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRCJ06B	Install and maintain de-energised LV underground polymeric cable

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to the installation and maintenance of de-energised HV underground polymeric cables	1.1	Works 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 the installation and maintenance of de-energised HV underground polymeric cables 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 work permits are obtained to access and 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 work site 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

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ELEMENT	PERFORMANCE CRITERIA	
		and to minimise risk and damage to property, commerce, and individuals in accordance with 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 the installation and maintenance of de-energised HV underground polymeric cables	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	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures.
	2.4	Essential knowledge and associated skills are applied in the safe installation and maintenance of de-energised HV underground polymeric cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.5	De-energised HV underground polymeric cables are installed according the work schedule and requirements/established procedures.
	2.6	Maintenance, including repair and/or replacement of de-energised HV underground polymeric cables is carried out, in accordance with the work schedule and requirements/established procedures.
	2.7	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are reported

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ELEMENT	PERFORMANCE CRITERIA	
		to the immediate authorised persons for directions according to established procedures.
	2.8	Unplanned events in the installation and maintenance of de-energised HV underground polymeric cables are undertaken within the scope of established procedures.
	2.9	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.10	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the installation and maintenance of de-energised HV underground polymeric cables	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 work permit(s) are signed off and, HV underground polymeric cables are returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing and maintaining de-energised HV underground polymeric cables.

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 is given Volume 2 Part 2, Clauses:

T2.2.18	HV polymeric underground cable jointing principles

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 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 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 - UET09". 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

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- 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:	HV polymeric cables
B	At least two of the following:	Tee-off joints Straight through joint Parallel branch joint Parallel joint
C	At least one of the following:	Transformers Ring main units Chamber substations
D	At least one of the following:	Busbar/termination boxes Links/Fuses Termination boxes Control gear Circuit breakers
E	At least two of the following:	Resin filled boxes Compound filled boxes Polymeric tape Heat shrink

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		'slip-on' moulds Pre-stretched polymeric
F	All of the following:	Insulation resistance testers Voltage detectors
G	All of the following;	Cable identification devices Cable spiking devices
H	At least two of the following:	Mechanical connectors Compression connectors Lugs
I	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 installation and maintenance of de-energised underground HV polymeric cables.

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

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	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 may be assessed concurrently with the following units: UETTDRCJ06B Install and maintain LV underground polymeric cables

Range Statement

RANGE STATEMENT

8) 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 the installation and maintenance of de-energised high voltage underground polymeric cables and covers the jointing, terminating, repair and replacement of cables used in systems and circuits and the issuing/accepting of relevant permits.

Underground equipment may include links, fuses, ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations and busbar/termination boxes.

Test and recording equipment includes voltage detectors, cable identification equipment, cable spiking equipment and insulation resistance testers.

Jointing and terminating materials include compound and resin filled boxes, polymeric tape materials, polymeric heat shrink materials, "slip-on" moulded components and pre-stretched polymeric materials, compression and mechanical connectors

Jointing and terminating locations include circuit breakers, links, fuses, , ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations and busbar/termination boxes.

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:

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RANGE STATEMENT

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform
- Assessing risk
- 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

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Cable Jointing

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UETTDRCJ08B Joint and maintain energised LV underground polymeric cables

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the jointing and maintenance of energised low voltage underground polymeric cables according to established enterprise procedures. It covers the use of specialised live working equipment, tools and devices, the issuing and/or accepting electrical access permits and or relevant working documentation and the undertaking of authorised cable testing procedures. It also encompasses the pre-commissioning and/or re-commissioning tests and the updating of system data/maintenance records.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) CSU(s): Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRCJ06B	Install and maintain de-energised LV underground polymeric cables

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the jointing and maintenance of energised LV underground polymeric cables	1.1 Works 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 the jointing and maintenance of energised LV underground polymeric cables 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 work permits are obtained to access and 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 Specialist equipment for live working is inspected and confirmed in working order as per requirements and established procedures.
	1.9 Relevant personnel at work site are confirmed current in First Aid, Pole Top Rescue and other related work procedures according to

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ELEMENT		PERFORMANCE CRITERIA	
			requirements.
		1.10	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved to carry out work where necessary.
		1.11	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
		1.12	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures.
		1.13	Road signs, barriers and warning devices are positioned in accordance with requirements.
2	Carry out jointing and maintenance of energised LV underground polymeric cables	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 in the safe jointing and maintenance of energised LV underground polymeric cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
		2.4	Cable(s), underground equipment, associated hardware and surrounds are prepared in accordance with established procedures.
		2.5	Joint and termination procedures of energised LV cable(s) are carried out in accordance with the work schedule and requirements/established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.6	Authorised cable testing procedures and fault identification and location process are implemented in accordance with requirements and established procedures.
	2.7	Maintenance, including repair and/or replacement of energised LV underground polymeric cables is carried out, in accordance with the work schedule and requirements/established procedures.
	2.8	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.
	2.9	Unplanned events in the jointing and maintenance of energised LV underground polymeric cables are undertaken within the scope of established procedures.
	2.10	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.11	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the jointing and maintenance of energised LV underground polymeric cables	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 work permit(s) are signed off and, LV underground polymeric cables are returned to

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ELEMENT	PERFORMANCE CRITERIA	
		service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 jointing and maintaining energised LV underground polymeric cables.

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 is given Volume 2 Part 2, Clauses:

T2.2.13	Low voltage - energised working practices for substations
T2.3.1	Powerline safety practices

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 **9.1**)

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EVIDENCE GUIDE

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 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 - UET09". Evidence shall also comprise:

- A representative body of performance criteria demonstrated within the timeframes typically expected of the discipline,

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EVIDENCE GUIDE

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:	LV polymeric cables
B	At least two of the following:	Tee-off joints Straight through joints Parallel branch joints Parallel joints
C	At least one of the following:	Transformers LV switchboards

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		Pillars/turrets Lighting columns Ring main units Chamber substations
D	At least one of the following:	Busbar/termination boxes Links/fuses Termination boxes Control gear
E	At least one of the following:	Resin filled boxes Polymeric tape Heat shrink 'slip-on' moulds Pre-stretched polymeric
F	At least two of the following:	Compression joints/lugs Insulation piercing connectors Mechanical connectors
G	All of the following:	Voltage detecting instruments Insulation resistance testers Cable identification equipment Phase rotation instruments Specialised live working equipment/tools.
H	All of the following:	Temporary earth bonding/bridging Insulating covers/matting Insulating tooling /gloves
I	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

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EVIDENCE GUIDE

		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 jointing and maintenance of energised underground LV polymeric cables.

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 may be assessed concurrently with the following units:

UETTDRCJ04B	Joint and maintain energised LV underground paper insulated cables

Range Statement

RANGE STATEMENT

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RANGE STATEMENT

8) 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 the jointing and maintenance of energised low voltage underground polymeric cables and covers the jointing, repair and replacement of cables using specialised live working equipment, tools and devices

Maintenance may include the repair and replacement of cables and associated hardware.

Underground equipment may include, ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations, LV switchboards, pillars/turrets, busbar/termination boxes, street lighting control gear and street lighting columns.

Test and recording equipment includes voltage detectors, tong ammeters, cable identification equipment, and insulation resistance testers.

Jointing and terminating materials include compound and resin filled boxes, polymeric tape materials, polymeric heat shrink materials, "slip-on" moulded components and pre-stretched polymeric materials, compression and mechanical connectors.

Jointing and terminating locations include, ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations, LV switchboards, pillars/turrets, busbar/termination boxes, street lighting control points and street lighting columns.

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
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5)**

Cable Jointing

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UETTDRCJ09B Install oil and gas filled specialised underground cables

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation, jointing and termination of oil and gas filled specialised underground cables from 33kV and higher. It includes the laying of the specialised underground ground cable, the preparation of the cables and phasing out jointing and terminating and the preparation of the cable jointing bay. It also encompasses the relevant safety procedures to ensure installation of the specialised cable is undertaken according to established enterprise requirements.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) CSU(s): Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables
and	UETTDRCJ07B	Install and maintain de-energised HV underground polymeric cables

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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 unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/Plan to install oil and gas filled specialised underground cables	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 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3 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.
	1.4 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.5 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.6 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7 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.

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ELEMENT	PERFORMANCE CRITERIA	
	1.8	Clients/Customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
	1.11	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.12	Positioning of road signs, barriers and warning devices is planned and coordinated in accordance with requirements.
2 Carry out the installation of oil and gas filled specialised underground cables	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
	2.2	First Aid, Rescue and other related work procedures are performed according to requirements and/or established procedures.
	2.3	Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
	2.4	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.
	2.5	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established

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ELEMENT	PERFORMANCE CRITERIA	
		procedures.
	2.6	Installation of oil and gas filled specialised underground cables is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied in the safe installation of oil and gas filled specialised underground cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.9	On going 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 installation of oil and gas filled specialised underground cables	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	Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and confirmed 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 work permit(s) are signed off and, underground cables are returned to service and advised to client/customer in accordance with requirements.

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ELEMENT	PERFORMANCE CRITERIA
	3.6 Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing oil and gas filled specialised underground cables.

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 is given Volume 2 Part 2, Clauses:

T2.2.12	Underground cable installation
T2.2.23	Underground cable construction
T2.2.40	Jointing and terminating oil and gas filled specialised cable
T2.2.43	Installing oil and gas filled specialised underground cables
T2.2.47	Oil and gas filled specialised underground cable principles
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions
T2.8.3	Enterprises specific - technical drawing and documents

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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 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 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

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 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 - UET09". 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:	Oil filled cables Gas filled cables

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B	All of the following:	Specialised cable installation equipment Winches Caterpillars Rollers Bond lines Drum jacks Install cable end caps/nose pull assemblies
C	At least two of the following:	Straight through joint Straight stop joint Trifurcating joint Splitter joint Trifurcating/transition/stop
D	At least one of the following:	Box termination Gas filled termination Compound filled termination
E	At least two of the following:	Welded connectors Mechanical connectors Compression connectors
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.

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- Suitable work environment, facilities, equipment and materials to undertake actual installation of oil and gas filled specialised underground cables.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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 may be assessed concurrently with the following units:

UETTDRCJ10B	Maintain oil and gas filled specialised underground cables
UETTDRCJ11B	Install and maintain polymeric specialised underground cables

Range Statement

RANGE STATEMENT

8) 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

This Competency Standard Unit shall/may be demonstrated in relation to the installation of oil and gas filled specialised underground cables and may include the following:

Cable type includes: Pressurised oil filled and gas filled cables 33kV and above.

Testing and recording equipment may include voltage detectors, cable identification equipment, insulation resistance testers.

Jointing and terminating materials: compound and resin filled boxes, paper tape/roll materials, polymeric tape materials, heat shrink materials, "slip on" moulded components, molten solders and gas/oil piping and fittings. compression, mechanical , solder lugs and ferrules and welded connections.

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
- 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

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RANGE STATEMENT

- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Cable Jointing

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UETTDRCJ10B Maintain oil and gas filled specialised underground cables

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance and repair of oil and gas filled specialised underground cables. It includes testing, diagnosing faults, repairing and replacing the specialised cables. It also encompasses the processes for preliminary pressure control and leak repair, as well as working under induced voltages, cable identification and cable freezing.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2**)

2.1) CSU(s): Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRCJ09B	Install oil and gas filled specialised underground cables

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/Plan to maintain oil and gas filled specialised underground cables	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 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.4 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.5 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.6 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7 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.
	1.8 Clients/Customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.

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ELEMENT	PERFORMANCE CRITERIA	
	1.10	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
	1.11	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.12	Positioning of road signs, barriers and warning devices is planned in accordance with requirements.
2 Carry out the maintenance of oil and gas filled specialised underground cables	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
	2.2	First Aid, Rescue and other related work procedures are performed according to requirements and/or established procedures.
	2.3	Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
	2.4	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.
	2.5	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.6	Maintenance of oil and gas filled specialised underground cables is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied in the safe maintenance of oil and gas

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ELEMENT	PERFORMANCE CRITERIA	
		filled specialised underground cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.9	On going 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 maintenance of oil and gas filled specialised underground cables	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	Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and confirmed 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 work permit(s) are signed off and, underground cables are returned to service and advised to client/customer in accordance with requirements.
	3.6	Works completion records, reports, as installed/modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining oil and gas filled specialised underground cables.

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 is given Volume 2 Part 2, Clauses:

T2.2.45	Maintaining oil and gas filled specialised underground cables

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 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 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 - UET09". 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

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- 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:	Oil filled cables Gas filled cables
B	At least two of the following:	Straight through joint Straight stop joint, Trifurcating joint Splitter joint Trifurcating/transition/stop joint
C	At least one of the following:	Air box terminator Gas filled terminator Compound filled terminator
D	At least two of the following:	Welded connectors Mechanical connectors Compression connectors
E	All of the following:	Voltage detectors Cable identification equipment and spiking Insulation resistance testers

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F	All of the following:	Leak repair and pressure control cable freezing equipment Application of pressure control tapes Fittings and seals
G	All of the following:	Oil filled cables Gas filled cables
H	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 maintenance of oil and gas filled specialised underground cables.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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

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	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 may be assessed concurrently with the following units: UETTDRCJ11B Install and maintain polymeric specialised underground cables

Range Statement

RANGE STATEMENT

8) 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 the maintenance and repair of oil and gas filled specialised underground cables and may include the following:

Cable type includes: Pressurised oil filled and gas filled cables 33kV and above.

Testing and recording equipment may include voltage detectors, cable identification equipment, insulation resistance testers.

Jointing and terminating materials: compound and resin filled boxes, paper tape/roll materials, polymeric tape materials, heat shrink materials, "slip on" moulded components, molten solders and gas/oil piping and fittings. compression, mechanical, solder lugs and ferrules and welded connections.

This unit also encompasses the preparation for cable freezing and preliminary pressure control and leak repair activities.

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
- Assessment

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- 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

Custom Content Section

2.2) Literacy and numeracy skills

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"

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2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Cable Jointing

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UETTDRCJ11B Install and maintain polymeric specialised underground cables

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation, maintenance and repair of polymeric specialised underground cables including XLPE and EPR above 33kV. It includes jointing and terminating, as well as working under induced voltages and undertaking the relevant tests required for jointing. It also encompasses the preparation of the cable jointing bay, the preparation of cables and phasing out, cable identification and spiking, the treatment/handling of, but not jointing fibre optical cables.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) CSU(s): Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables
and	UETTDRCJ07B	Install and maintain de-energised HV underground polymeric cables

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/Plan to install and maintain polymeric specialised underground cables	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 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4 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.
	1.5 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.6 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7 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.
	1.8 Clients/customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements.

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ELEMENT	PERFORMANCE CRITERIA	
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
	1.12	Positioning of road signs, barriers and warning devices is planned and coordinated in accordance with requirements.
2 Carry out the installation and maintenance of polymeric specialised underground cables	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
	2.2	First Aid, Rescue and other related work procedures are performed according to requirements and/or established procedures.
	2.3	Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
	2.4	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.
	2.5	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.6	Installation and\or maintenance of polymeric specialised underground cables is carried out, in

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ELEMENT	PERFORMANCE CRITERIA	
		accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied in the safe installation and\or maintenance of polymeric specialised underground cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.9	On going 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 installation and maintenance of polymeric specialised underground cables	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	Accidents and/or injuries are reported in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and confirmed 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 work permit(s) are signed off and, underground cables are returned to service and advised to client/customer in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing and maintaining polymeric specialised underground cables

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 is given Volume 2 Part 2, Clauses:

T2.2.12	Underground cable installation
T2.2.23	Underground cable construction
T2.2.41	Polymeric specialised underground cables principles
T2.2.42	Jointing and terminating specialised polymeric underground cables
T2.2.44	Installing and maintaining specialised polymeric underground cables
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions
T2.8.3	Enterprises specific - technical drawing and documents

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

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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 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.

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EVIDENCE GUIDE

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 - UET09". 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	Install and maintain at least one of the following:	Specialised XLPE cables above 33kv Specialised EPR cables above

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		33kv
B	All of the following:	Straight through joints. Terminations
C	Use of at least three of the following specialised cable installation equipment:	Winches Caterpillars Rollers Bond lines Nose pull devices Drum jacks
D	At least two of the following:	Connectors Mechanical connectors Compression connectors
E	At least two of the following:	Air boxes Compound filled boxes Gas filled boxes
F	At least two of the following:	Polymeric tape materials Heat shrink materials Moulded components
G	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 installation and maintenance of polymeric specialised underground cables.

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In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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 may be assessed concurrently with the following units:

UETTDRCJ09B	Install oil and gas filled specialised underground cables
UETTDRCJ10B	Maintain oil and gas filled specialised underground cables
UETTDRCJ12B	Install and maintain oil &gas pressure systems for specialised underground cables

Range Statement

RANGE STATEMENT

8) 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

This Competency Standard Unit shall/may be demonstrated in relation to polymeric specialised underground cables including XLPE and EPR above 33kV, and covers the installation, jointing, terminating, repair and replacement of cables used in systems and circuits and the issuing/accepting of relevant permits.

It also encompasses the preparation of the cable jointing bay, the preparation of cables and phasing out, the treatment/handling, but not jointing of fibre optical cables. Also cable identification and spiking are included.

Underground equipment may include switchgear, transformers, specialised cable joints and termination kits, specialised cable installation equipment, specialised cable heating equipment and tooling.

Test and recording equipment includes voltage detectors, cable identification equipment, cable spiking equipment and insulation resistance testers.

Jointing and terminating materials include compound and resin filled boxes, polymeric tape materials, polymeric heat shrink materials, "slip-on" moulded components and pre-stretched polymeric materials, welded, compression and Mechanical connectors.

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
- 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

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- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Cable Jointing

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UETTDRCJ12B stall and maintain oil and gas pressure systems for specialised underground cables

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation, maintenance and repair of oil and gas pressure systems for specialised underground cables. It includes the undertaking of pressure control activities, the installation of gauges, oil tanks and gas cubicles. It also includes the knowledge of Oil Route Profiles as well as the operation of pressure equipment for jointing works, and the repairing and replacing of pressure systems. It also encompasses the procedures associated with performing accessory impregnation, oil flow testing, the processes for oil degasification and performing leak location of pressure systems.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit may require a licence/registration to

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1.2) License to practice

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) **2)**

2.1) CSU(s): Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables
and	UETTDRCJ07B	Install and maintain de-energised HV underground polymeric cables

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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 unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/Plan to install and maintain oil and gas pressure systems for specialised underground cables	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 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.4 Relevant requirements and established procedures for the work are to all personnel and identified for all work sites.
	1.5 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.6 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7 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.

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ELEMENT	PERFORMANCE CRITERIA	
	1.8	Clients/Customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
	1.12	Positioning of road signs, barriers and warning devices is planned and coordinated in accordance with requirements.
2 Carry out the installation and maintenance of oil and gas pressure systems for specialised underground cables	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
	2.2	First Aid, Rescue and other related work procedures are performed according to requirements and/or established procedures.
	2.3	Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
	2.4	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.
	2.5	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established

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ELEMENT	PERFORMANCE CRITERIA	
		procedures.
	2.6	Installation and/or maintenance of oil&gas pressure systems for specialised underground cables is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied in the safe installation and/or maintenance of oil&gas pressure systems for specialised underground cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.9	On going 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 installation and maintenance of oil and gas pressure systems for specialised underground cables	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	Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and confirmed 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 work permit(s) are signed off and, underground cables are returned to service and advised to client/customer in accordance with requirements.

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ELEMENT	PERFORMANCE CRITERIA
	3.6 Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing and maintaining oil&gas pressure systems for specialised underground cables

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 is given Volume 2 Part 2, Clauses:

T2.2.12	Underground cable installation
T2.2.23	Underground cable construction
T2.2.40	Jointing and terminating oil&gas filled specialised cable
T2.2.43	Installing oil&gas filled specialised underground cables
T2.2.45	Maintaining oil&gas filled specialised underground cables
T2.2.46	Install&maintain oil&gas pressurised systems
T2.2.47	Oil&gas filled specialised underground cable principles.
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions
T2.8.3	Enterprises specific - technical drawing and

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REQUIRED SKILLS AND KNOWLEDGE

documents

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 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

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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 - UET09". 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	**The minimum number of**	**Item List**

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No	**items on which skill is to be demonstrated**	
A	All of the following:	Oil filled pressure systems Gas filled pressure systems
B	All of the following:	Gas analyser/detector Manometers Flow boards Cable freezing equipment
C	All of the following:	Accessory impregnation equipment Oil degasification plant Manometers Flowboards Vacuum pumps Site bottles Gas cylinders Pressure/vacuum meters Oil evacuation pumps RGP equipment Oil sampling equipment
D	All of the following:	Gas control cubicles Oil control cubicles Cable joints and terminations Oil degasification units Oil pressure tanks
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

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EVIDENCE GUIDE

		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 installation and maintenance of oil and gas pressure systems for specialised underground cables.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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 may be assessed concurrently with the following units:

UETTDRCJ09B	Install oil and gas filled specialised underground cables
UETTDRCJ11B	Install and maintain polymeric specialised underground cables

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Range Statement

RANGE STATEMENT

8) 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 the installation and maintenance of oil and gas pressure systems for specialised underground cables. It covers the installation of pressure control cubicles, pressure lines, oil and gas tanks/cylinders and flow control equipment. Maintenance of pressure systems including routine maintenance activities and equipment testing. Leak location activities including cable freezing and flow rate comparison tests.

It also encompasses the processing of cable oil and basic testing and sampling of oil.

Oil processing and control equipment may include: Oil de-gasification units, oil trays and pumps, vacuum pumps, accessory impregnation equipment, RGP meters&equipment, manometers, vacuum meters, flow boards, oil sampling flasks and extraction plant, liquid nitrogen cylinders and associated cable freezing equipment, oil pressure tanks, oil piping ,fittings and valves, oil control cubicles

Gas processing&control equipment may include: Dry nitrogen cylinders, gas piping, fittings and valves, pressure meters and transducers, gas control cubicles.

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
- 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

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5)**

Cable Jointing

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UETTDRCJ13B Install and maintain network infrastructure LV underground cables

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation and maintenance of de-energised low voltage underground cables and covers the laying of cables as well as the jointing, terminating, repair and replacement of cables. It could include direct laying of cables in trenches, on racks, in troughs and/or in conduit or ducts and also includes the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning and/or re-commissioning tests and the updating of system data/maintenance records.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2**)

2.1) CSU(s): Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRIS06B	Install and maintain network infrastructure electrical equipment

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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

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unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare for the laying, installation and maintenance of underground cables	1.1	Works 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 the laying, installing and maintenance of LV underground cables 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 work permits are obtained to access and 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 work site 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

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ELEMENT	PERFORMANCE CRITERIA	
		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 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 the laying, installation and maintenance of LV underground cables	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 working aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
	2.3	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures.
	2.4	Essential knowledge and associated skills are applied for the safe installation and maintenance of LV underground cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.5	Electrical cables are laid in accordance with the work schedule and requirements/established procedures.
	2.6	De-energised LV underground cables are installed according to the work schedule and requirements/established procedures.
	2.7	Maintenance, including repair and/or replacement of de-energised LV underground cables is carried out, in accordance with the work schedule and

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ELEMENT	PERFORMANCE CRITERIA	
		requirements/established procedures.
	2.8	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.
	2.9	Unplanned events in the laying, installing and carrying out the maintenance of LV underground cables are undertaken within the scope of established procedures.
	2.10	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.11	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the laying, installation and maintenance of LV underground cables	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 work permit(s) are signed off and LV underground cables are returned to service in accordance with requirements
	3.6	Works completion records, reports, drawings and/or documentation and information are finalised and processed and appropriate personnel notified.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 laying, installing and maintaining LV underground cables.

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 is given Volume 2 Part 2, Clauses:

E2.8.2.2	Alternating current circuit principles
E2.8.5	Magnetism
E2.8.6	Electromagnetic principles
T2.1.9.	Stores procedures
T2.2.2	Transmission, distribution and rail power systems
T2.2.3	Substations, power transformers and reactors fundamentals
T2.2.12	Underground cable installation
T2.2.16	Fundamentals of jointing LV polymeric cables.
T2.2.17	LV polymeric cable jointing principles
T2.2.23	Underground cable construction
T2.3.1	Powerline safety practices

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be

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EVIDENCE GUIDE

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 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

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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 - UET09". 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	Laying at least one of the following:	LV polymeric LV paper insulated
B	With regards to "A" incorporate at least one of the	Direct lay On racks

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	following:	In conduits
C	With regards to "A" incorporate at least one cable pulling methods of the following:	Stocking pulling Bond pulling Armour pulling Nose pull attachments
D	With regards to "A" incorporate at least two cable sealing methods of the following:	Heat shrinkable Pre-stretched materials Tin/lead wiping Pre-moulded components
E	At least one cable cutting methods of the following:	Hydraulic cutters Electric reciprocating Motorised Hand tools
F	With regards to "A" incorporate at least four of the following:	Drum jacks Winches Spindles Capstans Bollards Cable trailers Rollers Lubricants Ropes Bell mouths Draw wires/rods
G	Installation and maintenance of all of the following:	LV polymeric cable
H	With regards to "G" incorporate at two of the following:	Tee-off joints Straight through joints Parallel branch joints Parallel joints

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I	With regards to "G" incorporate at least one of the following:	Transformers, LV switchboards Pillars/turrets Lighting columns Ring main units Chamber substations
J	With regards to "G" incorporate at least two of the following:	Busbar/termination boxes Links/Fuses Disconnect boxes Termination boxes Control gear UG/OH terminations Circuit breakers
K	With regards to "G" incorporate at least one of the following:	Resin filled boxes, Compound filled boxes Polymeric tape Heat shrink Slip-on' moulds Pre-stretched polymeric
L	With regards to "G" incorporate at least one of the following:	Compression lugs Welded connections Mechanical connectors Insulation piercing connectors
M	With regards to the above incorporate all of the following:	Insulation resistance testers Voltage detectors
N	At least one occasion	Dealing with an unplanned event by drawing on essential knowledge and associated skills to provide appropriate solutions incorporated in the

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		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 installation and maintenance network infrastructure low voltage underground cables.

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 may be assessed concurrently with the following units:

UETTDRCJ14B	Install and maintain network infrastructure HV underground cables

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Range Statement

RANGE STATEMENT

8) 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 the installation and maintenance of de-energised low voltage underground polymeric cables and covers the laying, jointing, terminating, repair and replacement of cables used in systems and circuits and the issuing/accepting of relevant permits. It includes the laying of ducts and/or conduit for electrical cables.

The unit includes the laying of cables direct in trenches, on racks, in troughs and /or in conduit or ducts.

It also encompasses cable pulling methods, pulling tensions, minimum bending radii, reduction of frictional forces, use of supporting plant (eg dynamometers, rigging, winches, etc), working on FRC, PVC, A/C ducted systems and the cutting and sealing of cables.

Test and recording equipment may include voltage detectors, tong ammeters, cable identification equipment, and insulation resistance testers.

Jointing and terminating materials may include compound and resin filled boxes, polymeric tape materials, polymeric heat shrink materials, "slip-on" moulded components and pre-stretched polymeric materials, compression, welded and mechanical connectors.

Jointing and terminating equipment and locations may include links, fuses, disconnect boxes, ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations, LV switchboards, pillars/turrets, busbar/termination boxes, street lighting control points and street lighting columns.

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
- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration.
- Documenting detail work events, record keeping and or storage of information.
- Drawings and specifications
- Emergency

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

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Competency Field

Competency Field **5**)

Cable Jointing

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UETTDRCJ14B Install and maintain network infrastructure HV underground cables

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation and maintenance of de-energised high voltage underground cables and covers the laying of cables as well as the jointing, terminating, repair and replacement of cables. It could include direct laying of cables in trenches, on racks, in troughs and /or in conduit or ducts and also includes the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning and/or re-commissioning tests and the updating of system data/maintenance records.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) CSU(s): Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRCJ13B	Install and maintain network infrastructure LV underground cable

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to the laying, installation and maintenance of de-energised HV underground cables	1.1 Works 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 the laying, installing and maintenance of HV underground cables 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 work permits are obtained to access and 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 work site 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

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ELEMENT	PERFORMANCE CRITERIA	
		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 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 the laying, installation and maintenance of HV underground cables	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	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures.
	2.4	Essential knowledge and associated skills are applied in the safe installation and maintenance of HV underground polymeric cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.5	Electrical cables are laid in accordance with the work schedule and requirements/established procedures.
	2.6	De-energised HV underground cables are installed according the work schedule and requirements/established procedures.
	2.7	Maintenance, including repair and/or replacement of de-energised HV underground cables is carried

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ELEMENT	PERFORMANCE CRITERIA	
		out, in accordance with the work schedule and requirements/established procedures.
	2.8	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.
	2.9	Unplanned events in the installation and maintenance of HV underground cables are undertaken within the scope of established procedures.
	2.10	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.11	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the laying, installation and maintenance of HV underground cables	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 work permit(s) are signed off and, HV underground cables are returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing and maintaining de-energised HV underground polymeric cables.

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 is given Volume 2 Part 2, Clauses:

T2.2.12	Underground cable installation
T2.2.18	HV polymeric underground cable jointing principles
T2.2.23	Underground cable construction
T2.3.1	Powerline safety practices

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

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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 the "Assessment Guidelines - UET09". 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

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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	Laying at least one of the following;	HV polymeric HV paper insulated
B	With regards to "A" incorporate at least one of the following:	Direct lay On racks In conduits
C	With regards to "A" incorporate at least one cable pulling methods of the following:	Stocking pulling Bond pulling Armour pulling Nose pull attachments
D	With regards to "A" incorporate at least two cable sealing methods of the following:	Heat shrinkable Pre-stretched materials Tin/lead wiping Pre-moulded components

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E	With regards to "A" incorporate at least one cable cutting methods of the following:	Hydraulic cutters Electric reciprocating Motorised Hand tools
F	With regards to "A" incorporate at least four of the following:	Drum jacks Winches Spindles Capstans Bollards Cable trailers Rollers Lubricants Ropes Bell mouths Draw wires/rods
G	Install and maintain all of the following:	HV polymeric cables
H	With regards to "G" incorporate at least two of the following:	Tee-off joints Straight through joint Parallel branch joint Parallel joint
I	With regards to "G" incorporate at least one of the following:	Transformers Ring main units Chamber substations
J	With regards to "G" incorporate at least one of the following:	Busbar/termination boxes Links/Fuses Termination boxes Control gear Circuit breakers

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K	With regards to "G" incorporate at least two of the following:	Resin filled boxes Compound filled boxes Polymeric tape Heat shrink 'slip-on' moulds Pre-stretched polymeric
L	With regards to the above incorporate at all of the following:	Insulation resistance testers Voltage detectors
M	With regards to the above incorporate all of the following;	Cable identification devices Cable spiking devices
N	With regards to "G" incorporate at least two of the following:	Mechanical connectors Compression connectors Lugs
O	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 installation and maintenance of network infrastructure HV underground cables.

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

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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 may be assessed concurrently with the following units:

UETTDRCJ13B	Install and maintain network infrastructure LV underground cables

Range Statement

RANGE STATEMENT

8) 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 the installation and maintenance of de-energised high voltage underground polymeric cables and covers the jointing, terminating, repair and replacement of cables used in systems and circuits and the issuing/accepting of relevant permits.

Underground equipment may include links, fuses, ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations and busbar/termination boxes.

The unit includes the laying of cables direct in trenches, on racks, in troughs and /or in conduit or ducts.

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RANGE STATEMENT

It also encompasses cable pulling methods, pulling tensions, minimum bending radii, reduction of frictional forces, use of supporting plant (eg dynamometers, rigging, winches, etc), working on FRC, PVC, A/C ducted systems and the cutting and sealing of cables.

Test and recording equipment includes voltage detectors, cable identification equipment, cable spiking equipment and insulation resistance testers.

Jointing and terminating materials include compound and resin filled boxes, polymeric tape materials, polymeric heat shrink materials, "slip-on" moulded components and pre-stretched polymeric materials, compression and mechanical connectors

Jointing and terminating locations include circuit breakers, links, fuses, , ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations and busbar/termination boxes.

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
- 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

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RANGE STATEMENT

- Permits and/or permits to work
- Personnel.
- Quality assurance systems.
- Requirements.
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Cable Jointing

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UETTDRDP01B Inspect overhead structures and electrical apparatus (poles /structures)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the inspection as per requirements of overhead structures such as poles and/or other structures other than towers. It also includes inspection of electrical apparatus such as, overhead conductors and or cables, underground and overhead transition points, electrical equipment, such as pole-mounted transformers, switchgear, hardware and or earthing systems. It encompasses the completion of inspection reports and other relevant documentation in accordance with requirements.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRIS12B	Install and maintain poles/structures and associated hardware'

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the inspection of overhead structures and electrical apparatus used on poles and/or structures	1.1 Works 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 the inspection of overhead structures and electrical apparatus used on poles and/or structures 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 work permits are obtained to access and 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, Pole Top Rescue and other related work procedures according to requirements.

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ELEMENT	PERFORMANCE CRITERIA	
	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 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	Traffic management plan is identified and implemented.
2 Carry out inspection of overhead structures and electrical apparatus used on poles and/or structures	2.1	OHS, sustainable energy and environmental 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 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 in the safe inspection of overhead structures and electrical apparatus used on poles and/or structures to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.4	Inspection of overhead structures and electrical apparatus used on poles and/or structures is carried out, in accordance with the work schedule and requirements/established procedures.
	2.5	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.

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ELEMENT	PERFORMANCE CRITERIA	
	2.6	Unplanned events during the inspection of overhead structures and electrical apparatus used on poles and/or structures are undertaken within the scope of established procedures.
	2.7	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.8	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the inspection of overhead structures and electrical apparatus used on poles and/or structures	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 or disposed of in accordance with established procedures.
	3.5	Relevant work permit(s) are signed off and, overhead structures and electrical apparatus used on poles and/or structures are returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

7) **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 inspecting overhead structures and electrical apparatus (poles /structures).

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.8 Poles and structures inspection principles

T2.2.9 Powerline inspection principles

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 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 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 - UET09". 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;

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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:

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	Any three of the following:	Poles and structures Overhead conductors/cables Underground/overhead transition points Electrical equipment Hardware Earthing systems
B	At least one of the following:	Ground Vehicle Helicopter Fixed wing
C	At least two of the following:	Visual* Infra-red camera X-ray Camera (*must Do)
D	At least one occasion	Dealing with an unplanned event by drawing on essential knowledge and associated skills to provide appropriate solutions incorporated in the

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		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 inspection of overhead structures and 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 may be assessed concurrently with the following units:

There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

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RANGE STATEMENT

8) 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 the inspection of overhead structures such as poles and/or other structures other than towers and electrical apparatus and equipment.

Inspection may be carried out on foot, and/or by conventional ground-based vehicle, or from the air. Aircraft may be helicopters or fixed-wing types.

Inspection techniques include use of X-ray and infrared camera.

Items to be inspected may include overhead poles and or structures, but not towers.

Types of electrical apparatus to be inspected include overhead conductors and cables, underground cables and overhead transition points and, electrical equipment such as pole-mounted transformers and air-break switches, hardware, such as insulators, surge arrestors and cross-arms and or earthing systems.

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
- Assessment
- Authorisation
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Distribution

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UETTDRDP02B Maintain overhead energised LV conductors and cables

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance of overhead energised low voltage conductors and cables and includes the verification of the site conditions and the potential hazards. It also encompasses the selection of appropriate and authorised work method using specialised equipment, the diagnosis of faults, the undertaking of electrical tests and the updating of system data/maintenance records.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRIS14B	Install and maintain overhead conductors and cables (poles and structures)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the maintenance of overhead energised LV conductors and cables.	1.1 Works 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 the maintenance of overhead energised LV conductors and cables are obtained and confirmed for the purposes of the work to be performed and communicated.
	1.4 Physical loads and calculations are confirmed according to requirements, using essential knowledge and appropriate skill.
	1.5 Work is prioritised and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures.
	1.6 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.
	1.7 Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.
	1.8 Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.
	1.9 Specialist equipment for live working is inspected and confined in working order as per requirements and established procedures.
	1.10 Relevant personnel at worksite are confirmed

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ELEMENT	PERFORMANCE CRITERIA	
		current in First Aid, Pole Top Rescue and other related work procedures according to requirements.
	1.11	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved to carry out work where necessary.
	1.12	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.13	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures.
	1.14	Traffic management plan is identified and implemented.
2 Carry out maintenance of overhead energised LV conductors and cables.	2.1	Environmental 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 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 in the safe maintenance of overhead energised LV conductors and cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.4	Maintenance, including repair and/or replacement of poles and/or structures is carried out, in accordance with the work schedule and requirements/established procedures.
	2.5	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are reported

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ELEMENT	PERFORMANCE CRITERIA	
		to the immediate authorised persons for directions according to established procedures.
	2.6	Unplanned events in the maintenance of overhead energised LV conductors and cables are undertaken within the scope of established procedures.
	2.7	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.8	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the maintenance of overhead energised LV conductors and cables.	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 or disposed of in accordance with established procedures.
	3.5	Relevant work permit(s) are signed off and, overhead energised LV conductors and cables are returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining overhead energised LV conductors and cables.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.13	Low voltage - energised working practices for substations.
T2.3.1	Powerline safety practices.
T2.4.2	Low voltage switching principles

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 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 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 - UET09". 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

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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	At least two of the following:	Copper Aluminium Aluminium/steel reinforced Steel Pilot
B	At least two of the following:	EWP Ladder Portable platform
C	All of the following:	Insulating mats/sleeves Temporary bridging device Insulating gloves Insulated cable tensioning devices Ladder/pole shrouds Equipotential bonding
D	At least three	Voltage detector*

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EVIDENCE GUIDE

	of the following:	Clamp-on ammeter Polarity tester Insulation resistance tester Phase sequence indicator Recording meters (*must do)
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 to undertake actual maintenance of overhead energised LV conductors and cables

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.

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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 following units: There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

8) 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 the maintenance of overhead energised low voltage conductors and cables taking into account the potential hazards, the calculation of physical loads, including an understanding of the effects of traffic loads and de-rating of circuits.

Maintenance may include the removal, repair and replacement of cables, conductors and associated hardware.

Structures include poles, and columns.

Work methods require the use of insulating gloves and specialised live working equipment and tools.

Work may be performed from elevating work platform, ladder, portable pole platform, or the ground.

Testing and recording devices include voltage detectors, tong ammeters, polarity testers, recording meters and phase sequence indicators.

Specialised live working equipment includes insulating mats and sleeves, insulating gloves, temporary bridges/hoppers, insulated cable tensioning devices and ladder/pole shrouds and equipotential bonding.

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
- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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"

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2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Distribution

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UETTDRDP03B Maintain energised high voltage distribution overhead electrical apparatus (stick)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This Competency Standard Unit covers the maintenance of energised high voltage distribution overhead electrical apparatus using high voltage live line sticks and includes the verification of the site conditions and the potential hazards, the conformation and calculation of physical loads and the selection of appropriate and authorised work method. It includes the preparation and cleaning of specialist material and tools in accordance with authorised technical instructions. It also encompasses the undertaking of OHS and safe working practices and the rendering inoperative of the automatic re-closing device including its restoration in accordance with the work plan and the procedure of issuing/accepting electrical access permits and or relevant working documents.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	BSBWOR402A	Promote team effectiveness
and	UETTDRDP02B	Maintain overhead energised low voltage conductors and cables
and	UETTDRIS02B	Maintain electrical equipment (network infrastructure).
and	UETTDRIS25B	Contribute to coordinated HV live line

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan to maintain energised high voltage distribution overhead electrical apparatus (stick)	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 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.4 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.5 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear,

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ELEMENT	PERFORMANCE CRITERIA	
		to ensure safe systems of work are followed and according to established procedures.
	1.6	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7	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.
	1.8	Clients/Customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures
	1.12	Positioning of road signs, barriers and warning devices is planned and coordinated in accordance with requirements.
2 Carry out maintenance of energised high voltage distribution overhead electrical apparatus (stick)	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
	2.2	First Aid, Rescue and other related work procedures are performed according to requirements and/or established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Lifting, climbing, working aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
	2.4	Auto-reclose devices associated with the circuits being worked on have been rendered inoperative and necessary work documentation acquired in accordance with enterprise requirements.
	2.5	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.
	2.6	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.7	Maintenance of energised high voltage overhead electrical apparatus is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.8	Essential knowledge and associated skills are applied in the safe installation and maintenance of energised high voltage overhead electrical apparatus to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.9	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.10	On going 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 maintenance of energised high voltage distribution overhead electrical apparatus	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	Accidents and/or injuries are reported and

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ELEMENT	PERFORMANCE CRITERIA	
(stick)		followed up in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and confirmed 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 work permit(s) are signed off and, energised high voltage apparatus is returned to service and advised to client/customer in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining energised high voltage distribution overhead electrical apparatus (stick).

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.35	Live lines working up to 132kV with hotstick
T2.2.53	HV principles
T2.3.1	Powerline safety practices.
T2.4.3	High voltage switching principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.4.4	High voltage fault switching principles
T2.4.5	High voltage distribution transformer principles
T2.4.6	High voltage SWER system
T2.4.7	Feeder automation system
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions
T2.8.3	Enterprises specific - technical drawing and documents

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 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 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 - UET09". 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

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- 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:	Install/replace structures Install/replace hardware (e.g. crossarm and insulator) Repair conductors Install/replace/connect bridge/bonding connections
B	At least two of the following:	Install/replace pole mounted reclosers Install/repair/replace air brake switches Install/repair/replace high voltage links/disconnects Install/remove temporary high voltage links/high voltage fuses Washing insulators Install/repair/replace expulsion drop-out fuses Install/replace lightning arrestors Install/replace vibration dampers or

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		aircraft warning markers
C	At least two of the following:	EWP Ladder Pole platform Insulated structure
D	At least one of the following:	Voltage detector Leakage detector Insulation test equipment
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 to undertake actual installation and maintenance of energised high voltage overhead electrical apparatus (stick).

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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

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	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 recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

8) 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 the maintenance of energised HV distribution overhead electrical apparatus and may include the following

Types of conductor may include bare aluminium; steel cored aluminium, steel and copper conductors and insulated unscreened conductor (IUC) systems.

Maintenance work may include -

The replacement and repair or installation of structures, associated hardware and conductors, and the installation, repair, replacement or connection of bridges/bonding connections.

The repair/replacement/installation of electrical equipment and associated components whose current carrying parts are exposed, e.g. Air break switches, High Voltage links or disconnects and expulsion drop-out fuses. Pole mounted reclosers, transformers, sectionalisers, lightning arresters and High Voltage cables.

The washing of insulators.

The commissioning of High Voltage electrical apparatus

Distribution structures may be wood, steel, concrete or composite.

Conductor voltage will generally not exceed 132kV.

Work may be performed from elevating work platform, ladder, portable pole platform or insulated scaffold and may include the use of a gin pole.

Testing and recording equipment includes phasing sticks, fault indicators, voltage detectors, leakage detectors insulation testers and test equipment for live-line tools.

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RANGE STATEMENT

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
- Assessment
- Authorisation
- 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

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Distribution.

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UETTDRDP04B Maintain energised high voltage distribution overhead electrical apparatus (glove)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This Competency Standard Unit covers the maintenance of energised high voltage distribution overhead electrical apparatus using high voltage live line glove and barrier method and includes the verification of the site conditions and the potential hazards, the conformation and calculation of physical loads and the selection of appropriate and authorised work method. It includes the preparation and cleaning of specialist material and tools in accordance with authorised technical instructions. It also encompasses the undertaking of OHS and safe working practices and the rendering inoperative of the automatic re-closing device including its restoration in accordance with the work plan and the procedure of issuing/accepting electrical access permits and or relevant working documents.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	BSBWOR402A	Promote team effectiveness
and	UETTDRDP02B	Maintain overhead energised low voltage conductors and cables
and	UETTDRIS02B	Maintain electrical equipment (network Infrastructure).
and	UETTDRIS25B	Contribute to coordinated HV live vine

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan to maintain energised high voltage distribution overhead electrical apparatus (glove and barrier)	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 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.4 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.5 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear,

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ELEMENT	PERFORMANCE CRITERIA	
		to ensure safe systems of work are followed and according to established procedures.
	1.6	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7	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.
	1.8	Clients/Customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
	1.12	Positioning of road signs, barriers and warning devices is planned and coordinated in accordance with requirements.
2 Carry out maintenance of energised high voltage distribution overhead electrical apparatus (glove and barrier)	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
	2.2	First Aid, Rescue and other related work procedures are performed according to requirements and/or established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Lifting, climbing, working aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements and including the use of high voltage live line sticks.
	2.4	Auto-reclose devices associated with the circuits being worked on have been rendered inoperative and necessary work documentation acquired in accordance with enterprise requirements.
	2.5	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.
	2.6	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.7	Maintenance of energised high voltage distribution overhead electrical apparatus is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.8	Essential knowledge and associated skills are applied in the safe maintenance of energised high voltage distribution overhead electrical apparatus to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.9	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.10	On going 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 maintenance of energised high voltage distribution overhead	3.1	Work undertaken is checked against works schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
electrical apparatus (glove and barrier)	3.2	Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and confirmed 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 work permit(s) are signed off and, energised high voltage apparatus is returned to service and advised to client/customer in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining energised high voltage distribution overhead electrical apparatus (glove).

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.37	Live line working up to 33kV with glove and barrier
T2.2.38	Working on live lines to 33kV with glove and barrier/hotstick combined

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REQUIRED SKILLS AND KNOWLEDGE

T2.2.39	Plant, equipment and tools used for HV live line work
T2.2.53	HV principles
T2.3.1	Powerline safety practices
T2.4.3	High voltage switching principles
T2.4.4	High voltage fault switching principles
T2.4.5	High voltage distribution transformer principles
T2.4.6	High voltage SWER system
T2.4.7	Feeder automation system

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 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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EVIDENCE GUIDE

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

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 - UET09". 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

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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:	Install/replace structures Install/replace hardware (e.g. crossarm and insulator) Repair conductors Install/replace/connect bridge/bonding connections
B	At least two of the following:	Install/replace pole mounted reclosers Install/repair/replace air brake switches Install/repair/replace high voltage links/disconnects Install/remove temporary high voltage links/high voltage fuses Install/repair/replace expulsion drop-out fuses Install/replace lightning arrestors Install/replace vibration dampers or aircraft warning

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		markers
C	At least two of the following:	EWP Ladder Pole platform Insulated structured
D	At least one of the following:	Voltage detector Leakage detector Insulation test equipment
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 to undertake actual installation and maintenance of energised high voltage overhead electrical apparatus.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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

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	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 may be assessed concurrently with the following units: There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

8) 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 the maintenance of energised HV distribution overhead electrical apparatus and may include the following:

Types of conductor may include bare aluminium; steel cored aluminium, steel and copper conductors and insulated unscreened conductor (IUC) systems.

Maintenance work may include -

The replacement and repair or installation of structures, associated hardware and conductors, and the installation, repair, replacement or connection of bridges/bonding connections.

The repair/replacement/installation of electrical equipment and associated components whose current carrying parts are exposed, e.g. air break switches, High Voltage links or disconnects and expulsion drop-out fuses. Pole mounted reclosers, transformers, sectionalisers, lightning arresters and High Voltage cables.

The commissioning of High Voltage electrical apparatus

Distribution structures may be wood, steel, concrete or composite.

Conductor voltage will not exceed 33kV.

Work may be performed from elevating work platform, ladder, portable pole platform or insulated scaffold and may include the use of a gin pole.

Testing and recording equipment includes phasing sticks, fault indicators, voltage

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RANGE STATEMENT

detectors, leakage detectors insulation testers and test equipment for live-line tools.

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
- Assessment
- Authorisation
- 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

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Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Distribution.

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UETTDRDP05B Inspect, maintain and restore energised LV overhead distribution network infrastructure

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the inspection of overhead structures such as poles and/or other structures other than towers and the maintenance of overhead energised low voltage conductors and cables. It includes the conducting of low voltage switching operations involving the operation of circuit breaking and isolation devices from a given switching schedule and in accordance with enterprise procedures. It covers low voltage distribution systems in field situations but also includes paralleling in accordance with the switching schedule. It also includes inspection of electrical apparatus such as, overhead conductors and or cables, underground and overhead transition points, electrical equipment, such as pole-mounted transformers, switchgear, hardware and or earthing systems. It encompasses the completion of inspection reports and other relevant documentation in accordance with requirements.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit requires 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) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence . Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

UETTDRIS06B	Install and maintain network infrastructure electrical equipment
UETTDRIS27B	Install and maintain overhead distribution network infrastructure

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the inspection, maintenance and restoration of overhead distribution network infrastructure	1.1 Works 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 the, inspection of overhead structures and electrical apparatus used on poles and/or structures, the maintenance of overhead energised LV conductors and cables and LV switching, are obtained and confirmed for the purposes of the work to be performed and communicated.
	1.4 Physical loads and calculations are confirmed according to requirements, using essential knowledge and appropriate skill.
	1.5 Work is prioritised and sequenced following

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ELEMENT	PERFORMANCE CRITERIA	
		consultation with others for completion within acceptable timeframes and in accordance with established procedures.
	1.6	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.
	1.7	Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.
	1.8	Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.
	1.9	Specialist equipment for live working is inspected and confined in working order as per requirements and established procedures.
	1.10	Relevant personnel at worksite are confirmed current in First Aid, Pole Top Rescue and other related work procedures according to requirements.
	1.11	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved to carry out work where necessary.
	1.12	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.13	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures.
	1.14	Traffic management plan is identified and implemented.
2 Carry out inspection, maintenance and	2.1	OHS, sustainable energy and environmental principles and practices to reduce the incidents of

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ELEMENT	PERFORMANCE CRITERIA	
restoration of overhead distribution network infrastructure		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 in the safe maintenance and restoration of overhead distribution network infrastructure to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.4	Inspection of overhead structures and electrical apparatus used on poles and/or structures is carried out, in accordance with the work schedule and requirements/established procedures.
	2.5	Maintenance, including repair and/or replacement of poles and/or structures is carried out, in accordance with the work schedule and requirements/established procedures.
	2.6	Communications with Switching Control Officer are established and maintained throughout the isolation operation according to established procedures.
	2.7	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.
	2.8	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.
	2.9	Unplanned events during the inspection, maintenance or switching procedures are undertaken within the scope of established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.10	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.11	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the inspection, maintenance and restoration of overhead distribution network infrastructure	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 or disposed of in accordance with established procedures.
	3.5	Relevant work permit(s) are signed off and, overhead structures and electrical apparatus used on poles and/or structures are returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 inspecting, maintenance and

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REQUIRED SKILLS AND KNOWLEDGE

restoration of overhead distribution network infrastructure.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.8	Poles and structures inspection principles
T2.2.9	Powerline inspection principles
T2.2.13	Low voltage - energised working practices for substations
T2.3.1	Powerline safety practices
T2.4.1	Switching installation
T2.4.2	Low voltage switching principles

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 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 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 - UET09". 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

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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	Inspect any three of the following overhead structures and electrical apparatus:	Poles and structures Overhead conductors/cables Underground/overhead transition points Electrical equipment Hardware Earthing systems
B	With regards to "A" incorporate at least one of the following:	Ground Vehicle Helicopter Fixed wing
C	With regards to "A" incorporate at least two of the following:	Visual* Infra-red camera X-ray Camera (*must Do)

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D	Maintain at least two of the following overhead energised LV conductors and cables:	Copper Aluminium Aluminium steel Steel Pilot
E	With regards to "D" incorporate at least two of the following:	EWP Ladder Portable platform
F	With regards to "D" incorporate all of the following:	Insulating mats/sleeves Temporary bridging device Insulating gloves Insulated cable tensioning devices Ladder/pole shrouds Equipotential bonding
G	With regards to "D" incorporate at least three of the following:	Voltage detector* Clamp-on ammeter Polarity tester Insulation resistance tester Phase sequence indicator Recording meters (*must do)
H	Perform LV switching to a given schedule and incorporate all of the following:	Approvals/clearances Access authority/permits
I	With regards to "H" incorporate	Voltage detectors Polarities testers

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	two of the following:	Phase rotation indicators
J	With regards to "H" incorporate one of the following:	LV links LV bridges LV fuses
K	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 inspection, maintenance and restoration of energised LV overhead distribution network infrastructure.

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.

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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 following units: There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

8) 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 the inspection, maintenance and restoration of overhead distribution network infrastructure.

Inspection may be carried out on foot, and/or by conventional ground-based vehicle, or from the air. Aircraft may be helicopters or fixed-wing types.

Inspection techniques include use of X-ray and infrared camera.

Items to be inspected may include overhead poles and or structures, but not towers.

Types of electrical apparatus to be inspected include overhead conductors and cables, overhead transition points and, electrical equipment such as pole-mounted transformers and air-break switches, hardware, such as insulators, surge arrestors and cross-arms and or earthing systems.

The maintenance of overhead energised low voltage conductors and cables must take into account the potential hazards, the calculation of physical loads, including an understanding of the effects of traffic loads and de-rating of circuits.

Maintenance may include the removal, repair and replacement of cables, conductors and associated hardware.

Structures include poles, and columns.

Work methods require the use of insulating gloves and specialised live working equipment and tools.

Work may be performed from elevating work platform, ladder, portable pole platform, or the ground.

Testing and recording devices include voltage detectors, tong ammeters, polarity testers, recording meters and phase sequence indicators.

Specialised live working equipment includes insulating mats and sleeves, insulating

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RANGE STATEMENT

gloves, temporary bridges/hoppers, insulated cable tensioning devices and ladder/pole shrouds and equipotential bonding.

Low voltage switching operation may involve the operation of circuit breaking and isolation devices from a given switching schedule as it relates to low voltage distribution systems in field situations but also includes paralleling with the switching schedule.

Operating circuit isolation devices associated with energy reticulation systems/networks is confined to low voltage systems in field situations which performed in accordance with a switching schedule and established procedures.

Switchgear may include Low Voltage fuses, Low Voltage links and bridges.

Specialist tools and devices may include Low Voltage detectors, Low Voltage polarity testers Low Voltage phase rotation indicators.

Switching programs/schedule refers to structure, switch or equipment number, locations, Low Voltage distributor, spur or feeder, outage times, work order/plan.

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
- Assessment
- Authorisation
- 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

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RANGE STATEMENT

- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Distribution

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UETTDRDS01B Draft and layout an overhead distribution extension

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the planning and layout of one or two pole minor overhead distribution extensions, including the estimating of the costs and/or resources for the work to be undertaken. It also encompasses on-the-job design, surveying techniques and layout to the field locations as per enterprise requirements.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRIS22B	Implement and monitor the organisation's OHS policies, procedures and programs
and	UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures
and	UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
and	UEENEEE007B	Use Drawing, Diagrams and Service Manuals
and	UEENEEG002B	Solve problems in single and three phase low voltage circuits

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to draft and layout an overhead distribution extension	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 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.4 Relevant requirements and established procedures for the work are to all personnel and identified for all work sites.
	1.5 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear,

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ELEMENT	PERFORMANCE CRITERIA	
		to ensure safe systems of work are followed and according to established procedures.
	1.6	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7	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.
	1.8	Clients/Customers are provided with possible solutions and /or options within the scope, acceptable cost and requirements.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
	1.11	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.12	Positioning of road signs, barriers and warning devices is planned in accordance with requirements.
2 Carry out drafting and layout of an overhead distribution extension	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
	2.2	First Aid, Pole Top Rescue and other related work procedures are performed according to requirements and/or established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
	2.4	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.
	2.5	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.6	The drafting and layout of an overhead distribution extension is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied for the drafting and layout of an overhead distribution extension to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.9	On going 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 drafting and layout of an overhead distribution extension	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	Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and confirmed safe in accordance with established

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ELEMENT	PERFORMANCE CRITERIA	
		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 work permit(s) are signed off and the job is returned to service and advised to client/customer in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 drafting and laying out an overhead distribution extension.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.4	Powerline distribution installation
T2.2.5	Powerline installation safety
T2.2.6	Pole and hardware installation
T2.2.31	Distribution overhead line component fundamentals
T2.8.4	Enterprise specific - switching diagrams
T2.9.1	Interpretation of power distribution network drawings and documentation

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REQUIRED SKILLS AND KNOWLEDGE

T2.9.2	Overhead distribution extension layout principles
T2.9.3	Surveying techniques
T2.9.4	Introduction to computer software (Powerline) and CAD

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 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

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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 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 - UET09". 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

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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	At least one of the following:	Produce an LV single phase distribution extension plan/layout Produce an LV multi-phase distribution extension plan/layout
B	At least one of the following:	Layout a HV single phase distribution extension Layout a HV multi-phase distribution extension
C	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 drafting and layout of an overhead distribution extension.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, in limited spaces, with different

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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 may be assessed concurrently with the following units:

There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

8) 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 Unit shall/may be demonstrated in relation to undertaking a draft and layout of an overhead distribution extension and may include the following equipment:

Pole, including wood, concrete, steel and composite), associated hardware, including conductors (bare wire and aerial bundle cable), crossarms, insulators, ACR, regulator, earthing, air break switches, gas switches, capacitor units, transformers, links, fuses, sectionalisers, lead arrestors, HV switchgear, LV switchgear, control boxes, communications equipment, lanterns, signage, supervisory cable, cable TV, substations, relevant protection systems and associated civil works

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. They form an

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RANGE STATEMENT

integral part of the Range Statement of this unit:

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform
- Assessing risk
- 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
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Design.

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UETTDRDS02B Draft and layout an underground distribution extension

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the planning and layout of minor HV and LV underground distribution extensions, including the estimating of the costs and/or resources for the work to be undertaken. It also encompasses on-the-job design, surveying techniques, the pegging and/or marking out of the trench position, the pit/pillar position and the cable position according to the work order and enterprise requirements.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRIS22B	Implement and monitor the organisation's OHS policies, procedures and programs
and	UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures
and	UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
and	UEENEEE007B	Use Drawing, Diagrams, Schedules and Service Manuals
and	UEENEEG002B	Solve problems in single and three phase low voltage circuits

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to draft and layout an underground distribution extension	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 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.4 Relevant requirements and established procedures for the work are to all personnel and identified for all work sites.
	1.5 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear,

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ELEMENT		PERFORMANCE CRITERIA	
			to ensure safe systems of work are followed and according to established procedures.
		1.6	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
		1.7	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.
		1.8	Clients/Customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements.
		1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
		1.10	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
		1.11	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
		1.12	Positioning of road signs, barriers and warning devices is planned in accordance with requirements.
2	Carry out drafting and layout of an underground distribution extension	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
		2.2	First Aid, Pole Top Rescue and other related work procedures are performed according to requirements and/or established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
	2.4	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.
	2.5	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.6	The drafting and layout of an underground distribution extension is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied for drafting and layout of an underground distribution extension to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.9	On going 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 drafting and layout of an underground distribution extension	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	Accidents and/or injuries are reported in accordance with requirements/established procedures
	3.3	Work site is rehabilitated, cleaned up and confirmed safe in accordance with established

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ELEMENT	PERFORMANCE CRITERIA	
		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 work permit(s) are signed off and the job is returned to service and advised to client/customer in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 drafting and laying out an underground distribution extension

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.4	Powerline distribution installation.
T2.2.5	Powerline installation safety
T2.2.12	Underground cable installation
T2.2.23	Underground cable construction
T2.8.4	Enterprise specific - switching diagrams
T2.9.1	Interpretation of power distribution network drawings and documentation

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REQUIRED SKILLS AND KNOWLEDGE

T2.9.3	Surveying techniques
T2.9.4	Introduction to computer software (Powerline) and CAD
T2.9.6	Underground mains layout principles

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 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 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 - UET09". 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:

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EVIDENCE GUIDE

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	At least one of the following:	Produce a HV multi-phase underground distribution extension plan/layout Produce an LV multi-phase underground distribution extension plan/layout
B	At least one of the following:	Layout an LV multi-phase underground distribution extension Layout a HV multi-phase underground distribution extension
C	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 drafting and layout of an underground distribution extension.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above

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	ground i.e. above 3 metres, 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 may be assessed concurrently with the following units: There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

8) 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 the draft and layout of an underground distribution extension and may include the following:

Underground cable, terminations, joints, Substations, mechanical protection, HV Switchgear, LV Switchgear, signage, relevant protection systems, relevant protection systems including fuses and circuit breakers and associated civil works.

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:

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RANGE STATEMENT

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform
- Assessing risk
- 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
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Design.

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UETTDRDS03B Draft and layout a street lighting system

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1)**

1.1) Descriptor

This Competency Standard Unit covers the planning and layout of street lighting systems. It includes the conduction of site inspections to confirm and or modify a street lighting system layout, estimation of costs and resources for the works order and the pegging out of the poles/underground cables according to the work order and to optimise visibility and minimise traffic hazards. It also encompasses the provision of advice on conditions of supply and permits and the communication and coordination needed to be undertaken with the relevant authorities and clients.

Application of the Unit

Application of the Unit **4)**

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRIS22B	Implement and monitor the organisation's OHS policies, procedures and programs
and	UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures
and	UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
and	UEENEEE007B	Use Drawing, Diagrams, Schedules and Service Manuals
and	UEENEEG002B	Solve problems in single and three phase low voltage circuits

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to draft and layout a street lighting system	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 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.4 Relevant requirements and established procedures for the work are to all personnel and identified for all work sites.
	1.5 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear,

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ELEMENT	PERFORMANCE CRITERIA	
		to ensure safe systems of work are followed and according to established procedures.
	1.6	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7	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.
	1.8	Clients/Customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
	1.11	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.12	Positioning of road signs, barriers and warning devices is planned in accordance with requirements.
2 Carry out the drafting and layout of a street lighting system	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
	2.2	First Aid, Pole Top Rescue and other related work procedures are performed according to requirements and/or established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
	2.4	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.
	2.5	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.6	The drafting and layout of a street lighting system are carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied in the safe drafting and layout of a street lighting system to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
3 Complete the drafting and layout of a street lighting system	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	Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and confirmed 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.

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ELEMENT	PERFORMANCE CRITERIA
	3.5 Relevant work permit(s) are signed off and are returned to service and advised to client/customer in accordance with requirements.
	3.6 Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 drafting and laying out a street lighting 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.4	Powerline distribution installation.
T2.2.5	Powerline installation safety.
T2.2.6	Pole and hardware installation.
T2.2.22	Installation and maintenance of public lighting and associated equipment
T2.2.31	Distribution overhead line component Fundamentals
T2.8.4	Enterprise specific - switching diagrams
T2.9.1	Interpretation of power distribution network drawings and documentation
T2.9.2	Overhead distribution extension layout principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.9.3	Surveying Techniques
T2.9.4	Introduction to Computer Software (Powerline) and CAD
T2.9.5	Principles of lighting design
T2.9.8	Principles in drafting street lighting system

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 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 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 - UET09". 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

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- 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:	Production of preliminary plan for a street lighting system Production of a layout of a street lighting system.
B	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 drafting and layout of a street lighting system.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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

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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 may be assessed concurrently with the following units:

There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

8) 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 the draft and layout of a street lighting systems and may include the following equipment:

Pole (including wood, concrete, steel and composite) associated hardware including conductors (underground, bare wire and aerial bundle cable), LV Switchgear, lanterns, lamps, brackets, signage, supervisory cable, cable TV, Substations, relevant protection systems and associated civil works.

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
- Assessment
- Authorisation

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RANGE STATEMENT

- 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
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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"

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2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Design.

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UETTDRDS04B Draft and layout a distribution substation minor upgrade

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the drafting and laying out of minor LV distribution upgrades, including the estimating of the costs and/or resources for the work to be undertaken. It also encompasses on-the-job design, surveying techniques, the pegging and/or marking out of the trench position, the pit/pillar position and the cable position according to the work order and enterprise requirements.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRIS22B	Implement and monitor the organisation's OHS policies, procedures and programs
and	UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures
and	UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
and	UEENEEE007B	Use Drawing, Diagrams, Schedules and Service Manuals
and	UEENEEG002B	Solve problems in single and three phase low voltage circuits

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to draft and layout a distribution substation upgrade	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 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.4 Relevant requirements and established procedures for the work are to all personnel and identified for all work sites.
	1.5 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept

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ELEMENT		PERFORMANCE CRITERIA	
			clear, to ensure safe systems of work are followed and according to established procedures.
		1.6	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
		1.7	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.
		1.8	Clients/Customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements.
		1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
		1.10	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
		1.11	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
		1.12	Positioning of road signs, barriers and warning devices is planned in accordance with requirements.
2	Carry out the drafting and layout of a distribution substation upgrade	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
		2.2	First Aid, Pole Top Rescue and other related work procedures are performed according to requirements and/or established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
	2.4	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.
	2.5	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.6	Drafting and layout of a distribution substation upgrade is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied in the safe drafting and layout of a distribution substation upgrade to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.9	On going 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 drafting and layout of a distribution substation upgrade	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	Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and

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ELEMENT	PERFORMANCE CRITERIA
	confirmed 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 work permit(s) are signed off and, substation equipment, apparatus, wiring and instrumentation are returned to service and advised to client/customer in accordance with requirements.
	3.6 Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 drafting and laying out a distribution substation minor upgrade.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.4 Powerline distribution installation.

T2.2.5 Powerline installation safety.

T2.2.12 Underground cable installation

T2.2.23 Underground cable construction

T2.8.4 Enterprise specific - switching diagrams

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REQUIRED SKILLS AND KNOWLEDGE

T2.9.1	Interpretation of power distribution network drawings and documentation
T2.9.3	Surveying techniques
T2.9.4	Introduction to computer software (Powerline) and CAD
T2.9.6	Underground mains layout principles
T2.9.7	Distribution substation minor upgrade layout principles

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 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

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that may be required and the critical nature of the competencies being assessed.

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 - UET09". 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

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- 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	At least one of the following:	Produce a multi-phase pole mounted distribution transformer upgrade plan/layout Produce an single-phase pole mounted transformer upgrade plan/layout
B	At least one of the following:	Layout an multi-phase underground distribution substation upgrade Layout a multi-phase distribution substation or associated equipment upgrade eg. Substations, transformers, HV/LV switchgear etc.
C	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

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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 drafting and layout of a distribution substation upgrade.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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 may be assessed concurrently with the following units:

There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

8) 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 the draft and

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RANGE STATEMENT

layout of a minor distribution substation upgrade and may include the following equipment:

Substations, transformers, cables, Surge Div, HV Switchgear, LV Switchgear, links, relays, power supply, signage, busbars, relevant protection systems including fuses and circuit breakers and associated civil works.

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
- 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
- Safe design principles
- Testing procedures
- Work clearance systems

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Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5)**

Design.

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UETTDRDS05B Design overhead distribution systems

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the technical design of overhead distribution and sub transmission networks to relevant standards, including electrical clearances, electrical and mechanical loadings, earthing, environmental considerations, minor civil aspects and the handling of waterway, railway and other crossings. It also includes the necessary established procedures to ensure the line design conforms to specific organisational technical standards, operational and system planning requirements and incorporates the principles of safe design.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRDS13B	Develop HV and LV distribution protection systems
or	UETTDRDS15B	Organise and implement line and easement surveys.

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate the safe design of overhead distribution systems	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the design of overhead distribution systems, are reviewed and determined.
	1.2 Purpose of the design is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures, policies and specifications for the design are obtained or established with the appropriate personnel.
	1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures.
	1.5 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.
	1.6 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.8 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.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities

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ELEMENT	PERFORMANCE CRITERIA	
		coordinated to carry out work.
	1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
2 Carry out and coordinate the safe design of overhead distribution systems	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to avoid accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical models of the distribution system are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.

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ELEMENT	PERFORMANCE CRITERIA	
3 Complete and coordinate the safe design of overhead distribution systems	3.1	Final inspections of the design are undertaken to ensure they comply with all requirements and include all specifications and documentation needed to complete the design brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of design documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing overhead distribution 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
E2.18.8.2	Occupational Health and Safety , enterprise responsibilities
T2.1.1	Engineering applications of mathematical principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.1.2	Engineering applications of mechanical principles
T2.1.3	Engineering applications of material properties
T2.2.2	Transmission, distribution and rail power systems
T2.2.4	Powerline distribution installation
T2.2.6	Pole and hardware installation
T2.2.15	Metering installations
T2.2.31	Distribution overhead line component fundamentals
T2.3.1	Powerline safety practices
T2.3.2	Powerline safety implementation and monitoring
T2.3.3	Statutory and safety considerations
T2.3.8	Safe design principles
T2.4.6	High voltage SWER system
T2.7.1	Environmental fundamentals
T2.7.4	Powerline environmental impact - implementation and monitoring
T2.9.1	Interpretation of power distribution network drawings and documentation
T2.9.2	Overhead distribution extension layout principles
T2.11.1	Power system layouts
T2.11.4	AC transmission system components
T2.11.5	AC transmission line electrical parameters
T2.11.6	AC transmission line equivalent circuit calculations

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REQUIRED SKILLS AND KNOWLEDGE

T2.11.42	Design distribution systems
T2.11.44	Design characteristics of overhead and underground conductors and cables, poles and structures

Evidence Guide

EVIDENCE GUIDE

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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 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 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 - UET09". 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:

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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	Completion of six (6) compliant technical designs of an overhead distribution or sub transmission system with at least one relating to each of the following project types:	Multi-pole extensions In-line pole relocations Multi-circuit overhead lines
B	Designs should also included all of the following:	Activities that address the correction of errors in the process. Application of a design control checklist which lists all of the required design activities to be carried out in this process.
C	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

9.3)

This unit should be assessed as it relates to normal work practice

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for assessment

using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual safe design of overhead distribution systems.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions

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 may be assessed concurrently with the following units:

There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

8) 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 the design of overhead distribution systems using safe design, engineering principles and schedules

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RANGE STATEMENT

and may include the following equipment:

Pole (including wood, concrete, steel and composite) associated hardware including conductors (bare wire and covered), crossarms, insulators, stays, ACR, regulator, earthing, air break switches, gas switches, capacitor units, transformers, links, fuses, sectionalisers, surge arrestors, HV switchgear, LV switchgear, control boxes, communications equipment, luminaires/lanterns, signage, supervisory cable, cable TV, substations, relevant protection systems and associated civil works.

May include computer based drafting and design technologies.

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
- 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

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RANGE STATEMENT

- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Design.

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UETTDRDS06B Design underground distribution systems

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the technical design of underground distribution and sub transmission networks to relevant standards, including cable sizing and locations, soil resistivity and heat dissipation, backfill and trenching details, minor civil aspects and dynamic and cyclic ratings. It also includes the necessary established procedures to ensure the line design conforms to specific organisational technical standards, operational and system planning requirements and encompasses.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRDS13B	Develop HV and LV distribution protection systems
or	UETTDRDS15B	Organise and implement line and easement surveys.

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate for the design of underground distribution systems	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the design of underground distribution systems, are reviewed and determined.
	1.2 Purpose of the design is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures or policies and specifications for the design are obtained or established with the appropriate personnel.
	1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures.
	1.5 Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.6 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.8 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.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.

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ELEMENT		PERFORMANCE CRITERIA	
		1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
2	Carry out and coordinate the design of underground distribution systems	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
		2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
		2.3	System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
		2.4	Mathematical models for the design of the underground distribution system are used to analyse the effectiveness of the finished project as per requirements and established procedures.
		2.5	Technical advice is given to 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.
		2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
		2.7	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
		2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3	Complete and coordinate the design	3.1	Final inspections of the design are undertaken to ensure they comply with all requirements and

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ELEMENT	PERFORMANCE CRITERIA	
of underground distribution systems		include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of design documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing underground distribution 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
E2.18.8.2	Occupational health and safety , enterprise responsibilities
T2.1.1	Engineering applications of mathematical principles
T2.1.2	Engineering applications of mechanical principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.1.3	Engineering applications of material properties
T2.2.2	Transmission, distribution and rail power systems
T2.2.12	Underground cable installation
T2.2.23	Underground cable construction
T2.3.1	Powerline safety practices
T2.3.2	Powerline safety - implementation and monitoring
T2.3.3	Statutory and safety considerations
T2.3.8	Safe design principles
T2.7.1	Environmental fundamentals
T2.7.4	Powerline environmental impact - implementation and monitoring
T2.8.3	Enterprises specific - technical drawing and documents
T2.9.6	Underground mains layout principles
T2.11.1	Power system layouts
T2.11.44	Design characteristics of overhead and underground conductors and cables, poles and structures

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

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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 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 - UET09". Evidence shall also

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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	Completion of six (6) technical designs of an underground distribution or sub transmission network	Residential Subdivision Developments Industrial/Commercial Subdivision Developments Alteration to existing assets Underground supplies to single customers including

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	relating to the following project types:	projects requiring substations.
B	Designs should also included all the following:	Activities that address the correction of errors in the process. Application of a design control checklist which lists all of the required design activities to be carried out in this process.
C	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 the design of underground distribution systems.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in a realistic environment and a variety of conditions.

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

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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 following units:

There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

8) 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 the design of underground distribution systems and may include the following equipment:

Underground cable, terminations, joints, Substations, mechanical protection, HV Switchgear, LV Switchgear, signage, relevant protection systems, relevant protection systems including fuses and circuit breakers and associated civil works.

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
- 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

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RANGE STATEMENT

- 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
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Design.

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UETTDRDS07B Design distribution substations

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the technical design of distribution substations to relevant standards and specifications, including earthing, location of substation relevant to load, customer and environmental needs and minor civil aspects. It also includes the necessary established procedures to ensure the substation design conforms to specific organisational technical standards operational and system planning requirements and encompasses.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRDS13B	Develop HV and LV distribution protection systems
or	UETTDRDS15B	Organise and implement line and easement surveys.

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate for the design of distribution substations	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the design of distribution substations, are reviewed and determined.
	1.2 Purpose of the design is established and expected outcomes of the work is confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the design are obtained or established with the appropriate personnel.
	1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures.
	1.5 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.
	1.6 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.8 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.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities

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ELEMENT	PERFORMANCE CRITERIA	
		coordinated to carry out work.
	1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
2 Carry out and coordinate the design of distribution substations	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical models of the distribution system are used to analyse the effectiveness of the finish project as per requirements and established procedures.
	2.5	Technical advice is given to 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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.

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ELEMENT	PERFORMANCE CRITERIA
3 Complete and coordinate the design of distribution substations	3.1 Final inspections of the design are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief.
	3.2 Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3 Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4 Approved copies of design documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing distribution substations.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
E2.18.8.2	Occupational Health and Safety , enterprise responsibilities
T2.1.1	Engineering applications of mathematical principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.1.2	Engineering applications of mechanical principles
T2.1.3	Engineering applications of material properties
T2.2.1	Generation power systems
T2.2.3	Substations, power transformers and reactors
T2.2.15	Metering installations
T2.3.3	Statutory and safety considerations
T2.3.8	Safe design principles
T2.4.1	Switchgear installation
T2.4.5	High voltage distribution transformer principles
T2.4.7	Feeder automation system
T2.7.1	Environmental fundamentals
T2.9.7	Distribution substation minor upgrade layout principles
T2.11.46	Distribution transformer fundamentals
T2.11.47	Distribution transformer operation
T2.11.51	Distribution earthing system

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.

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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 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 - UET09". Evidence shall also comprise:

- A representative body of Performance Criteria 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; 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	Completion of six (6) technical designs of a Distribution Substation relating to at least two of the following project types:	Multi-transformer substations Residential developments Industrial/commercial developments Alteration to existing assets

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B	Designs should also included all the following:	Activities that address the correction of errors in the process. Application of a design control checklist, which lists all of the required design activities to be carried out in this process.
C	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 design of distribution substations

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.

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

9.5)

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EVIDENCE GUIDE

assessment and relationship with other units	For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units: There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

8) 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 the design of distribution substations and may include the following equipment:

Substations, transformers, cables, Surge Div, HV Switchgear, LV Switchgear, links, relays, power supply, signage, busbars, relevant protection systems including fuses and circuit breakers and associated civil works.

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
- 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

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RANGE STATEMENT

- Identifying hazards
- Inspect
- Legislation
- MSDS
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

Design.

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UETTDRDS08B Design public lighting systems

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the technical design of public lighting systems. This includes pedestrian and traffic route lighting to relevant Australian standards utilising appropriate software to generate design conformance. These activities should be undertaken with minimal supervision and technical support.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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.

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Pre-Requisites

Prerequisite Unit(s) **2**)

2.1) **Competencies**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRDS13B	Develop HV and LV distribution protection systems
and	UETTDRDS15B	Organise and implement line and easement surveys.

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate for the design of public lighting systems	1.1 OHS practices/procedures and environmental and sustainable energy procedures which may influence the design of public lighting systems are reviewed and determined.
	1.2 Purpose of the design is established and expected outcomes of the work is confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the design are obtained or established with the appropriate personnel.
	1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures.
	1.5 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.
	1.6 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.8 Resources including personal, equipment, tools and personnel protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and technical working order.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	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 coordinated and authorised where applicable in accordance with established procedures.
2 Carry out and coordinate the design of public lighting systems	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical models of the distribution system are used to analyse the effectiveness of the finish project as per requirements and established procedures.
	2.5	Technical advice is given to 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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.

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ELEMENT	PERFORMANCE CRITERIA
3 Complete and coordinate the design of public lighting systems	3.1 Final inspections of the design are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief.
	3.2 Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3 Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4 Approved copies of design documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing public lighting 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

E2.18.2 Electrical safe working practice

E2.18.8.2 Occupational Health and Safety , enterprise responsibilities

T2.1.1 Engineering applications of mathematical principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.1.2	Engineering applications of mechanical principles
T2.1.3	Engineering applications of material properties
T2.2.2	Transmission, distribution and rail power systems
T2.2.22	Installation and maintenance of public lighting and associated equipment
T2.3.3	Statutory and safety considerations
T2.3.8	Safe design principles
T2.7.1	Environmental fundamentals
T2.9.5	Principles of lighting design
T2.9.8	Principles in drafting street lighting system

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 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 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 - UET09". 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

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EVIDENCE GUIDE

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	Completion of six (6) technical designs of a Public Lighting systems utilising at least three of the following project types:	Single light on existing assets Main road/minor road schemes Intersections Traffic management devices Alteration to existing assets Multi circuit systems
B	Designs should also included all the following:	Activities that address the correction of errors in the process. Application of a design control checklist which lists all of the required design activities to be carried out in this process.
C	At least one occasion	Dealing with an unplanned event by drawing on essential knowledge and associated skills to provide appropriate

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EVIDENCE GUIDE

		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 design of public lighting systems.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.

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 may be assessed concurrently with the following units:

There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

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RANGE STATEMENT

8) 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 the design of public lighting systems and may include the following equipment:

Pole (including wood, concrete, steel and composite) associated hardware including conductors (underground, bare wire and aerial bundle cable), LV Switchgear, lanterns, lamps, brackets, signage, supervisory cable, cable TV, Substations, relevant protection systems and associated civil works.

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
- 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

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RANGE STATEMENT

- Personnel
- Quality assurance systems
- Requirements
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

Design.

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UETTDRDS09B Prepare and manage detailed construction plans for electrical system infrastructure

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the preparation of detailed plans to be used during the design phase and preparation of as-built drawings during the construction phase, and utilised by network owners as technical reference materials, to detail system infrastructure. It includes the use of CAD or other relevant drafting methods.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UEENEEG002B	Solve problems in single and three phase low voltage circuits.
UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate the preparation and management of detailed construction plans for electrical system infrastructure	1.1 OHS practices/procedures, which may influence the preparation and management of detailed construction, plans for electrical system infrastructure are reviewed and determined.
	1.2 Purpose of the construction plans is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Established organisational procedures, policies and specifications for the construction plans are obtained or established with the appropriate personnel.
	1.4 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.
	1.5 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.6 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7 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.
	1.8 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.9 Site is prepared according to the work schedule and to minimise risk and damage to property,

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ELEMENT	PERFORMANCE CRITERIA	
		commerce, and individuals in accordance with established procedures.
2 Carry out and coordinate the preparation and management of detailed construction plans for electrical system infrastructure	2.1	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures
	2.2	System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.3	Mathematical models of the distribution system are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.4	Technical advice is given to 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.
	2.5	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.6	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.7	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete and coordinate the preparation and management of detailed construction plans for electrical system infrastructure	3.1	Final inspections of the construction plans are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are

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ELEMENT	PERFORMANCE CRITERIA
	finalised.
	3.3 Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4 Approved copies of construction plan documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 preparing and managing detailed construction plans for electrical system infrastructure

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
E2.18.8.2	Occupational Health and Safety , enterprise responsibilities
T2.2.2	Transmission, distribution and rail power systems
T2.2.4	Powerline distribution installation
T2.2.6	Pole and hardware installation
T2.2.23	Underground cable construction
T2.3.1	Powerline safety practices

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REQUIRED SKILLS AND KNOWLEDGE

T2.3.2	Powerline safety - implementation and monitoring
T2.3.8	Safe design principles
T2.4.6	High voltage SWER system
T2.7.1	Environmental fundamentals
T2.8.1	Enterprises specific - policy and procedure instructions
T2.8.2	Enterprises specific - OHS instructions
T2.8.3	Enterprises specific - technical drawing and documents
T2.8.4	Enterprise specific - switching diagrams
T2.9.1	Interpretation of power distribution network drawings and documentation
T2.11.1	Power system layouts
T2.11.2	Circuit breaker auxiliary systems
T2.11.3	DC transmission system principles
T2.11.4	AC transmission system components
T2.11.5	AC transmission line electrical parameters
T2.11.6	AC transmission line equivalent circuit calculations
T2.11.8	Voltage control devices on interconnected transmission systems
T2.11.9	Calculation of rating of voltage control devices
T2.11.11	Control of transient over voltages
T2.11.12	Corona and discharge losses
T2.11.17	Protection scheme requirements

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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 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 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

9.**2**)

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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 - UET09". 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	Preparation of six (6)	Distribution overhead designs

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EVIDENCE GUIDE

	compliant detailed plans that relate to the following project types:	Distribution underground designs Distribution substations designs Transmission and subtransmission substations designs Public lighting designs Zone substation designs Customer Substation designs
B	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 preparation and management of detailed construction plans for electrical system infrastructure

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.

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

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EVIDENCE GUIDE

	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 may be assessed concurrently with the following units: There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

8) 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 the preparation and management of detailed construction plans for electrical infrastructure and may include the following equipment:

Drafting software, Computer hardware, Reference manuals, Design sketches

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
- 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

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RANGE STATEMENT

- 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
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

Design.

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UETTDRDS10B Prepare and appraise financial impact statements

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the creation, interpretation and application of financial implications in distribution, zone, subtransmission and transmission network augmentations, maintenance and construction activities. It includes project scoping, cost estimating, providing economic justifications and cost benefit analysis and the use of guarantee and capital contribution arrangements with customers.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRDS09B	Prepare and manage detailed construction plans for electrical system infrastructure
or	UETTDRTS16B	Commission network protection and control systems (complex)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for and coordinate the preparation and appraisal of financial impact statements	1.1 OHS practices/procedures and environmental and sustainable energy procedures which may influence the preparation and appraisal of financial impact statements are reviewed and determined.
	1.2 Purpose of the financial statement is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Established procedures, policies and specifications for financial impact statement preparation and appraisal are obtained or established with the appropriate personnel.
	1.4 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.
	1.5 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.6 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.7 Personnel participating in the work are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
2 Carry out and coordinate the preparation and appraisal of financial impact statements	2.1 Circuit system modelling is used to evaluate alternative proposals as per established procedures.
	2.2 OHS and sustainable energy principles, functionality and practices to reduce the incidents

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ELEMENT	PERFORMANCE CRITERIA	
		of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.4	Technical advice is given to 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.
	2.5	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
3 Complete and coordinate the preparation and appraisal of financial impact statements	3.1	Final inspections of the financial impact statement are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the appraisal brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of financial impact statement documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

7) **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 preparing and appraising financial impact statements.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
E2.18.8.2	Occupational Health and Safety , enterprise responsibilities
T2.3.8	Safe design principles
T2.8.18	Enterprise specific - writing management reports
T2.11.21	Financial impact statements
T2.11.39	Project management

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

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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 the "Assessment Guidelines - UET09". 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

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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	Completion of six (6) in total from at least two (2) of the following project types:	Distribution overhead designs Distribution underground designs Distribution substations designs Customer substations designs Transmission substations designs Sub-transmission substations designs Public lighting designs Zone substation designs Substation secondary systems

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		- Commissioning. Substation secondary systems -Maintenance and augmentation. Generation secondary systems -Commissioning. Generation secondary systems -Maintenance and augmentation. HV Primary plant -Commissioning. HV Primary plant -Maintenance and augmentation
B	Financial Impact Statements shall also include:	Activities that address the correction of errors in the process.
C	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 preparation and appraisal of financial impact statements

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.

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EVIDENCE GUIDE

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 may be assessed concurrently with the following units:

There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

8) 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 the preparation and appraisal of financial impact statements and may include the following equipment:

Financial software, Computer hardware, Design sketches.

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
- Assessment

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RANGE STATEMENT

- 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
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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"

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2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Design.

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UETTDRDS11B Manage electrical infrastructure projects

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the work planning and resource requirements, and financial control of infrastructure projects being undertaken within the distribution, sub transmission and transmission, overhead and underground networks. It includes project management activities, which may involve the simultaneous management of many projects, and must encompass at least 20 identifiable tasks.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2**)

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRDS10B	Prepare and appraise financial impact statements

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for and coordinate the management of electrical infrastructure projects	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the management of electrical infrastructure projects, are reviewed and determined.
	1.2 Purpose of the electrical infrastructure project is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the electrical infrastructure project are obtained or established with the appropriate personnel.
	1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures.
	1.5 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.
	1.6 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.8 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.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10 Site is prepared according to the work schedule

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ELEMENT		PERFORMANCE CRITERIA	
			and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
		1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
		1.12	Positioning of road signs, barriers and warning devices is planned in accordance with requirements.
2	Carry out and coordinate the management of electrical infrastructure projects	2.1	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
		2.2	System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
		2.3	Mathematical models of relevant networks are used to analyse the effectiveness of the finish project as per requirements and established procedures.
		2.4	Technical advice is given to 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.
		2.5	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
		2.6	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
		2.7	Quality of work is monitored against personal

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ELEMENT	PERFORMANCE CRITERIA	
		performance agreement and/or established organisational and professional standards.
	2.8	Testing of electrical infrastructure is undertaken according to requirements and established procedures.
	2.9	Electrical infrastructure decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures
	2.10	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
3 Complete and coordinate the management of electrical infrastructure projects	3.1	Final inspections of the infrastructure are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of project documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 managing electrical infrastructure projects.

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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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
E2.18.8.2	Occupational Health and Safety , enterprise responsibilities
T2.2.4	Powerline distribution installation
T2.2.5	Powerline installation safety
T2.2.6	Pole and hardware installation
T2.2.7	Low voltage electrical service installation
T2.2.21	Installation and maintenance on transmission lines and associated equipment
T2.2.22	Installation and maintenance of public lighting and associated equipment
T2.2.31	Distribution overhead line component fundamentals
T2.2.38	Working on live lines up to 33kV with glove and barrier/Hotstick combined
T2.3.8	Safe design principles
T2.4.2	Low voltage switching principles
T2.4.3	High voltage switching principles
T2.4.4	High voltage fault switching principles
T2.7.4	Powerline environmental impact - implementation and monitoring
T2.9.1	Interpretation of power distribution network drawings and documentation
T2.9.2	Overhead distribution extension layout principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.9.3 Surveying techniques

T2.11.39 Project management

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 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 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 - UET09". 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/oth

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er variables		
Group No	**The minimum number of items on which skill is to be demonstrated**	**Item List**
A	Manage at least six (6) projects that, each encompass at least twenty (20) identifiable tasks and that relate to four (4) the following project types:	Distribution overhead designs Distribution underground designs Distribution substations designs Public lighting designs Zone substation designs
B	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 management of electrical infrastructure projects

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.

Method of assessment

9.4)

This Competency Standard Unit shall be assessed by methods

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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 may be assessed concurrently with the following units:

There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

8) 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 the management of electrical infrastructure projects and may include the following: contract and in-house workforces, project management software.

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
- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration
- Documenting detail work events, record keeping and or

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RANGE STATEMENT

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
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

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Competency Field

Competency Field **5**)

Design.

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UETTDRDS12B Investigate quality of supply issues

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the technical investigation of quality of supply issues and recommend solutions. Quality of supply issues may include television and radio interference, voltage complaints, harmonics and system irregularities.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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.

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Pre-Requisites

Prerequisite Unit(s) **2**)

2.1) **Competencies**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRDS05B	Design overhead distribution systems.
UETTDRDS06B	Design underground distribution systems

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate for the investigation of issues in the quality of supply	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the investigation of issues in the quality of supply, are reviewed and determined.
	1.2 Purpose of the investigation is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the investigation are obtained or established with the appropriate personnel.
	1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures.
	1.5 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.
	1.6 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.8 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.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10 Site is prepared according to the work schedule and to minimise risk and damage to property,

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ELEMENT	PERFORMANCE CRITERIA	
		commerce, and individuals in accordance with established procedures.
	1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
	1.12	Positioning of road signs, barriers and warning devices is planned in accordance with requirements.
2 Carry out and coordinate the investigation of issues in the quality of supply	2.1	Circuit/system modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Investigation decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical models of the quality system are used to analyse the effectiveness of the finished product/service as per requirements and established procedures.
	2.5	Technical advice is given to 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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge

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ELEMENT	PERFORMANCE CRITERIA	
		and associated skills according to requirements.
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.9	Testing of quality is undertaken according to requirements and established procedures.
3 Complete and coordinate the investigation of issues in the quality of supply	3.1	Final assessments of the quality of supply are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the supply brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of quality assessment documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 investigating quality of supply issues.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.2	Electrical safe working practice
E2.18.8.2	Occupational Health and Safety , enterprise responsibilities
T2.3.8	Safe design principles
T2.11.26	Test equipment - fundamentals
T2.11.30	Test equipment E - field
T2.11.32	Quality of supply measures

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 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

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that may be required and the critical nature of the competencies being assessed.

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 - UET09". 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

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- 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	Completing six (6) technical solutions to issues relating to the following project types:	Television and radio interference Voltage irregularities in an urban area Voltage irregularities in a rural area Voltage irregularities affecting an industrial/commercial customer Voltage irregularities in an underground area
B	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 evaluation of quality of supply

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	issues. In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.
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 may be assessed concurrently with the following units: There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

8) 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 the investigation of supply issues and may include the following: distribution feeders/networks, substations, transformers, HV switchgear, LV switchgear, relevant protection systems, fuses and circuit breakers.

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:

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RANGE STATEMENT

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform
- Assessing risk
- 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
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

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Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Design.

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UETTDRDS13B Develop HV and LV distribution protection systems

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the development of appropriate protection systems for HV and LV distribution networks, including calculations of fault levels, selection of appropriate protection devices and automation requirements and protection coordination schemes. This also includes recommendations to support the calculations and must ensure conformance to specific organisational operational and system planning requirements, and compliance with national or supply authority codes.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UEENEEE007B	Use drawings, diagrams, schedules and manuals
UEENEEG049B	Solve problems in complex polyphase power circuits
UETTDRIS22B	Implement and monitor organisation's OHS policies and procedures
UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate for the development of HV and LV protection systems	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the development of HV and LV protection systems, are reviewed and determined.
	1.2 Purpose of the development is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the development are obtained or established with the appropriate personnel.
	1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures.
	1.5 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

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ELEMENT	PERFORMANCE CRITERIA	
		in accordance with established procedures.
	1.6	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.7	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.8	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.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
2 Carry out and coordinate the development of HV and LV protection systems	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	system design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical models of the HV/LV protection system are used to analyse the effectiveness of the finished project as per requirements and

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ELEMENT	PERFORMANCE CRITERIA	
		established procedures.
	2.5	Technical advice is given to 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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete and coordinate the development of HV and LV protection systems	3.1	Final inspections of the development's design are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of design documents are issued and records are updated in accordance with established procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 developing HV and LV distribution protection 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
E2.18.8.2	Occupational Health and Safety , enterprise responsibilities
T2.3.8	Safe design principles
T2.4.1	Switchgear installation
T2.10.28	Electrical equipment - distribution field device protection and control schemes - substations
T2.11.14	Fault calculation techniques
T2.11.18	Discrete protection systems
T2.11.49	Polyphase circuit analysis
T2.11.53	Protection schemes

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

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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 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 - UET09". Evidence shall also

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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	Completion of two (2) designs in total from at least two (2) of the following project types:	Distribution overhead designs Distribution underground designs Distribution substations designs
B	At least one	Dealing with an unplanned event by drawing on essential

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	occasion	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 development of high voltage and low voltage distribution protection systems

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.

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 may be assessed concurrently with the following units:

There are no recommended concurrencies for this unit.

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Range Statement

RANGE STATEMENT

8) 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 the development of high voltage and low voltage distribution protection systems and may include the following equipment:

ACR, regulator, earthing, air break switches, gas switches, capacitor units, transformers, links, fuses, sectionalisers, lead Arrestors, HV Switchgear, LV Switchgear, control boxes, communications equipment, , supervisory cable, cable TV, Substations, relevant protection systems and associated civil works.

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
- 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

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RANGE STATEMENT

- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Design.

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UETTDRDS14B Design zone substations modifications

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the design of modifications within a substation. This may include busbar upgrades, equipment replacement projects and basic secondary upgrades or SCADA modifications The design may include civil engineering aspects and must conform to safety regulations and environmental standards and incorporates the principles of safe design.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE007B	Use drawings, diagrams, schedules and manuals
UETTDRIS22B	Implement and monitor organisation's OHS policies and procedures
UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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 unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate for the design of substations	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the design of substations, are reviewed and determined.
	1.2 Purpose of the design is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Established organisational procedures, policies and specifications for the design are obtained or established with the appropriate personnel.
	1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures.
	1.5 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.
	1.6 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.8 Resources including personnel, equipment, tools and personal protective equipment required for

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ELEMENT	PERFORMANCE CRITERIA	
		the job are identified, scheduled and coordinated and confirmed in a safe and technical working order.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
2 Carry out and coordinate the design of substations	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical models of the distribution system are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	Technical advice is given to 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.
	2.6	Essential knowledge and associated skills are

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ELEMENT	PERFORMANCE CRITERIA	
		applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete and coordinate the design of substations	3.1	Final inspections of the design are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of design documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing substation modifications.

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 (EKAS) required is given in

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REQUIRED SKILLS AND KNOWLEDGE

Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.8.11	Power engineering computation
E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
E2.18.8.2	Occupational Health and Safety , enterprise responsibilities
T2.2.1	Generation power systems
T2.2.2	Transmission, Distribution and Rail power systems
T2.2.3	Substations, power transformers and reactors.
T2.2.13	Low voltage - energised work practices for substations
T2.2.15	Metering installations
T2.3.3	Statutory and safety considerations
T2.3.4	Electrical equipment - protection and control schemes
T2.3.8	Safe design principles
T2.4.1	Switchgear installation
T2.7.1	Environmental fundamentals
T2.7.2	Material handling and the environment
T2.10.11	Substation safety practices
T2.10.15	High voltage insulation system principles - substations
T2.11.67	substation modification design principles

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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 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 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.

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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 - UET09". 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**	**Item List**

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	demonstrated	
A	Completion of six (6) compliant technical designs of different components of a Substation with at least one relating to each of the following project types:	Primary equipment upgrades or replacements Secondary equipment upgrades or replacements SCADA modifications
B	Designs should also included all the following:	Activities that address the correction of errors in designs. Application of a design control checklist which lists all of the required design activities to be carried out in this process.
C	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 design of substation.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.

Method of assessment **9.4**)

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EVIDENCE GUIDE

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 may be assessed concurrently with the following units:

There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

8) 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 the design of substations and may include the following equipment:

Pole (including wood, concrete, steel and composite) associated hardware including conductors (bare wire and aerial bundle cable), crossarms, insulators, ACR, regulator, earthing, air break switches, gas switches, capacitor units, transformers, links, fuses, sectionalisers, lead Arrestors, HV Switchgear, LV Switchgear, control boxes, communications equipment, lanterns, signage, supervisory cable, cable TV, Substations, relevant protection systems and associated civil works.

Underground cable, terminations, joints, Substations, mechanical protection, HV Switchgear, LV Switchgear, signage, relevant protection systems, relevant protection systems including fuses and circuit breakers and associated civil works.

Substations, transformers, cables, Surge Div, HV Switchgear, LV Switchgear, links, relays, power supply, signage, busbars, relevant protection systems including fuses and

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RANGE STATEMENT

circuit breakers and associated civil works.

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
- 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
- Safe design principles
- Testing procedures
- Work clearance systems

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Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Design

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UETTDRDS15B Organise and implement line and easement surveys

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the surveying of distribution and sub transmission lines and easements for activities associated with the design and installation of electrical equipment. This activity should encompass the use of instruments such as compasses, inclinometer, distance measuring devices, etc and be in accordance with customer requirements, nominated design specifications and company processes.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRDS09B	Prepare and manage detailed construction plans for electrical system infrastructure

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and coordinate the organisation and implementation of line and easement surveys	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the organisation and implementation of line and easement surveys, are reviewed and determined.
	1.2	Purpose of the line and easement surveys is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established procedures on policies and specifications for the design are obtained or established with the appropriate personnel.
	1.4	Equipment/tools and personnel protective equipment are selected and coordinated based on specified requirements and established procedures.
	1.5	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.
	1.6	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.7	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.8	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.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Site is prepared according to the work schedule

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ELEMENT	PERFORMANCE CRITERIA	
		and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
	1.12	Positioning of road signs, barriers and warning devices is planned in accordance with requirements
2 Carry out and coordinate the organisation and implementation of line and easement surveys	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Survey design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical models of the distribution system are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	Technical advice is given to 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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified

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ELEMENT	PERFORMANCE CRITERIA	
		and actioned using acquired essential knowledge and associated skills according to requirements.
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.9	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
3 Complete and coordinate the organisation and implementation of line and easement surveys	3.1	Final assessment of the surveys are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of survey documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 organising and implementing line and easement surveys

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
E2.18.8.2	Occupational Health and Safety , enterprise responsibilities
T2.3.8	Safe design principles
T2.9.3	Surveying techniques
T2.11.39	Project management

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 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

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EVIDENCE GUIDE

that may be required and the critical nature of the competencies being assessed.

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 - UET09". 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

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EVIDENCE GUIDE

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	Completion of six (6) surveys of an overhead network relating to the following project types:	Multi-pole extensions (distribution and sub transmission) In-line pole relocations (distribution and sub transmission) Multi circuit overhead lines (distribution and sub transmission) Underground augmentation project.
B	Designs should also included all the following:	Activities that address the correction of errors in the process. Application of a design control checklist which lists all of the required design activities to be carried out in this process.
C	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 **9.3)**

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EVIDENCE GUIDE

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 organisation and implementation of line easement surveys.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.

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 may be assessed concurrently with the following units:

There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

8) 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 the

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RANGE STATEMENT

organisation and implementation of line and easement surveys and may include the following:

Survey instruments (theodolites, measuring devices, compasses, inclinometer); survey software

Poles; conductors - bare wire and aerial bundled cable; crossarms; insulators; substations ; transformers; HV switchgear; LV switchgear.

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
- 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
- Safe design principles
- Testing procedures

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RANGE STATEMENT

- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Design.

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UETTDRDS16B Develop planned outage strategies

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the competency required to assess, and manage the impact on the network and customers with regards to planned outages. This includes customer outage times, network and plant loading issues and regulatory requirements. A detailed knowledge of Network performance indicators is included.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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.

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Pre-Requisites

Prerequisite Unit(s) **2**)

2.1) **Competencies**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

	UEENEED004B	Use Engineering Application Software
and	UETTDRIS22B	Implement and monitor the organisation's OHS policies, procedures and programs.

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and coordinate for the development of outage strategies	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the outage strategies, are reviewed and determined.
	1.2	Purpose of the strategies is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established procedures on policies and specifications for the strategies are obtained or established with the appropriate personnel.
	1.4	Equipment/tools and personnel protective equipment are selected and coordinated based on specified requirements and established procedures
	1.5	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
	1.6	Risk control measures are identified, prioritised and evaluated against the work schedule
	1.7	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures
	1.8	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
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land-owners are resolved and activities coordinated to carry out work
	1.10	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with

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ELEMENT	PERFORMANCE CRITERIA	
		established procedures
2 Carry out and coordinate outage strategies	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the strategy in accordance with requirements and/or established procedures
	2.3	Strategy decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures
	2.4	Mathematical models of the outage strategies are used to analyse the effectiveness of the finished project as per requirements and established procedures
	2.5	Technical advice is given to 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
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the strategy within an agreed timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete and coordinate outage strategies	3.1	Final review of the strategy is undertaken to ensure it complies with all requirements and include all specifications and documentations needed to complete the project.

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ELEMENT	PERFORMANCE CRITERIA	
	3.2	Final review of the strategy is undertaken to ensure it complies with all requirements and include all specifications and documentations needed to complete the project.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval
	3.4	Approved copies of outage strategy documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing distribution substations.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
E2.18.8.2	Occupational health and safety , enterprise responsibilities
T2.2.49	Co-ordinating permit access authority procedures.
T2.3.8	Safe design principles
T2.4.1	Switchgear installation

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REQUIRED SKILLS AND KNOWLEDGE

T2.4.2	Low voltage switching principles
T2.4.3	High voltage switching principles
T2.4.11	High voltage overhead and substation switching principles

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 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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EVIDENCE GUIDE

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 is based, shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines - UET09". 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:

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EVIDENCE GUIDE

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	Writing of three (3) switching instructions that relate to each of the following network types:	LV networks HV networks
B	Each of the above switching instructions to include the following:	Switching instructions laid out according to enterprise requirements for layout A documented process to indicate methods used to check switching instructions Documentation of coordination process of switching schedules Documentation of plant loading calculation Entry of data for collection of 'minute of supply' records into relevant systems
C	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 9.3)

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EVIDENCE GUIDE

specific 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 development of Planned Outage Strategies

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.

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)

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.

Range Statement

RANGE STATEMENT

8) 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 the development of planned outage strategies and may include the following equipment:

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RANGE STATEMENT

Distribution feeders/networks, zone substation networks, substations , transformers, HV switchgear, LV switchgear, relevant protection systems, (fuses and circuit breakers), switching instructions (applicable to enterprise equipment), computers (applicable to enterprise equipment), network diagrams.

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
- 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.
- Safe design principles
- Testing procedure

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RANGE STATEMENT

- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Design

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UETTDRDS17B Review asset management strategies

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the management of assets within the distribution and sub transmission networks. This includes plant optimisation, condition monitoring, maintenance strategies and policies and capital works planning, including recommendations for continual improvement. Cost benefit analysis is fundamental for successful implementation of the afore mentioned asset management functions.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

	UETTDRDS09B	Prepare and manage detailed construction plans for electrical system infrastructure
or	UETTDRTS16B	Commission network protection and control systems (complex)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate for the establishment and implementation of asset management systems	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the design of asset management systems, are reviewed and determined.
	1.2 Purpose of the design is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the design are obtained or established with the appropriate personnel.
	1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures
	1.5 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
	1.6 Risk control measures are identified, prioritised and evaluated against the work schedule
	1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures
	1.8 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
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land-owners are resolved and activities

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ELEMENT	PERFORMANCE CRITERIA	
		coordinated to carry out work
	1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures
2 Carry out and coordinate the establishment and implementation of asset management systems	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures
	2.3	System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures
	2.4	Mathematical models of the distribution system are used to analyse the effectiveness of the finished project as per requirements and established procedures
	2.5	Technical advice is given to 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
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.

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ELEMENT	PERFORMANCE CRITERIA
3 Complete and coordinate the establishment and implementation of asset management systems	3.1 Final inspections of the design are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief.
	3.2 Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3 Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval
	3.4 Approved copies of design documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing distribution substations.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational health and safety principles

E2.18.2 Electrical safe working practice

E2.18.8.2 Occupational health and safety , enterprise responsibilities

T2.3.8 Safe design principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.8.8	Enterprise specific - data management processes
T2.8.17	Enterprise specific - effective management and communication.
T2.8.18	Enterprise specific - write management reports.
T2.9.1	Interpretation of power distribution network drawings and documentation
T2.9.2	Overhead distribution extension layout principles

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 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

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place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

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 is based, shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines - UET09". 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

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- 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	Correct interpretation of three (3) existing maintenance strategies or policies that relate to the following project types:	Distribution network Sub transmission network Distribution substations Zone substations Public lighting
B	Preparation of three (3) maintenance strategies or policies that relate to the following project types:	Distribution network Sub transmission network Distribution substations Zone substations Public lighting
C	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 9.3)

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specific 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 review of asset management strategies

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.

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)

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.

Range Statement

RANGE STATEMENT

8) 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 the review of asset management strategies and include specific enterprise tools, equipment,

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RANGE STATEMENT

information data systems and other resources typical of a workplace.

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 and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform.
- Assessing risk
- 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.
- Safe design principles
- Testing procedures
- Work clearance systems

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Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Design.

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UETTDRDS18B Analyse and appraise fault and outage data

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the data gathering and analysis of system outages and plant failures. It includes the recommending of solutions and maintenance plans to ensure system security.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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.

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Pre-Requisites

Prerequisite Unit(s) **2**)

2.1) **Competencies**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

UETTDRDS09B	Prepare and manage detailed construction plans for electrical system infrastructure

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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

Elements and Performance Criteria

ELEMENT **PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA	
1 Plan and coordinate for the analysis and appraisal of fault and outage data	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the analysis and appraisal of fault and outage data, are reviewed and determined.
	1.2	Purpose of the analysis/appraisal is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established procedures on policies and specifications for the design are obtained or established with the appropriate personnel.
	1.4	Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures
	1.5	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
	1.6	Risk control measures are identified, prioritised and evaluated against the work schedule
	1.7	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures
	1.8	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
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land-owners are resolved and activities coordinated to carry out work
	1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures
2 Carry out and	2.1	Personnel participating in the work, including

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ELEMENT	PERFORMANCE CRITERIA	
coordinate the analysis and appraisal of fault and outage data		plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures
	2.2	Positioning of road signs, barriers and warning devices is planned in accordance with requirements
	2.3	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.4	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures
	2.5	Analysis \ Appraisal decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures
	2.6	Mathematical models of solutions for system outages and plant failures are used to analyse the effectiveness of the finished project as per requirements and established procedures
	2.7	Technical advice is given to 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
	2.8	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
3 Complete and coordinate the analysis and appraisal of fault and outage data	3.1	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements
	3.2	Quality of work is monitored against personal

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ELEMENT	PERFORMANCE CRITERIA	
		performance agreement and/or established organisational and professional standards.
	3.3	Final inspections of the analysis/appraisal are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief.
	3.4	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing distribution substations.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
E2.18.8.2	Occupational health and safety , enterprise responsibilities
T2.2.53	HV principles
T2.3.2	Powerline safety - implementation and monitoring
T2.3.4	Electrical equipment - protection and control schemes
T2.3.8	Safe design principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.4.1	Switchgear installation
T2.4.2	Low voltage switching principles
T2.4.3	High voltage switching principles
T2.4.4	High voltage fault switching principles
T2.4.5	High voltage distribution transformer principles
T2.4.6	High voltage SWER system
T2.4.7	Feeder automation system
T2.11.61	Analysis network event records

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 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 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 is based, shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines - UET09". 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 kills 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

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- 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	Writing of reports relating to each of the following, recommending relevant action(s):	Zone substation faults Distribution feeders faults Distribution substation faults
B	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 analysis and appraisal of fault and outage data

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show

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EVIDENCE GUIDE

	demonstrated competency working realistic environment and a variety of conditions.
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)** 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.

Range Statement

RANGE STATEMENT

8) 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 the analysis and appraisal of fault and outage data and may include the following:

Relevant protection systems, both HV and LV (fuses and circuit breakers); distribution feeders/networks (overhead and underground); substations and transformers; HV switchgear; LV switchgear.

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

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RANGE STATEMENT

- Appropriate work platform.
- Assessing risk
- 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.
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Design

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UETTDRDS19B Establish and manage geographical information systems data

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the preparation and updating of detailed plans to be used during the construction phase of all design activities, and utilised by network owners as technical reference materials, to detail system infrastructure. It includes the use of GIS.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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.

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Pre-Requisites

Prerequisite Unit(s) **2**)

2.1) **Competencies**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

	UEENEED004B	Use Engineering Application Software
and	UEENEEE007B	Use Drawings, Diagrams, Schedules and Manuals
and	UETTDRIS22B	Implement and monitor the organisation's OHS policies, procedures and programs.

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate for the establishment and management of geographical information system data	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the establishment and management of graphical information systems, are reviewed and determined.
	1.2 Purpose of the geographical information systems is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the geographical information systems are obtained or established with the appropriate personnel.
	1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures
	1.5 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
	1.6 Risk control measures are identified, prioritised and evaluated against the work schedule
	1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures
	1.8 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
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land-owners are resolved and activities

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ELEMENT	PERFORMANCE CRITERIA	
		coordinated to carry out work
	1.10	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures
2 Carry out and coordinate the establishment and management of geographical information system data	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures
	2.3	Decisions concerning the establishment and management of graphical information systems are made on the basis of safety and effective outcomes according to requirements and/or established procedures
	2.4	Mathematical/engineering models of the establishment and management of geographical information systems are used to analyse the effectiveness of the finished project as per requirements and established procedures
	2.5	Technical advice is given to 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
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements

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ELEMENT	PERFORMANCE CRITERIA	
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete and coordinate the establishment and management of geographical information system data	3.1	Final review of the establishment and management process are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval
	3.4	Approved copies of documents regarding the establishment and management process are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing distribution substations.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.5.1.2 Drawings and diagrams

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.1	Occupational health and safety principles
E2.18.2	Electrical safe working practice
E2.18.8.2	Occupational health and safety , enterprise responsibilities
T2.2.4	Powerline distribution installation.
T2.2.48	Electrical equipment - HV and LV powerline
T2.3.8	Safe design principles
T2.8.3	Enterprises specific - Technical drawing and documents
T2.8.4	Enterprise specific - switching diagrams
T2.8.8	Enterprise specific - data management processes
T2.11.23	Locate and rectify faults in electrical equipment
T2.11.33	Geographic information systems principles

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)

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EVIDENCE GUIDE

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 is based, shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines - UET09". 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

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- 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	Completion of six (6) construction drawings of a distribution or subtransmission network relating to the following project types:	Overhead extensions (distribution and sub transmission) Underground extensions (distribution and sub transmission) Substation construction (distribution and sub transmission)
B	Construction drawings should also included all the following:	Any preparation and updating of detailed construction drawings of distribution and sub transmission networks The use of a GIS.
C	At least one	Dealing with an unplanned event by drawing on

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	occasion	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 establishment and management of geographical information system data

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.

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)

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.

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Range Statement

RANGE STATEMENT

8) 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 the establishment and management of geographical information systems and may include the following equipment:

Geographical information system, computer aided drafting software, construction drawings, design sketches and as built drawings.

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
- 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

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RANGE STATEMENT

- Permits and / or permits to work
- Personnel.
- Quality assurance systems.
- Requirements.
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

Design

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UETTDRDS20B Design customer substations

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This competency standard unit covers the design of basic primary and secondary plant within a customer substation. Such designs will usually include relay-operated HV switchgear, distribution transformers LV switchgear, including customer distribution boards. The design may include minor civil engineering aspects and must conform to relevant Australian standards, safety regulations, environmental standards and customer requirements taking into account costs as an important criterion.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

	UETTDRDS07B	Design Distribution Substations.
or	UETTDRDS14B	Design substation modifications

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and coordinate for the design of customer substations	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the design of customer substations, are reviewed and determined.
	1.2	Purpose of the design is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established procedures on policies and specifications for the design are obtained or established with the appropriate personnel.
	1.4	Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures
	1.5	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
	1.6	Risk control measures are identified, prioritised and evaluated against the work schedule
	1.7	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures
	1.8	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
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land-owners are resolved and activities coordinated to carry out work

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ELEMENT	PERFORMANCE CRITERIA	
	1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures
2 Carry out and coordinate the design of customer substations	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures
	2.3	Substation design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures
	2.4	Mathematical models of the customer substation are used to analyse the effectiveness of the finished project as per requirements and established procedures
	2.5	Technical advice is given to 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
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete and coordinate the design	3.1	Final inspections of the design are undertaken to ensure they comply with all requirements and

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ELEMENT	PERFORMANCE CRITERIA	
of customer substations		include all specifications and documentations needed to complete the design brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval
	3.4	Approved copies of design documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing distribution substations.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
E2.18.8.2	Occupational health and safety , enterprise responsibilities
T2.2.1	Generation power systems
T2.2.3	Substations, power transformers and reactors.
T2.2.15	Metering installations.

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REQUIRED SKILLS AND KNOWLEDGE

T2.3.8	Safe design principles
T2.4.1	Switchgear installation
T2.4.5	High voltage distribution transformer principles
T2.4.7	Feeder automation system
T2.9.7	Distribution substation minor upgrade layout principles
T2.11.46	Distribution transformer fundamentals
T2.11.47	Distribution transformer 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 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 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 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 is based, shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines - UET09". 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

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- 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	Completion of six (6) designs in total from at least two (2) of the following project types:	Single transformer substation Multi-transformer substations Upgrade/alteration to existing assets Auto-changeover systems
B	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 design of customer substations.

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	In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.
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**) 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.

Range Statement

RANGE STATEMENT

8) 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 the design of customer substations and may include the following:

Substations, transformers, HV switchgear, LV switchgear, relevant protection systems, (fuses and circuit breakers), civil works, customer distribution boards.

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)

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RANGE STATEMENT

- Appropriate authorities
- Appropriate work platform.
- Assessing risk
- 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.
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Design

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UETTDRDS21B Manage transmission and sub-transmission design process

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the management of transmission, Sub-transmission and Zone substation design process activities. This applies to all design projects whether they be basic secondary upgrades, SCADA modifications or new installations on green field sites. The design and management must conform to safety regulations and environmental standards and incorporate the principles of safe design.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

UETTDRDS09B	Prepare and Manage Detailed Construction Plans for Electrical System Infrastructure.

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate for the management of the transmission, sub-transmission and zone substation design process	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the design of zone substations, are reviewed and determined.
	1.2 Purpose of the design is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Established policies, procedures and specifications for the design are obtained or established with the appropriate personnel.
	1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures
	1.5 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
	1.6 Risk control measures are identified, prioritised and evaluated against the work schedule
	1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures
	1.8 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
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land-owners are resolved and activities coordinated to carry out work

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ELEMENT	PERFORMANCE CRITERIA	
	1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures
	1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures
2 Carry out and coordinate the management of the transmission, sub-transmission and zone substation design process	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures
	2.3	System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures
	2.4	Mathematical models of the system are used to analyse the effectiveness of the finished project as per requirements and established procedures
	2.5	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
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements
	2.8	Quality of work is monitored against personal

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ELEMENT	PERFORMANCE CRITERIA	
		performance agreement and/or established organisational and professional standards.
3 Complete and coordinate the management of the transmission, sub-transmission and zone substation design process	3.1	Final checks of the design are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval
	3.4	Approved copies of design documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing distribution substations.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
E2.18.9	Electronic safe working practices

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REQUIRED SKILLS AND KNOWLEDGE

T2.3.8	Safe design principles
T2.8.1	Enterprise specific - Policies and procedures instructions
T2.8.2	Enterprise specific - OHS instructions
T2.8.7	Enterprise specific - equipment installation procedures
T2.8.8	Enterprise specific - data management processes
T2.8.14	Enterprise specific - procedures and work practices relating to critical events
T2.8.17	Enterprise specific - effective management and communication
T2.8.18	Enterprise specific - writing management reports
T2.8.19	Enterprise specific - procedures and work practices relating to managing critical events
T2.10.1	Visual inspection procedures - substations
T2.10.7	Substation tools and equipment
T2.11.37	Negotiation techniques
T2.11.62	Preparing policies and procedures
T2.11.68	Management of Transmission, Sub-transmission and Zone Substation design process principles.

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.

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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 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 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 is based, shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two

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occasions in accordance with the "Assessment Guidelines - UET09". 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	The design process commencement activities, and to include each of the following items:	Completion of site survey. Geotechnical and resistivity details. Completion of environmental considerations Acquisition of design project

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		scope document Component manufacturer's details. Engagement of necessary consultants / contractors.
B	The design process commencement activities, and to include each of the following items:	Issue of design documentation to allow construction. Closure of the design process post delivery review and implementation of corrective actions. Issue of corrected design documents reflecting field mark ups.
C	The two technical projects to included all the following:	Activities that address the correction of errors in the process. Application of a design control checklist, which lists all of the required design activities to be carried out in this process.
D	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 management of the transmission, sub-transmission and zone substation design

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EVIDENCE GUIDE

	process In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.
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)** 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.

Range Statement

RANGE STATEMENT

8) 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 the design housekeeping/management components of transmission, sub-transmission and zone substation.

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)

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RANGE STATEMENT

- Appropriate authorities
- Appropriate work platform.
- Assessing risk
- 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.
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Design.

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UETTDRDS22B Design transmission, sub-transmission and zone substation buildings

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the design of Transmission, Sub-Transmission and Zone Substation Buildings. This may include basic augmentations or new installations on green field sites. The design must conform to safety and building regulations and environmental standards and incorporate the principles of safe design.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

UETTDRDS09B	Prepare and Manage Detailed Construction Plans for Electrical System Infrastructure.
UETTDRDS14B	Design Zone Substation Modifications

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate for the design of transmission, sub-transmission and zone substation buildings	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the design of substations buildings, are reviewed and determined.
	1.2 Purpose of the design is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Established policies, procedures and specifications for the design are obtained or established with the appropriate personnel.
	1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures
	1.5 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
	1.6 Risk control measures are identified, prioritised and evaluated against the work schedule
	1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures
	1.8 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
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land-owners are resolved and activities

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ELEMENT	PERFORMANCE CRITERIA	
		coordinated to carry out work
	1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures
	1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures
2 Carry out and coordinate the design of transmission, sub-transmission and zone substation buildings	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures
	2.3	System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures
	2.4	Mathematical models of the system are used to analyse the effectiveness of the finished project as per requirements and established procedures
	2.5	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
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements

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ELEMENT	PERFORMANCE CRITERIA	
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete and coordinate the design of transmission, sub-transmission and zone substation buildings	3.1	Final checks of the design are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval
	3.4	Approved copies of design documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing distribution substations.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.8.9.2	Electronic power circuit analysis
E2.18.1	Occupational Health and Safety principles

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.2	Electrical safe working practice
T2.1.2	Engineering applications of mechanical principles
T2.3.8	Safe design principles
T2.9.5	Principles of lighting design
T2.9.6	Underground mains layout principles
T2.11.69	Transmission. sub-transmission and zone Substation building design process - principles

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 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 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 is based, shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines - UET09". 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;

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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:

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	Completion of two (2) compliant technical designs relating to each of the following:	Establishment of equipment dimensions, weights and dynamic loadings. Suitability of building room/compartments and door opening dimensions for the equipment to be housed. Compliance with security, fire rating and safety, pressure relief, BCA and BA requirements. Compliance with electrical requirements, i.e. frame leakage, earthed metal isolation. Appropriateness of floor reference levels. Provision of cable supports, penetrations and pulling ring requirements. Building light and power design and drafting.
B	Designs should also included all the following:	Activities that address the correction of errors in the process.

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		Application of a design control checklist which lists all of the required design activities to be carried out in this process.
C	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 design of transmission, sub-transmission and zone substation buildings.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.

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

9.5)

There are no recommended concurrent assessments with this

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other units	unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed.

Range Statement

RANGE STATEMENT

8) 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 the design housekeeping components of transmission, sub-transmission and zone substations and may include the following equipment:

Primary components of a substation which may include: Electrical equipment in accordance with SLD, bays spaced in accordance with standard requirements, switchyard design in accordance with AS2067, equipment spaced so that space is available for maintenance facilities, maintenance space to fence in accordance with AS2067, switchyard equipment device codes correct, busbar earthing facilities available in appropriate positions, earth switches fitted to high busbar, portable earth attachment points in correct position, connections, busbar and flexibles, earthing points, switchgear operating handle positions, disconnector operator earth mats, anti-vibration Pads and Transformer location, auxiliary transformer location, earth stick storage, control building equipment layout, H.V. cable layout, wiring/connection diagrams, cable schedule, pilot terminations, streamline filter supply, frame leakage CT's, VT 's and CT's, photo electric cells, earthing of plumbing, distribution feeder cable CB connection and route drawing produced by regional designer and checked.

Manufacture's data sheets, documents, drawings

Manufacturers recommendations; Reliability performance profiles; Knowledge of local history and experience; Consultation with other Authorities; Environmental influences; Present practices.

Equipment includes; Sectionalisers, air break switches, capacitor banks, transformer taps, metering and protection equipment, data communication systems

Primary and secondary voltage and current injection equipment; time delay measuring equipment; Current transformers; Voltage transformers; Power transformers; Tapchangers; Circuit breakers; Capacitor banks; Ring main units; Audio frequency load control; Circuit breaker auxiliary systems; Substation and metal structure earthing systems; SCADA interfaces and transducer inputs; local opto-isolated alarms: PLC programs; Auto Reclosers (ACRs); protection relays; metering; control circuits; Statistical metering systems; Frame leakage relays; Distance relays; Pilot wire relays; Transformer differential relays; Busbar differential relays; Impedance bus zone relays;

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RANGE STATEMENT

Overcurrent and earth fault relays; Transformer neutral check relays; Circuit breaker fail relays; Multi-trip relays; Auto recloser relays; Voltage transformer failure relays; Surge protection relays; Buchholz relays; Winding temperature relays; Sensitive earth fault relays; Phase failure relays; Frequency relays; Load shedding relays; General protection LV devices; Oil temperature protection devices; Oil surge protection devices; Power supplies. differential relays; power systems; multi-facetted schemes; interactive overload schemes, distance protection (incorporating relay selection, switched/non-switched schemes; mutual coupling and teed feeder systems); protection signalling (incorporating series, direct, permissive, distance acceleration, block interruption); telecommunication circuits and equipment.

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
- 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.

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RANGE STATEMENT

- Quality assurance systems.
- Requirements.
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Design

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UETTDRDS23B Design transmission and sub-transmission substation primary plant

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the design of transmission, sub-transmission and zone substation primary plant. This may include busbar upgrades, equipment replacement projects, basic secondary upgrades or new installations on green field sites. The design must conform to safety regulations and environmental standards and incorporate the principles of safe design.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

	UETTDRDS09B	Prepare and Manage Detailed Construction Plans for Electrical System Infrastructure.
and	UETTDRDS14B	Design Zone Substation Modifications

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate for the design of transmission, sub-transmission and zone substation primary plant	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the design of primary plant component of substations, are reviewed and determined.
	1.2 Purpose of the design is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Established policies, procedures and specifications for the design are obtained or established with the appropriate personnel.
	1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures
	1.5 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
	1.6 Risk control measures are identified, prioritised and evaluated against the work schedule
	1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures
	1.8 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
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land-owners are resolved and activities

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ELEMENT		PERFORMANCE CRITERIA	
			coordinated to carry out work
		1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures
		1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures
2	Carry out and coordinate the design of transmission, sub-transmission and zone substation primary plant	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
		2.2	OHS and sustainable energy principles, functionality and practices to avoid incidents and accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures
		2.3	System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures
		2.4	Mathematical models of the design are used to analyse the effectiveness of the finished project as per requirements and established procedures
		2.5	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
		2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
		2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements

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ELEMENT	PERFORMANCE CRITERIA	
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete and coordinate the design of transmission, sub-transmission and zone substation primary plant	3.1	Final checks of the design are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval
	3.4	Approved copies of design documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing distribution substations.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice

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REQUIRED SKILLS AND KNOWLEDGE

T2.1.3	Engineering applications of material properties
T2.3.8	Safe design principles
T2.10.16	Power transformer reactor principles - substations
T2.10.17	Static reactive plant principles - substations
T2.10.18	On load tapchanger principles - substations
T2.10.19	Substation switching principles
T2.10.21	Circuit breaker construction principles - substations
T2.10.24	Rotating reactive plant principles - substations
T2.11.1	Power system layouts
T2.11.8	Voltage control devices on interconnected transmission systems
T2.11.11	Control of transient overvoltages
T2.11.16	Commissioning procedures
T2.11.22	Instrument transformers
T2.11.24	Metering devices and principles
T2.11.25	Communication devices and principles
T2.11.31	Primary plant testing
T2.11.40	Harmonics
T2.11.44	Design characteristics of overhead and underground conductors and cables, poles and structures.
T2.11.48	Power test equipment
T2.11.70	Transmission, sub-transmission and zone substation primary plant design process - principle

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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 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 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

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EVIDENCE GUIDE

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 is based, shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines - UET09". 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**

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A	Completion of two (2) compliant technical designs relating to each of the following:	Electrical equipment in accordance with the Single Line Diagram. Bay spacing, busbar heights, statutory and maintenance clearances in accordance with AS2067 and organisational requirements. Switchyard equipment layout. Lightning protection. Control and power cables routes within and outside switchyard.
B	Designs should also included all the following:	Activities that address the correction of errors in the process. Application of a design control checklist, which lists all of the required design activities to be carried out in this process.
C	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 design of transmission, sub-transmission and zone substation primary plant.

In addition to the resources listed above, in Context of and

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	specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.
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)** 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.

Range Statement

RANGE STATEMENT

8) 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 the design of transmission, sub-transmission and zone substation primary plant and may include the following equipment:

Primary components of a substation which may include: Electrical equipment in accordance with SLD, bays spaced in accordance with standard requirements, switchyard design in accordance with AS2067, equipment spaced so that space is available for maintenance facilities, maintenance space to fence in accordance with AS2067, switchyard equipment device codes correct, busbar earthing facilities available in appropriate positions, earth switches fitted to high busbar, portable earth attachment points in correct position, connections, busbar and flexibles, earthing points, switchgear operating handle positions, disconnector operator earth mats, anti-vibration Pads and

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RANGE STATEMENT

Transformer location, auxiliary transformer location, earth stick storage, control building equipment layout, H.V. cable layout, wiring/connection diagrams, cable schedule, pilot terminations, streamline filter supply, frame leakage CT's, VT 's and CT's, photo electric cells, earthing of plumbing, distribution feeder cable CB connection and route drawing produced by regional designer and checked.

Manufacture's data sheets, documents, drawings

Manufacturers recommendations; Reliability performance profiles; Knowledge of local history and experience; Consultation with other Authorities; Environmental influences; Present practices.

Equipment includes; Sectionalisers, air break switches, capacitor banks, transformer taps, metering and protection equipment, data communication systems

Primary and secondary voltage and current injection equipment; time delay measuring equipment; Current transformers; Voltage transformers; Power transformers; Tapchangers; Circuit breakers; Capacitor banks; Ring main units; Audio frequency load control; Circuit breaker auxiliary systems; Substation and metal structure earthing systems; SCADA interfaces and transducer inputs; local opto-isolated alarms: PLC programs; Auto Reclosers (ACRs); protection relays; metering; control circuits; Statistical metering systems; Frame leakage relays; Distance relays; Pilot wire relays; Transformer differential relays; Busbar differential relays; Impedance bus zone relays; Overcurrent and earth fault relays; Transformer neutral check relays; Circuit breaker fail relays; Multi-trip relays; Auto recloser relays; Voltage transformer failure relays; Surge protection relays; Buchholz relays; Winding temperature relays; Sensitive earth fault relays; Phase failure relays; Frequency relays; Load shedding relays; General protection LV devices; Oil temperature protection devices; Oil surge protection devices; Power supplies. differential relays; power systems; multi-facetted schemes; interactive overload schemes, distance protection (incorporating relay selection, switched/non-switched schemes; mutual coupling and teed feeder systems); protection signalling (incorporating series, direct, permissive, distance acceleration, block interruption); telecommunication circuits and equipment.

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
- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration.
- Documenting detail work events, record keeping and or storage of information.

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RANGE STATEMENT

- 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.
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

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Competency Field

Competency Field **5)**

Design

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UETTDRDS24B Design transmission and sub-transmission protection and control

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the design of Transmission, Sub-transmission and Zone Substation Protection and Control. This may include basic secondary upgrades, SCADA modifications or new installations on green field sites. The design must conform to safety regulations and environmental standards and incorporate the principles of safe design.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

	UETTDRDS09B	Prepare and Manage Detailed Construction Plans for Electrical System Infrastructure.
and	UETTDRDS14B	Design Zone Substation Modifications

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate for the design of transmission, sub-transmission and zone substation protection and control systems	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the design of substations, are reviewed and determined.
	1.2 Purpose of the design is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Established policies, procedures and specifications for the design are obtained or established with the appropriate personnel.
	1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures
	1.5 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
	1.6 Risk control measures are identified, prioritised and evaluated against the work schedule
	1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures
	1.8 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
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and

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ELEMENT	PERFORMANCE CRITERIA	
		land-owners are resolved and activities coordinated to carry out work
	1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures
	1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures
2 Carry out and coordinate the design of transmission, sub-transmission and zone substation protection and control systems	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures
	2.3	System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures
	2.4	Mathematical models of the design are used to analyse the effectiveness of the finished project as per requirements and established procedures
	2.5	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
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge

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ELEMENT	PERFORMANCE CRITERIA	
		and associated skills according to requirements
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete and coordinate the design of transmission, sub-transmission and zone substation protection and control systems	3.1	Final checks of the design are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval
	3.4	Approved copies of design documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing distribution substations.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.2	Electrical safe working practice
T2.3.8	Safe design principles
T2.4.7	Feeder automation system
T2.10.3	Commissioning of discrete protection devices - Substations
T2.10.12	Substation LV supply design principles
T2.10.13	Substation control systems design principles
T2.10.25	Commissioning of distribution protection and control systems - substations
T2.10.26	Voltage regulation scheme principles - Substations
T2.10.27	Use of test equipment on a discrete protection scheme - Substations
T2.10.28	Electrical equipment - distribution field device protection and control schemes - substations
T2.11.2	Circuit breaker auxiliary systems
T2.11.17	Protection scheme requirements
T2.11.18	Discrete protection systems
T2.11.19	Interdependent protection systems
T2.11.20	Complex protection systems
T2.11.26	Test Equipment A - fundamental
T2.11.27	Test Equipment B - protection
T2.11.29	Test Equipment D - control
T2.11.53	Protection schemes
T2.11.71	Transmission, sub-transmission and zone substation control and protection design process - principles

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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 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 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

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EVIDENCE GUIDE

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 is based, shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines - UET09". 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**

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A	Completion of two (2) compliant technical designs relating to each of the following:	Protection and control systems implemented to suit statutory and organisational requirements. AC and DC circuit diagrams correct and documented. SCADA hardwired and serially communicated signals. Metering. Load control. Power factor control. AC and DC supplies. Protection and control panel layouts. Control cable termination diagrams.
B	Designs should also included all the following:	Activities that address the correction of errors in the process. Application of a design control checklist, which lists all of the required design activities to be carried out in this process.
C	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.

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- Suitable work environment, facilities, equipment and materials to undertake actual design of transmission, sub-transmission and zone substation protection and control systems.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.

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)

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.

Range Statement

RANGE STATEMENT

8) 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 the design of transmission, sub-transmission and zone substation protection and control components and may include the following equipment:

Manufacturers recommendations; Reliability performance profiles; Knowledge of local history and experience; Consultation with other Authorities; Environmental influences;

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RANGE STATEMENT

Present practices.

Equipment includes; Sectionalisers, air break switches, capacitor banks, transformer taps, metering and protection equipment, data communication systems

Primary and secondary voltage and current injection equipment; time delay measuring equipment; Current transformers; Voltage transformers; Power transformers; Tapchangers; Circuit breakers; Capacitor banks; Ring main units; Audio frequency load control; Circuit breaker auxiliary systems; Substation and metal structure earthing systems; SCADA interfaces and transducer inputs; local opto-isolated alarms: PLC programs; Auto Reclosers (ACRs); protection relays; metering; control circuits; Statistical metering systems; Frame leakage relays; Distance relays; Pilot wire relays; Transformer differential relays; Busbar differential relays; Impedance bus zone relays; Overcurrent and earth fault relays; Transformer neutral check relays; Circuit breaker fail relays; Multi-trip relays; Auto recloser relays; Voltage transformer failure relays; Surge protection relays; Buchholz relays; Winding temperature relays; Sensitive earth fault relays; Phase failure relays; Frequency relays; Load shedding relays; General protection LV devices; Oil temperature protection devices; Oil surge protection devices; Power supplies. differential relays; power systems; multi-facetted schemes; interactive overload schemes, distance protection (incorporating relay selection, switched/non-switched schemes; mutual coupling and teed feeder systems); protection signalling (incorporating series, direct, permissive, distance acceleration, block interruption); telecommunication circuits and equipment.

AC protection circuits: HV FDRs, TFRs, BBP/LBU, LV FDRs

DC protection and control circuits: Supplies and auxiliaries, protection, BBP, trip circuit monitoring, CB monitoring, serially communicated SCADA, control and indication

Hard wire communicated SCADA

TFR tap changer and cooling control circuits

Power factor correction capacitor protection/control

AC Supplies (415/240VAC)

DC Supplies (125/48VDC)

Indication lighting timer circuit

Miscellaneous circuits may include: Metering, frequency injection, radio/communication, intertripping, frame leakage and SMU control

Connection diagrams may incude: Control panels, HV circuit breakers,LV circuit breakers, Line and TFR CT's, TFR neutral CT's, Line VT's, TFR's, disconnectors, battery chargers, fire control panel, power factor and control caps.

Other areas may include: Control panel layouts, control cable schedule and label list.

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

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RANGE STATEMENT

integral part of the Range Statement of this unit:

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform.
- Assessing risk
- 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.
- Safe design principles
- Testing procedures
- Work clearance systems

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Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Design

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UETTDRDS25B Design transmission and sub-transmission substation earthing

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the design of transmission and sub-transmission zone Substation Earthing. This may include earth resistivity tests coordination, design of the earth grid, electrodes, grid connections, equipment connections and remote earthing connections to conduct maximum earth fault currents without exceeding the maximum allowable earth potential rise. The design does include earthing engineering aspects and must conform to safety regulations and environmental standards and incorporate the principles of safe design. However, it excludes the certification of earthing design.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

UETTDRDS09B	Prepare and Manage Detailed Construction Plans for Electrical System Infrastructure.
UETTDRDS14B	Design Zone Substation Modifications

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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 unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate for the design of transmission, sub-transmission and zone substation earthing	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the design of substations, are reviewed and determined.
	1.2 Purpose of the design is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Established policies, procedures and specifications for the design are obtained or established with the appropriate personnel.
	1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures
	1.5 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
	1.6 Risk control measures are identified, prioritised and evaluated against the work schedule
	1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures
	1.8 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

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ELEMENT		PERFORMANCE CRITERIA	
			order
		1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land-owners are resolved and activities coordinated to carry out work
		1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures
		1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures
2	Carry out and coordinate the design of transmission, sub-transmission and zone substation earthing	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
		2.2	OHS and sustainable energy principles, functionality and practices to avoid incidents and accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures
		2.3	System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures
		2.4	Mathematical models of the earth grid are used to analyse the effectiveness of the finished project as per requirements and established procedures
		2.5	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
		2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed

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ELEMENT	PERFORMANCE CRITERIA	
		timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete and coordinate the design of transmission, sub-transmission and zone substation earthing	3.1	Final checks of the design are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval
	3.4	Approved copies of design documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing distribution substations.

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 (EKAS) required is given in

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REQUIRED SKILLS AND KNOWLEDGE

Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.3.8	Safe design principles
T2.11.51	Distribution earthing system
T2.11.72	Transmission , sub-transmission and zone substation earthing design process - principles

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 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

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that may be required and the critical nature of the competencies being assessed.

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 is based, shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines - UET09". 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

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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	Completion of two (2) compliant technical designs relating to each of the following:	Coordination and analysis of earth resistivity tests. Design and drafting of earth grid including electrodes, grid connections, equipment connections and remote earthing connections to conduct maximum earth fault currents without exceeding the maximum allowable earth potential rise (EPR). Confirmation of acceptable step and touch potentials including attenuation or hazard control measures. Confirmation of control of transfer of EPR.
B	Designs should also included all the following:	Activities that address the correction of errors in the process. Application of a design control checklist which lists all of the required design activities to be carried out in this process.
C	At least one	Dealing with an unplanned event by drawing on

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	occasion	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 design of transmission, sub-transmission and zone substation earthing.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.

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)

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.

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Range Statement

RANGE STATEMENT

8) 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 the design of transmission, sub-transmission and zone substation earthing and may include the following equipment:

Concerns associated with the earthing design should take into account: Grid designed for max fault current, maximum allowable earth potential rise, step potentials, touch potentials, fence separately earthed or bonded to station grid, fence isolation from all items bonded to station grid, e.g. building, grading ring outside fence, two connections to every switchyard device, disconnector earth mats bonded directly to handle, disconnectors earthed correctly, control building(s) earthed in two places, switchgear building (s) earthed in two places, two connections to switchgear earth bar (s), two connections to control panel earth bar (s), sufficient portable earth connection points, gates earthed via flexible connections, equipotential conductor between all gate posts, grading ring extends to extremity of gate radius, fence earthed adequately, earthing of sheath at substation end of power cables and earthing of sheath at remote end of power cables

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
- 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.

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- Fall prevention
- Hazards
- Identifying hazards
- Inspect
- Legislation
- MSDS
- Notification.
- OHS practices
- OHS issues
- Permits and / or permits to work
- Personnel.
- Quality assurance systems.
- Requirements.
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

Design.

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UETTDRDS26B Design transmission, sub-transmission and zone substation - civil and structural components

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the design of transmission, sub-transmission and zone substation - civil and structure. This may include augmentations of existing substations or new substations on green field sites. The design includes civil and structural engineering aspects and must conform to safety regulations and environmental standards and incorporate the principles of safe design. However, it excludes the certification of civil and structural design.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

	UETTDRDS09B	Prepare and Manage Detailed Construction Plans for Electrical System Infrastructure.
and	UETTDRDS14B	Design Zone Substation Modifications

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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 unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate for the design of transmission, sub-transmission and zone substation - civil and structural components	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the design of substations, are reviewed and determined.
	1.2 Purpose of the design is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Established policies, procedures and specifications for the design are obtained or established with the appropriate personnel.
	1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures
	1.5 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
	1.6 Risk control measures are identified, prioritised and evaluated against the work schedule
	1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures
	1.8 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

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ELEMENT		PERFORMANCE CRITERIA	
			order
		1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land-owners are resolved and activities coordinated to carry out work
		1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures
		1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures
2	Carry out and coordinate the design of transmission, sub-transmission and zone substation - civil and structural components	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
		2.2	OHS and sustainable energy principles, functionality and practices to avoid incidents and accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures
		2.3	System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures
		2.4	Mathematical models of the design are used to analyse the effectiveness of the finished project as per requirements and established procedures
		2.5	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
		2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed

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ELEMENT	PERFORMANCE CRITERIA	
		timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete and coordinate the design of transmission, sub-transmission and zone substation - civil and structural components	3.1	Final inspections of the design are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval
	3.4	Approved copies of design documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing distribution substations.

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 (EKAS) required is given in

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REQUIRED SKILLS AND KNOWLEDGE

Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.3.8	Safe design principles
T2.11.73	Transmission , sub-transmission and zone substation civil and structural design process - principles

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 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

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being assessed.

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 is based, shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines - UET09". 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

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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	Completion of two (2) compliant technical designs relating to each of the following:	Earthworks. Foundation design including relationship to geotechnical analysis. Footing layout including assignment of reference levels and benchmark. Conduits, Pits and drainage. Hydraulics including fire and safety facilities. Access roads. Fences and gates including implementation of EPR control measures. Transformer fire and sound attenuation measures, bunding and oil containment. Indoor and outdoor structural steelwork.
B	Designs should also included all the following:	Activities that address the correction of errors in the process. Application of a design control checklist which lists all of the required design activities to be carried out in this process.

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C	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 design of transmission, sub-transmission and zone substation - civil and structural components.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.

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)

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.

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Range Statement

RANGE STATEMENT

8) 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 the design of transmission, sub-transmission and zone substation - civil and structural component and may include the following equipment:

Other areas that may need to be taken into account: Earthworks, foundations and footings, reference levels (RL)s, conduit and drainage, hydraulics, electrical isolation of water service etc, fire services, access roads, access road OK for low loaders and cranes (width, space turning radius, gradient), fences and gates, single point entry facilities in fences and gates, bundwalls and oil containment, retaining walls, sound attenuation facilities, panel cutouts.

Outdoor steelwork (Stands) may include: Strain/Landing tower, surge arrestor, isolator, voltage transformer, current transformer, circuit breaker, fault thrower, lightening masts, cages/screens, sealing ends, cable supports, operating stands and busbar supports.

Indoor Steelwork may include: Frequency injection, cable supports, cages/screens, cable ladder

Transformer bund facilities.

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
- 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.

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RANGE STATEMENT

- 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.
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

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Competency Field

Competency Field **5**)

Design

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UETTDRDS27B Design overhead transmission systems

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the the technical design of overhead transmission networks to relevant standards, including electrical clearances, electrical and mechanical loadings, earthing, environmental considerations, minor civil aspects and the handling of waterway, railway and other crossings. It also includes the necessary established procedures to ensure the line design conforms to specific organisational technical standards, operational and system planning requirements and incorporates the principles of safe design.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

UETTDRDS15B	Organise and Implement Line and Easement Surveys

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and coordinate for the design of overhead transmission systems	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the design of overhead transmission systems, are reviewed and determined.
	1.2	Purpose of the design is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Established policies, procedures and specifications for the design are obtained or established with the appropriate personnel.
	1.4	Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures
	1.5	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
	1.6	Risk control measures are identified, prioritised and evaluated against the work schedule
	1.7	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures
	1.8	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
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land-owners are resolved and activities coordinated to carry out work
	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 coordinated and authorised where applicable in accordance with established procedures
2 Carry out and coordinate the design of overhead transmission systems	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to avoid incidents and accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures
	2.3	System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures
	2.4	Mathematical models of the design are used to analyse the effectiveness of the finished project as per requirements and established procedures
	2.5	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
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.

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ELEMENT	PERFORMANCE CRITERIA	
3 Complete and coordinate the design of overhead transmission systems	3.1	Final inspections of the design are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval
	3.4	Approved copies of design documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing distribution substations.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.2.1	Generation power systems
T2.2.2	Transmission, Distribution and Rail power systems
T2.2.10	Transmission structures and hardware

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REQUIRED SKILLS AND KNOWLEDGE

T2.2.11	Routine maintenance on transmission structures
T2.2.21	Installation and maintenance on transmission lines and associated equipment
T2.2.28	Towers and structures inspection principles
T2.2.29	Transmission powerline inspection principles
T2.2.39	Plant, equipment and tools used for HV live line work
T2.3.8	Safe design principles
T2.4.3	High voltage switching principles
T2.4.6	High voltage SWER system
T2.4.7	Feeder automation system
T2.4.11	High voltage overhead and substation switching principles
T2.8.1	Enterprise specific - Policies and procedure instructions
T2.8.2	Enterprise specific - OHS instructions
T2.11.4	AC transmission system components
T2.11.5	AC transmission line electrical parameters
T2.11.6	AC transmission lines equivalent circuit calculations
T2.11.7	Basic design characteristics of transmission structures and associated equipment
T2.11.8	Voltage control devices on interconnected transmission systems
T2.11.12	Corona and discharge losses
T2.11.40	Harmonics
T2.11.65	HV system load calculation principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.11.66 EHV system load calculation principles

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 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

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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 is based, shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines - UET09". 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

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Group No	The minimum number of items on which skill is to be demonstrated	Item List
A	Completion of six (6) compliant technical designs of an overhead transmission system with at least one relating to each of the following project types:	Multi-tower extensions New installations Multi-circuit overhead lines
B	Designs should also included all the following:	Activities that address the correction of errors in the process. Application of a design control checklist which lists all of the required design activities to be carried out in this process.
C	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 design of overhead transmission systems.

In addition to the resources listed above, in Context of and

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	specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.
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)** 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.

Range Statement

RANGE STATEMENT

8) 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 the design of overhead transmission systems and may include the following items or equipment:

Manufacture's data sheets, documents, drawings

Manufacturers recommendations; Reliability performance profiles; Knowledge of local history and experience; Consultation with other Authorities; Environmental influences; Present practices.

Equipment includes; Sectionalisers, air break switches, capacitor banks, transformer taps, metering and protection equipment, data communication systems

Primary and secondary voltage and current injection equipment; time delay measuring equipment; Current transformers; Voltage transformers; Power transformers;

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Tapchangers; Circuit breakers; Capacitor banks; Ring main units; Audio frequency load control; Circuit breaker auxiliary systems; Substation and metal structure earthing systems; SCADA interfaces and transducer inputs; local opto-isolated alarms: PLC programs; Auto Reclosers (ACRs); protection relays; metering; control circuits; Statistical metering systems; Frame leakage relays; Distance relays; Pilot wire relays; Transformer differential relays; Busbar differential relays; Impedance bus zone relays; Overcurrent and earth fault relays; Transformer neutral check relays; Circuit breaker fail relays; Multi-trip relays; Auto recloser relays; Voltage transformer failure relays; Surge protection relays; Buchholz relays; Winding temperature relays; Sensitive earth fault relays; Phase failure relays; Frequency relays; Load shedding relays; General protection LV devices; Oil temperature protection devices; Oil surge protection devices; Power supplies. differential relays; power systems; multi-facetted schemes; interactive overload schemes, distance protection (incorporating relay selection, switched/non-switched schemes; mutual coupling and teed feeder systems); protection signalling (incorporating series, direct, permissive, distance acceleration, block interruption); telecommunication circuits and equipment.

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
- 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

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RANGE STATEMENT

- Notification.
- OHS practices
- OHS issues
- Permits and / or permits to work
- Personnel.
- Quality assurance systems.
- Requirements.
- Safe design principles
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Design

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UETTDRDS28B Design underground transmission systems

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the technical design of underground transmission networks to relevant standards, including cable sizing and locations, soil resistivity and heat dissipation, backfill and trenching details, minor civil aspects and dynamic and cyclic ratings. It also includes the necessary established procedures to ensure the line design conforms to specific organisational technical standards, operational and system planning requirements and incorporates the principles of safe design.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

UETTDRDS15B	Organise and Implement Line and Easement Surveys

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate for the design of underground transmission systems	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the design of underground transmission systems, are reviewed and determined.
	1.2 Purpose of the design is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Established policies, procedures and specifications for the design are obtained or established with the appropriate personnel.
	1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures
	1.5 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
	1.6 Risk control measures are identified, prioritised and evaluated against the work schedule
	1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures
	1.8 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
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land-owners are resolved and activities coordinated to carry out work
	1.10 Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures

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ELEMENT	PERFORMANCE CRITERIA	
	1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures
2 Carry out and coordinate the design of underground transmission systems	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to avoid incidents and accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures
	2.3	System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures
	2.4	Mathematical models of the design are used to analyse the effectiveness of the finished project as per requirements and established procedures
	2.5	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
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete and coordinate the design	3.1	Final inspections of the design are undertaken to ensure they comply with all requirements and

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ELEMENT	PERFORMANCE CRITERIA	
of underground transmission systems		include all specifications and documentations needed to complete the design brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval
	3.4	Approved copies of design documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing distribution substations.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.2.1	Generation power systems
T2.2.2	Transmission, Distribution and Rail power systems
T2.2.10	Transmission structures and hardware
T2.2.11	Routine maintenance on transmission structures

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REQUIRED SKILLS AND KNOWLEDGE

T2.2.21	Installation and maintenance on transmission lines and associated equipment
T2.3.8	Safe design principles
T2.4.3	High voltage switching principles
T2.4.7	Feeder automation system
T2.8.1	Enterprise specific - policies and procedure instructions
T2.8.2	Enterprise specific - OHS instructions
T2.9.6	Underground mains layout principles
T2.11.1	Power system layouts
T2.11.4	AC Transmission system components
T2.11.5	AC Transmission line electrical parameters
T2.11.6	AC Transmission lines equivalent circuit calculations
T2.11.8	Voltage control devices on interconnected transmission systems
T2.11.12	Corona and discharge losses
T2.11.40	Harmonics
T2.11.65	HV system load calculation principles
T2.11.66	EHV system load calculation principles

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

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EVIDENCE GUIDE

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 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 is based, shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines -

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UET09". 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	Completion of six (6) compliant technical designs of an underground transmission network with at least one relating to each of the following project	Alteration to existing assets Underground supplies between substations possibly including overhead to underground connections.

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	types:	
B	Designs should also included all the following:	Activities that address the correction of errors in the process. Application of a design control checklist which lists all of the required design activities to be carried out in this process.
C	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 design of underground transmission systems.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.

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

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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.

Range Statement

RANGE STATEMENT

8) 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 the design of underground transmission systems and may include the following items or equipment:

Manufacture's data sheets, documents, drawings

Manufacturers recommendations; Reliability performance profiles; Knowledge of local history and experience; Consultation with other Authorities; Environmental influences; Present practices.

Equipment includes; Sectionalisers, air break switches, capacitor banks, transformer taps, metering and protection equipment, data communication systems

Primary and secondary voltage and current injection equipment; time delay measuring equipment; Current transformers; Voltage transformers; Power transformers; Tapchangers; Circuit breakers; Capacitor banks; Ring main units; Audio frequency load control; Circuit breaker auxiliary systems; Substation and metal structure earthing systems; SCADA interfaces and transducer inputs; local opto-isolated alarms: PLC programs; Auto Reclosers (ACRs); protection relays; metering; control circuits; Statistical metering systems; Frame leakage relays; Distance relays; Pilot wire relays; Transformer differential relays; Busbar differential relays; Impedance bus zone relays; Overcurrent and earth fault relays; Transformer neutral check relays; Circuit breaker fail relays; Multi-trip relays; Auto recloser relays; Voltage transformer failure relays; Surge protection relays; Buchholz relays; Winding temperature relays; Sensitive earth fault relays; Phase failure relays; Frequency relays; Load shedding relays; General protection LV devices; Oil temperature protection devices; Oil surge protection devices; Power supplies. differential relays; power systems; multi-facetted schemes; interactive overload schemes, distance protection (incorporating relay selection, switched/non-switched schemes; mutual coupling and teed feeder systems); protection signalling (incorporating series, direct, permissive, distance acceleration, block

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RANGE STATEMENT

interruption); telecommunication circuits and equipment.

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
- 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.
- Safe design principles
- Testing procedures
- Work clearance systems

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Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Design

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UETTDREL01B Apply environmental and sustainable energy procedures

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.**1**) **Descriptor**

This Competency Standard Unit covers the implementation of relevant environmental procedures to specific projects/sites. It includes the identification of possible environmental risks and impacts, the undertaking of work in accordance with sustainable energy and energy conservation principles, the provision of re-cycling materials and the recording and reporting of environmental incidents. It also encompasses the process of reviewing and participating and contributing in environmental procedures according to established enterprise requirements.

Application of the Unit

Application of the Unit **4**)

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

1.**2**) **License to practice**

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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1.2) License to practice

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) **2)**

2.1) Competencies

There are no prerequisite competencies to this unit.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to implement environmental and sustainable energy procedures	1.1 Works 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 the implementation of environmental and sustainable energy procedures are obtained and confirmed for the purposes of the work to be performed and communicated.
	1.4 Environmental and sustainable energy procedures are identified, prioritised and combined within relevant projects, 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 work permits are obtained to access and perform work according to environmental and sustainable energy procedures, 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 environmental and sustainable energy procedures and other related work procedures according to requirements.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients

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ELEMENT	PERFORMANCE CRITERIA	
		and land owners are resolved to carry out work where necessary.
	1.10	Site is prepared according to the work schedule, taking into account environmental and sustainable energy procedures and the need to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed on environmental and sustainable energy procedures and respective responsibilities confirmed where applicable in accordance with established procedures.
2 Carry out environmental and sustainable energy procedures	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	Use of power tools/equipment, techniques and practices are safely followed under environmental and sustainable energy procedures and, currency according to requirements confirmed.
	2.3	Essential knowledge and associated skills are applied in the safe implementation of environmental and sustainable energy procedures to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.4	Relevant environmental procedures are applied to a specific project(s)/site(s).
	2.5	Work is conducted in accordance with the principles of sustainable energy and energy conservation.
	2.6	Provision for the re-cycling or re-use of materials is undertaken where possible.

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ELEMENT	PERFORMANCE CRITERIA	
	2.7	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.
	2.8	Unplanned events in the implementation of environmental and sustainable energy procedures are undertaken within the scope of established procedures.
	2.9	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills on environmental and sustainable energy procedures.
	2.10	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the environmental and sustainable energy procedures	3.1	Work undertaken is checked against works schedule for conformance with requirements and environmental and sustainable energy procedures 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 environmental and sustainable energy procedures as well as other established procedures.
	3.4	Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with environmental and sustainable energy procedures as well as other established procedures.
	3.5	Relevant work permit(s) are signed off and, environmental risks/incidents and potential impacts are reported and recorded according to requirements/established procedures.
	3.6	Works completion records, reports, as installed

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ELEMENT	PERFORMANCE CRITERIA
	/modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 applying environmental and sustainable energy 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
T2.7.1	Environmental Fundamentals
T2.7.2	Material handling and the environment
T2.7.3	Filtering and sampling oil and the environment
T2.8.2	Enterprise specific - OHS instructions

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 component 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 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 - UET09". Evidence shall also comprise:

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- 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:	Environmental risk assessment Legislative requirements Sustainable energy principles and practice
B	At least one occasion	Dealing with an unplanned event by drawing on essential knowledge and associated

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		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 environmental and sustainable energy procedures.

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 may be assessed concurrently with the following units:

UEENEEE001B Apply OHS practices in the workplace

UETTDREL02B Operate plant and equipment near live electrical conductors/apparatus

UETTDREL04B Working safely near live electrical apparatus

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as a non electrical worker

Range Statement

RANGE STATEMENT

8) 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 Unit shall/may be demonstrated in relation to the application of relevant environmental and sustainable energy procedures to specific projects/sites incorporating energy conservation principles and relevant re-cycling procedures.

Specific project(s)/site(s) may include, but is not limited to buildings; plants construction and maintenance sites; workshops; laboratories; catchments; flood plains irrigation sites; wetlands; drainage sites; waste disposal sites; easements.

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; 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; chain of custody and compliance records; audit results; management reviews

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

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RANGE STATEMENT

integral part of the Range Statement of this unit:

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Assessing risk
- Assessment
- Authorisation
- 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

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5)**

Entry Level - Cross Discipline Units.

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UETTDREL02B Operate plant and equipment near live electrical conductors/apparatus

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This Competency Standard Unit covers the safe operation of plant and equipment near live electrical conductors and/or apparatus. It encompasses plant and equipment relevant to the enterprise and is in addition to any Commonwealth, State/Territory or Local Government legislation and or regulatory requirements regarding the operation of that plant and or equipment. It includes maintenance the conducting of operational checks, the correct positioning of road signs, barriers and or warning devices. It also encompasses the completion of log books and job completion documentation.

Application of the Unit

Application of the Unit **4**)

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

1.2) **License to practice**

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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1.2) License to practice

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) **2)**

2.1) Competencies

There are no prerequisite competencies to this unit.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to operate plant and equipment near energised and exposed electrical conductors/apparatus	1.1 Works 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 operation of plant and equipment near energised and exposed electrical conductors/apparatus are communicated to all personnel and identified for all work sites.
	1.3 OHS policies and procedures related to requirements and established procedures for the operation of plant and equipment near energised and exposed electrical conductors/apparatus 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 work permits are obtained to access and 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, relevant rescue procedures and other related work procedures according to requirements.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients

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ELEMENT	PERFORMANCE CRITERIA	
		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 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 the operation of plant and equipment near energised and exposed electrical conductors/apparatus	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 in the safe operation of plant and equipment near energised and exposed electrical conductors/apparatus to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.4	Plant and equipment are safely operated near energised and exposed electrical conductors/apparatus according to requirements and established procedures.
	2.5	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.
	2.6	Unplanned events in the operation of plant and equipment near energised and exposed electrical

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ELEMENT	PERFORMANCE CRITERIA	
		conductors/apparatus are undertaken within the scope of established procedures.
	2.7	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.8	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the operation of plant and equipment near energised and exposed electrical conductors/apparatus	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 work permit(s) are signed off and, plant and equipment are checked, returned to service/stored appropriately, in accordance with requirements and established procedures.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **Essential Knowledge and Associated Skills** (**EKAS**): This describes the essential

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REQUIRED SKILLS AND KNOWLEDGE

skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating plant and equipment near live electrical conductors/apparatus.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.8.1.1	Basic electrical principles
E2.8.5	Magnetism
E2.8.6	Electromagnetic principles
E2.8.8	Electrotechnology science and materials
E2.11.1	Hand tools
E2.11.2.1	Power tools
E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.1.1	Engineering applications of mathematical principles
T2.1.2	Engineering applications of mechanical principles
T2.1.3	Engineering applications of material properties
T2.1.5	Elevating work platform operational principles
T2.1.6.	Hydraulic and pneumatic portable equipment
T2.1.7	Enterprise vehicles
T2.1.8	Chain saw principles
T2.2.1	Generation power systems
T2.7.1	Environmental fundamentals
T2.7.2	Material handling and the environment
T2.8.1	Enterprise specific - policy and procedure

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REQUIRED SKILLS AND KNOWLEDGE

	instructions
T2.8.2	Enterprise specific - OHS instructions
T2.8.3	Enterprise specific - technical drawings and documents

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)

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

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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 - UET09". 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:

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EVIDENCE GUIDE

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	At least four of the following:	Portable generators Chain-saws Concrete cutters Jack hammers Welders Compressor Crimper-cutters Pumps Post hole diggers Drills Friction grip winches Pullers Block and tackle
B	At least one of the following:	Elevating work platform Back hoes Self loading vehicle Borer Bobcat Trench excavators Heavy vehicles
C	At least one occasion	Dealing with an unplanned event by drawing on essential knowledge and associated skills to provide appropriate solutions incorporated in the

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		holistic assessment with the above listed items. Note Refer to Section 2.1 Licence to practice contained in this unit for information relevant to the use of the above equipment.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual operation of plant and equipment near live conductors and or 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 may be assessed concurrently with the following units:

UETTDREL03B Comply with environmental and incidental

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response procedures

UEENEEE001B Apply OHS practices in the workplace

Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the operation of plant and equipment near live electrical conductors and/or apparatus.

Support plant may include elevating work platform, back hoes, earth drilling rigs, trench excavators, heavy vehicles, concrete cutters, compressors, portable generators, welders, crimper-cutters, pumps, chain-saws, jack-hammers, post hole diggers, sand-blasters, drills and self loading vehicle.

Equipment may include hand operated ratchet and friction grip winches, chain pullers and block and tackle.

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
- Assessment
- Authorisation
- Confined space
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5)**

Entry Level -Cross Discipline Units.

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UETTDREL03B Comply with environmental and incidental response procedures

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This Competency Standard Unit covers the compliance of environmental and incidental response procedures whilst undertaking tasks in the Electricity Supply Industry workplace and refers to relevant legislation, codes and practices and established procedures. The competency standard refers to compliance with relevant sections of Federal and State OHS and Environmental Protection Acts. The checking of plant and equipment should be performed through visual and mechanical checks. The plant and equipment used is that typically used in preparing worksites and compliance with environmental policies and procedures. Relevant regulations and procedures are referred to, but not limited to, the worksite and the use of plant; machinery/equipment; cleaning materials and aids; equipment operation; personal protective equipment e.g. safety boots, eye and ear protection, safety helmets.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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) **2)**

2.1) Competencies

There are no prerequisite competencies to this unit.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to comply with environmental and incident response procedures	1.1	Work instructions are received and confirmed.
	1.2	Relevant requirements and established procedures to be followed for the work to be performed are discussed with all persons to establish and confirm the work schedule.
	1.3	OHS and environmental policies and procedures to be followed for the work to be performed are received and confirmed.
	1.4	Suggestions to assist with complying with environmental and incident response procedures are made to others involved in the work.
	1.5	Hazards are identified, OHS risks assessed and emergency exits kept clear according to given instructions and established procedures.
	1.6	Scope of responsibility under any relevant work permits are received and confirmed according to requirements and established procedures with relevant persons.
	1.7	Resources including environmental compliance personal protective equipment required for the incident are obtained and in working order according to established procedures.
	1.8	Relevant responsibilities associated with first aid and other related work safety procedures at the worksite are confirmed in accordance with requirements and established procedures to ensure safety measures are followed in the instance of an incident.
	1.9	Client issues are referred to appropriate persons in accordance with industry and community standards.
	1.10	Site is reviewed according to given instructions and the work schedule for a quality outcome and to minimise risk and damage to property,

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ELEMENT	PERFORMANCE CRITERIA	
		commerce and individuals in accordance with established procedures.
	1.11	Road signs, barriers and warning devices are positioned in accordance with requirements.
2 Carry out compliance with environmental and incident response procedures	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are followed in accordance with given instructions, requirements and/or established procedures.
	2.2	Environmental requirements for the work are mentioned, reviewed and control measures, recommended for inclusion in the work process.
	2.3	Any environmental incidents and potential problems are referred to appropriate persons in accordance with established procedures.
	2.4	Lifting, climbing, working in confined spaces and or aloft, and use of power tools, techniques and practices are safely followed in accordance with given instructions and according to requirements confirmed to eliminate the prospects of incidents.
	2.5	Operational knowledge for compliance with environmental and incident response procedures is confirmed to ensure completion in an agreed timeframe and to quality standards with a minimum of waste according to requirements and established procedures.
	2.6	Complying with environmental and incident response procedures is carried out in accordance with given instructions and established procedures.
	2.7	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.
	2.8	Non-routine events are referred to the immediate authorised persons for directions according to established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.9	Problems associated with complying with environmental and incident response procedures are dealt with using acquired known solutions and skills related to routine procedures to ensure work instructions and established procedures are met.
	2.10	On going checks of quality of the work are undertaken in accordance with given instructions and established procedures.
3 Complete the compliance with environmental and incident response procedures	3.1	Work undertaken is checked against work schedule and anomalies reported to authorised persons in accordance with established procedures.
	3.2	Accidents and incidents are reported to authorised persons in accordance with established procedures.
	3.3	Work site is rehabilitated, cleaned up and made safe in accordance with given instructions and 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	Appropriate persons are notified of work completion according to established procedures.
	3.6	Environmental 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

7) **Essential Knowledge and Associated Skills** (**EKAS**): 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 complying with environmental and incidental response 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.3.1	Powerline safety practices
T2.7.1	Environmental fundamentals
T2.7.2	Material handling and the environment
T2.8.1	Enterprise specific - policies and procedure instructions
T2.8.2	Enterprise specific - OHS instructions

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) **Overview**:

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

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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 the "Assessment Guidelines - UET09". 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

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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:	Identification of potential environmental hazards. Practical application of environmental legislation and codes of practice. Implement control measure(s) to eliminate/reduce environmental hazard(s)/incident. Apply incident reporting/recording/investigation procedures. Maintain a safe and clean workplace environment. Apply safe manual handling techniques.

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B	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 environmental and incident response procedures

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in a variety of conditions and realistic environments

Method of assessment

9.4) Assessment Method(s):

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 may be assessed concurrently with the following units:

UEENEEE001B Apply OHS practices in the workplace

UETTDRTP02B Establish and reinstate a transmission tower worksite

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UETTDRTP03B Erect transmission towers

UETTDRTP04B Erect transmission tower hardware

Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to complying with environmental and incident response procedures.

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
- Authorisation
- Confined space
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications
- Emergency
- Environmental and sustainable energy procedures
- Environmental legislation.
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Legislation
- MSDS
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work

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RANGE STATEMENT

- Personnel
- Quality assurance systems
- Requirements

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5)**

Entry Level - Cross Discipline Units.

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UETTDREL04B Working safely near live electrical apparatus as non electrical worker

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

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 non-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 a non-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 **4**)

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

1.2) License to practice

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) **2)**

2.1) Competencies

There are no prerequisite competencies to this unit.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency

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standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to work safely near live electrical apparatus as non-electrical worker	1.1	Instructions related to the work to be performed safely near live electrical apparatus as non-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 a non-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.
	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.

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ELEMENT		PERFORMANCE CRITERIA	
		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 non-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 non-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 a non-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 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 a non-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	3.1	Work schedule and anomalies for completion and checking of the work are reported to authorised personnel in accordance with

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ELEMENT	PERFORMANCE CRITERIA	
non-electrical worker.		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

7) **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 non electrical worker.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.8.1.1	Basic electrical principles
E2.18.1	Occupational Health and Safety principles
T2.2.2	Transmission, distribution and rail power systems
T2.5.3	Fundamentals for working safely near live electrical apparatus

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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 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 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

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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 - UET09". 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**

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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 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

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		Electrical works Hazard Identification and Risk Assessment Hazard Control Risk Assessment and Management (JSAs) 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 non-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 to safely undertake actual work near live electrical apparatus

In addition to the resources listed above, in Context of and

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	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

8) 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/may 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 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 non-electrical worker/

Working safely up to the defined "safe working zone" near energised electrical

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RANGE STATEMENT

apparatus (inc. electrical powerlines) for non-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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2.2 Literacy and numeracy skills

2.2 Literacy and numeracy skills

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

Competency Field

Competency Field **5)**

Entry Level - Cross Discipline Units.

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UETTDREL05B Respond to technical enquiries and requests

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This Competency Standard Unit covers responding to enquiries of a technical nature using electricity supply industry (ESI) transmission, distribution and rail/tram network requirements, techniques and processes. It includes the relevant application of knowledge of relevant acts and regulations, codes of practice, guidelines and compliance regimes, and arrangements used to facilitate a response to enquiries or requests. The enquiries may be internal or with customers.

Note: examples include "storm codes" identification of key equipment, recognition of normal and abnormal industry situations, key processes and systems used in the industry such as, maps and the application of general safety and environmental processes and practices used in the industry.

Application of the Unit

Application of the Unit **4**)

This competency standard unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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 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) **2)**

2.1) Competencies

There are no prerequisite competencies to this unit.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to respond to technical enquiries and requests	1.1 Instructions related to responding to enquiries using industry requirements, techniques and processes of a technical nature to be performed are received and confirmed
	1.2 Relevant requirements and established procedures to be followed and, relevant personnel (including internal and/or customer) 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 responding to technical enquiries and requests 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.
	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 (including internal and customer) issues to appropriate personnel in accordance with industry/acceptable /community standards are identified
	1.9 Workplace and the work schedule is confirmed according to given instructions for a quality

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ELEMENT		PERFORMANCE CRITERIA	
			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, where applicable, for working safely near live electrical apparatus as non-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 responses to technical enquiries and requests	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	Enquiries and/or requests are responded to according to requirements and established procedures, and in a timely manner
		2.3	Working safely and complying with all safety requirements for responding to technical enquiries and requests are followed in accordance with given instructions and established routines/procedures
		2.4	Processes for monitoring and reporting/referring hazards and OHS risks to the immediate authorised personnel for directions according to established procedures are followed
		2.5	Non-routine events are referred to the immediate authorised personnel for directions according to established procedures
		2.6	Essential knowledge and associated skills are applied in the application of responding to technical enquiries and requests to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements
		2.7	Unexpected events associated with enquiries and/or requests of a technical nature are

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ELEMENT	PERFORMANCE CRITERIA	
		responded to using acquired known solutions and skills related to routine procedures to ensure work instructions and established procedures are met.
3 Complete responses to technical enquiries and requests	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, where applicable, 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

7) **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 of responding to technical enquiries and requests has been acquired.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
T2.1.3.	Engineering applications of material

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REQUIRED SKILLS AND KNOWLEDGE

properties.

T2.2.1.	Generation power systems
T2.2.2	Transmission, distribution and rail power systems
T2.5.3	Fundamentals for working safely near live electrical apparatus
T2.7.1	Environmental fundamentals
T2.7.2	Material handling and the environment
T2.8.1	Enterprise specific - policy and procedure instructions
T2.8.2	Enterprise specific - OHS instructions
T2.8.3	Enterprise specific - technical drawings and documents
T2.8.10	Technical enquiries and requests

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)

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

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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 the "Assessment Guidelines - UET09". 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

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- 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:

A	All of the following:	- Confirmation of the "safe working zone" for Safe work and access near live Electrical and Mechanical Apparatus - Application of knowledge of relevant acts and regulations, codes of practice, guidelines and compliance regimes, and arrangements used - Identification of established (Enterprise) procedures and processes
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 Networks - Identification of High Voltage Networks
C	All of the following:	- Procedures in the event of an incident - Events constituting an incident

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		- Procedures for responding to incidents - Hazard and risk assessment general principles and procedures - Principles for conducting work-site Hazard Assessment checks, basic safety principles and hazard control measures
D	All of the following:	- Purpose and 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 non-electrical worker
E	All of the following:	- Knowledge of critical codes in the industry - e.g. storm code emergencies - Identification of key equipment used in the industry - Recognition of normal and abnormal industry situations
F	All the following:	- Provision of a response to a technical enquiry or request in accordance with established procedures and timely manner
G	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.

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- Suitable work environment, facilities, equipment and materials to safely undertake actual work near live electrical apparatus

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

8) 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/may 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 requirements for responding to technical enquires and requests.

Work functions may include the application of knowledge of electricity supply industry (ESI) transmission, distribution or rail/tram network requirements, techniques and processes and the application of knowledge of relevant acts and regulations, codes of practice, guidelines and compliance regimes, and arrangements used to facilitate a response to enquiries or requests. Examples include knowledge of critical codes in the industry - e.g. storm code emergencies, identification of key equipment, recognition of normal and abnormal industry situations, key processes and systems used in the

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RANGE STATEMENT

industry such as, maps, catalogues, and the application of general safety and environmental processes and practices used in the industry.

Knowledge and identification of key equipment used in industry. Questioning (customer information gathering techniques) including observance of equipment, identification of anomalies from the norm and reporting of information. Recognition of normal and abnormal industry situations may include equipment, performance indicators, anomalies report, knowledge of critical system/network failures/anomalies and knowledge of key processes and systems used in the industry eg maps, drawings etc., and safety and environment processes and practices used in the industry.

Note:
Examples performance indicators are - SAIDI - System Average Interruption Duration Index, SAIFI - System Average Interruption Frequency Index, MAIFI - Momentary Average Interruption Frequency Index, CAIDI - Customer Average Interruption Duration Index

Enquiries may be internal or with customers.

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
- Internal and external customers
- Notification.
- OHS practices
- OHS issues
- Permits and/or permits to work
- Work clearance systems.

Unit Sector(s)

Not Applicable

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5)**

Entry Level - Cross Discipline Units

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UETTDRIS01B Install electrical equipment (network infrastructure).

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This Competency Standard Unit covers the installation of electrical equipment, such as fuse switches, drop out switches, sectionalisers, links, surge arrestors, gas filled and or oil filled switches, which are relevant to the transmission, distribution and rail networks. It includes the termination/connection of the equipment in accordance to enterprise requirements; the relevant pre-commissioning tests involving the equipment/system and the interpretation of these tests against agreed specifications.

Application of the Unit

Application of the Unit **4**)

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

1.2) **License to practice**

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDREL01B	Apply environment and sustainable energy procedures
and	UETTDREL02B	Operate plant and equipment near energised and exposed electrical conductors/apparatus
and	UETTDREL04B	Working safely near live electrical apparatus as a non-electrical worker
and	UEENEEE001B	Apply OHS practices in the workplace
and	UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
and	UEENEEE004B	Solve problems in multiple path d.c. circuits
and	UEENEEE005B	Fix and secure equipment
and	UEENEEE007B	Use drawing, diagrams, schedules and service manuals
and	UEENEEG001B	Solve problems in electromagnetic circuits.
and	UEENEEG002B	Solve problems in single and three phase low voltage circuits

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Prerequisite Unit(s) **2)**

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the installation of electrical equipment (network infrastructure)	1.1 Works 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 the installation of electrical equipment (network

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ELEMENT	PERFORMANCE CRITERIA	
		infrastructure) 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 work permits are obtained to access and 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, Pole Top Rescue 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 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.

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ELEMENT	PERFORMANCE CRITERIA	
2 Carry out installation of electrical equipment (network infrastructure)	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 in the safe installation of electrical equipment (network infrastructure) to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.4	Electrical equipment and associated hardware is positioned, secured and terminated/connected in accordance with requirements and established procedures.
	2.5	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.
	2.6	Unplanned events in the installation of electrical equipment (network infrastructure) are undertaken within the scope of established procedures.
	2.7	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.8	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the installation of electrical equipment (network infrastructure)	3.1	Work undertaken is checked/tested against works schedule for conformance with requirements and anomalies reported in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	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 work permit(s) are signed off and, electrical equipment (network infrastructure) are returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing electrical equipment (network infrastructure).

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.8.2.2	Alternating current principles - power
E2.8.5	Magnetism
E2.8.6	Electromagnetic principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.1.1	Engineering applications of mathematical principles
T2.1.2	Engineering applications of mechanical principles
T2.1.3.	Engineering applications of material properties
T2.1.4.	Basic rigging techniques
T2.1.9.	Stores procedures
T2.2.1	Generation power systems
T2.2.2	Transmission, distribution and rail power systems
T2.2.3	Substations, power transformers and reactors
T2.3.1	Powerline safety practices
T2.4.1	Switchgear installation

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,

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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 the "Assessment Guidelines - UET09". 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

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- 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	Any three of the following:	Fuse switches Dropout fuses Sectionalisers Disconnectors Links Fuses Surge arrestors
B	Any one of the following:	Reclosers Motorised switches Gas filled switches Ring main units Line fault indicators Oil filled switches Air break switches

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C	Any one of the following:	Transformers Reactors Regulators Capacitors
D	Any three of the following:	Voltage detectors Phasing equipment Clip-on ammeters Insulation resistance testers Recording meters Earth resistance tester
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 to undertake actual installation of electrical equipment in a network infrastructure.

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

8) 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 the installation, termination/connection of overhead electrical equipment relevant to the transmission, distribution and rail networks, and includes pre-commissioning.

Electrical equipment and associated hardware may include relevant transmission or distribution linework/network; switchgear (eg reclosers, sectionalisers, drop-out fuses, disconnectors, isolators, air break switches, gas filled switches, links, fuses, fuse switches and circuit breakers); transformers (eg padmount, pole-mounted and mobile); reactors; fault indicators; regulators; street lighting control points; capacitors; cables; underground/overhead cable terminations; relays (simple); mobile generators and surge arrestors; support brackets and the like.

It does not include the energisation of equipment in a highly complex, interdependent and interconnected electricity supply Network system, where the affects of unintended consequences on the system are high risk and appropriate personnel effect energisation.

Test and recording equipment includes voltage detectors, phasing equipment, tong ammeters, voltmeters, recording meters and insulation resistance testers used for the purposes as intended and according to requirements, and does not include use of such in energising installed equipment in a highly complex, interdependent and interconnected electricity supply Network system, where the affects of unintended consequences on the system are high risk.

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

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RANGE STATEMENT

integral part of the Range Statement of this unit:

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform
- Assessing risk
- 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

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Custom Content Section

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5)**

Industry Specific Cross-Discipline Units

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UETTDRIS02B Maintain electrical equipment (Network Infrastructure).

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance of electrical equipment and associated hardware, such as fuse switches, drop out switches, sectionalisers, links, surge arrestors, gas filled and or oil filled switches, relevant to the transmission, distribution and rail traction networks and includes the repair and/or replacement of "like for like" electrical equipment and associated hardware as well as the termination and/or connection of this equipment according to requirements and may include sampling of insulating oils. It also encompasses the identification of faults, the pre-commissioning tests involving the equipment/system and the interpretation of these tests against agreed specifications. It excludes the energisation of the equipment maintained in a highly complex, interdependent and interconnected electricity supply Network system, where the affects of unintended consequences on the system are high risk and appropriate personnel effect energisation.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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)

2)

2.1) Competencies

Granting competency in this unit shall be made only after competency in the following unit has been confirmed.	Install electrical equipment (network infrastructure)
UETTDRIS01B	

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the maintenance of electrical equipment (network infrastructure)	1.1 Works 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 the maintenance of electrical equipment (network infrastructure) 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

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ELEMENT		PERFORMANCE CRITERIA	
			control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.
		1.6	Relevant work permits are obtained to access and 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, Pole Top Rescue 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 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 maintenance of electrical equipment (network infrastructure)	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.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Essential knowledge and associated kills are applied in the safe maintenance of electrical equipment (network infrastructure) to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.4	Maintenance, including repair and/or replacement of electrical equipment (network infrastructure) is carried out, in accordance with the work schedule and requirements/established procedures.
	2.5	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.
	2.6	Unplanned events in the maintenance of electrical equipment (network infrastructure) are undertaken within the scope of established procedures.
	2.7	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.8	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the maintenance of electrical equipment (network infrastructure)	3.1	Work undertaken is checked/tested 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.

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ELEMENT	PERFORMANCE CRITERIA
	3.5 Relevant work permit(s) are signed off and, electrical equipment (network infrastructure) is returned to service in accordance with requirements.
	3.6 Works completion records, reports, as installed/modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining electrical equipment (network infrastructure).

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.1.10 Filtering and sampling of insulating oil

T2.7.3. Filtering and sampling oil and the environment

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.

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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 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 - UET09". Evidence shall also comprise:

- A representative body of Performance Criteria 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; 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	Any three of the following:	Fuse switches Dropout fuses Sectionalisers Disconnectors Links Fuses Surge arrestors

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B	Any one of the following:	Reclosers Gas filled switches Ring main units Oil filled switches Air break switches
C	Any one of the following:	Transformers Reactors Regulators Capacitors Relays Line fault indicators
D	Any three of the following:	Voltage detectors Phasing equipment Clip-on ammeters Insulation resistance testers Recording meters Earth resistance testers
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 to undertake actual maintenance of electrical equipment in the network infrastructure.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show

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	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)** There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

8) 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 the maintenance of overhead electrical equipment relevant to the transmission, distribution and rail networks.

Maintenance may include the removal, repair and replacement of electrical equipment encompassing "like for like" and associated hardware as well as the termination and/or connection of this equipment according to requirements and may include sampling of insulating oils. It also encompasses the identification of faults; the pre-commissioning tests involving the equipment/system and the interpretation of these tests against agreed specifications. It excludes the energisation of the equipment maintained in a highly complex, interdependent and interconnected electricity supply Network system, where the affects of unintended consequences on the system are high risk and appropriate

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personnel effect energisation.

Electrical equipment and associated hardware may include relevant transmission or distribution linework/network; switchgear (eg. reclosers, sectionalisers, drop-out fuses, disconnectors, isolators, air break switches, gas filled switches, links, fuses, fuse switches and circuit breakers); transformers (eg. padmount, pole-mounted and mobile); reactors; fault indicators; regulators; street lighting control points; capacitors; cables; underground/overhead cable terminations; underground cable joints; relays (simple); mobile generators and surge arrestors; support brackets and the like.

Test and recording equipment includes voltage detectors, phasing equipment, tong ammeters, voltmeters, recording meters, insulation resistance testers and may include the, sampling of transformers, switchgear and cable insulating oil and tests for dielectric strength and moisture used for the purposes as intended and according to requirements, and does not include use of such in energising equipment and circuits in a highly complex, interdependent and interconnected electricity supply Network system, where the affects of unintended consequences on the system are high risk.

Equipment may include Pump, filter press, hoses, pipes, soil kits, sample bottles, storage vessels etc.

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
- 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

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- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5)**

Industry Specific Cross-Discipline Units

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UETTDRIS03B Perform LV field switching operation to a given schedule.

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the conducting of low voltage switching operations involving the operation of circuit breaking and isolation devices from a given switching schedule and in accordance with enterprise procedures. It covers low voltage distribution systems in field situations but also includes paralleling in accordance with the switching schedule. It also encompasses the procedure 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 **4**)

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

1.2) License to practice

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

	UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables
or	UETTDRCJ07B	Install and maintain de-energised HV underground polymeric insulated cables
or	UETTDRIS02B	Maintain electrical equipment (network infrastructure)
or	UETTDRIS14B	Install and maintain overhead conductors and cables (poles and structures)
or	UETTDRTP09B	Install and maintain overhead conductors and cables (towers)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the LV field switching 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 LV 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

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ELEMENT	PERFORMANCE CRITERIA	
		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 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 LV field switching 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.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Essential knowledge and associated skills in the safe LV field switching to a given schedule are applied 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 parallelling 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 LV field switching to a given schedule are responded to and undertaken within the scope of established procedures.
	2.8	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.9	On going checks of quality of the work are undertaken in accordance with instructions and established procedures
3 Complete the LV field switching 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.

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ELEMENT	PERFORMANCE CRITERIA
	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.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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.

The extent of the essential knowledge and associated skills (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.4.1 Switchgear installation

T2.4.2 Low voltage switching principles

T2.4.9 System switching operations and authorisation procedures LV

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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 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 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

9.**2**)

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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 - UET09". 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	Approvals/clearances

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EVIDENCE GUIDE

	following:	Access authority /permits
B	Any two of the following:	Voltage detectors Polarity testers Phase rotation indicators
C	Any one of the following:	LV links LV bridges LV fuses
D	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 LV 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 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

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	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

8) 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 the conducting of low voltage switching operations involving the operation of circuit breaking and isolation devices from a given switching schedule as it relates to low voltage distribution systems in field situations but also includes paralleling in accordance with the switching schedule.

Operation of circuit isolation devices associated with energy reticulation systems/networks is confined to low voltage systems in field situations which are performed in accordance with a switching schedule and established procedures.

Switching Control Officer refers to an appropriate person designated as such by regulations, codes or enterprise arrangements who is responsible for coordinating and directing switching activities in consultation with field operatives.

Switchgear may include Low Voltage fuses, Low Voltage links and bridges.

Specialist tools and devices may include Low Voltage detectors, Low Voltage polarity testers and Low Voltage phase rotation indicators.

Switching program/schedule refers to structure, switch or equipment number; locations; Low Voltage distributor, spur or feeder; outage times; works order/plan

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
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Inspect
- Legislation
- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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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Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS04B Perform high voltage field switching operation to a given schedule

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

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 **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables
or	UETTDRCJ07B	Install and maintain de-energised HV underground polymeric insulated cables
or	UETTDRIS02B	Maintain electrical equipment (network infrastructure)
or	UETTDRIS14B	Install and maintain overhead conductors and cables (poles and structures)
or	UETTDRTP09B	Install and maintain overhead conductors and cables (towers)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

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

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ELEMENT		PERFORMANCE CRITERIA	
			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 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.

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ELEMENT	PERFORMANCE CRITERIA	
	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 parallelling 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 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	On going 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

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ELEMENT	PERFORMANCE CRITERIA	
		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.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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.

The extent of the essential knowledge and associated skills (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.4.3	High voltage switching principles
T2.4.4	High voltage fault switching principles
T2.4.5	High voltage distribution transformer principles
T2.4.6	High voltage SWER system
T2.4.7	Feeder automation system

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REQUIRED SKILLS AND KNOWLEDGE

T2.4.8	System switching operations and authorisation procedures HV
T2.4.11	High voltage overhead and substation switching principles

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 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 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 - UET09". 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:

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EVIDENCE GUIDE

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 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.

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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 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 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

8) 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

This Competency Standard Unit shall/may 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
- 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

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RANGE STATEMENT

- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS05B Perform substation switching operation to a given schedule

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the conducting of switching operations in a substation in accordance to a given instructions, switching schedule and established enterprises procedures. It encompasses the operation of substation switching devices such as circuit breakers, air break switches, fuses, reclosers, ring main units and isolators.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables
or	UETTDRCJ07B	Install and maintain de-energised HV underground polymeric insulated cables
or	UETTDRIS02B	Maintain electrical equipment (network infrastructure)
or	UETTDRIS14B	Install and maintain overhead conductors and cables (poles and structures)
or	UETTDRTP09B	Install and maintain overhead conductors and cables (towers)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for substation switching 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 substation 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

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ELEMENT	PERFORMANCE CRITERIA	
		control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.
	1.6	Relevant authority is obtained to access and 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, Pole Top Rescue 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 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 substation switching 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.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Essential knowledge and associated skills are applied in safe substation switching 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 is isolated and proved de-energised using appropriate devices, earthed where required and load transfer successfully achieved according to requirements and established procedures.
	2.6	Substation switching to a given schedule is carried out, in accordance with the work schedule and requirements/established procedures.
	2.7	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.
	2.8	Unplanned events occurring during substation switching to a given schedule are responded to and undertaken within the scope of established procedures.
	2.9	Relevant permits are prepared and issued in accordance with established procedures.
	2.10	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.11	On going checks of quality of the work are undertaken in accordance with instructions and established procedures
3 Complete substation switching 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.

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ELEMENT	PERFORMANCE CRITERIA
	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.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 substation switching to a given schedule.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.4.1 Switchgear installation

T2.4.2 Low voltage switching principles

T2.4.3 High voltage switching principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.4.4	High voltage fault switching principles
T2.4.5	High voltage distribution transformer principles
T2.4.6	High voltage SWER system
T2.4.7	Feeder automation system
T2.4.11	High voltage overhead and substation switching principles

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 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

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being assessed.

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 - UET09". 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

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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:	Operating sticks Operating earths Voltage detectors
C	All of the following:	Phasing equipment Ground equipment isolating handles and earths
D	Any one of the following:	Links Air break switches Fuses
E	Any two of the following:	Reclosers Ring main units Circuit breakers
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 **9.3)**

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specific 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 substation 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 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

8) 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 the carrying out of switching operations in a substation in accordance to a given instructions and

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RANGE STATEMENT

switching schedule.

Switchgear includes ring main units, circuit breakers, isolators, earth switches, HV links, air break switches, capacitor banks, reactor banks, line/wave traps and fuses. (Refer to Definition 25)

Specialist tools 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
- 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

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RANGE STATEMENT

- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS06B Install and maintain network infrastructure electrical equipment

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation and maintenance of electrical equipment, such as fuse switches, drop out switches, sectionalisers, links, surge arrestors, gas filled and or oil filled switches, which are relevant to the transmission, distribution and rail networks. It includes the termination/connection of the equipment in accordance to enterprise requirements; the repair and/or replacement of "like for like" electrical equipment and associated hardware, and may include sampling of insulating oils. It also encompasses the identification of faults, the relevant pre-commissioning tests involving the equipment/system and the interpretation of these tests against agreed specifications. It excludes the energisation of the equipment maintained in a highly complex, interdependent and interconnected electricity supply Network system, where the affects of unintended consequences on the system are high risk and appropriate personnel effect energisation.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit requires 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) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence. Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

	UETTDREL02B	Operate plant and equipment near energised and exposed electrical conductors/apparatus
and	UETTDRIS22B	Implement and monitor the organisational OHS policies, procedures and programs
and	UETTDRIS23B	Implement and monitor the environmental and sustainable energy management policies and procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the installation and maintenance of network infrastructure electrical equipment	1.1 Works 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 the installation and or maintenance of network infrastructure electrical equipment 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

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ELEMENT	PERFORMANCE CRITERIA	
		control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.
	1.6	Relevant work permits are obtained to access and 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, Pole Top Rescue 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 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 installation and maintenance of network infrastructure electrical equipment	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.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Essential knowledge and associated skills are applied in the safe installation of network infrastructure electrical equipment to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.4	Electrical equipment and associated hardware is positioned, secured and terminated/connected in accordance with requirements and established procedures.
	2.5	Maintenance, including repair and/or replacement of network infrastructure electrical equipment is carried out, in accordance with the work schedule and requirements/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 in the installation of electrical equipment (network infrastructure) are undertaken within the scope of established procedures.
	2.8	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.9	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the installation and maintenance of network infrastructure electrical equipment	3.1	Work undertaken is checked/tested 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.

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ELEMENT	PERFORMANCE CRITERIA	
	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 work permit(s) are signed off and, electrical equipment (network infrastructure) are returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing electrical equipment (network infrastructure).

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.8.2.2	Alternating current principles - power
E2.8.6	Electromagnetic principles
T2.1.1	Engineering applications of mathematical principles
T2.1.2	Engineering applications of mechanical principles
T2.1.3.	Engineering applications of material properties.
T2.1.4.	Basic rigging techniques

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REQUIRED SKILLS AND KNOWLEDGE

T2.1.9.	Stores procedures
T2.1.10.	Filtering and sampling of insulating oil
T2.2.1	Generation power systems
T2.2.2	Transmission, distribution and rail power systems
T2.2.3	Substations, power transformers and reactors
T2.3.1	Powerline safety practices
T2.4.1	Switchgear installation
T2.7.3	Filtering and sampling oil and the environment

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 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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EVIDENCE GUIDE

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

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 - UET09". 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

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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	Install and maintain any three of the following:	Fuse switches Dropout fuses Sectionalisers Disconnectors Links Fuses Surge arrestors
B	Install and maintain any one of the following:	Reclosers Motorised switches Gas filled switches Ring main units Line fault indicators Oil filled switches Air break switches
C	Install and maintain any one of the following:	Transformers Reactors Regulators Capacitors

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		Relays Line fault indicators
D	With regards to the above incorporate any three of the following:	Voltage detectors Phasing equipment Clip-on ammeters Insulation resistance testers Recording meters Earth resistance tester
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 to undertake actual installation and maintenance of network infrastructure electrical equipment

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

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	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

8) 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 the installation, termination/connection and maintenance of overhead electrical equipment relevant to the transmission, distribution and rail networks, and includes pre-commissioning.

Maintenance may include the removal, repair and replacement of electrical equipment encompassing "like for like" and associated hardware as well as the termination and/or connection of this equipment according to requirements and may include sampling of insulating oils. It also encompasses the identification of faults; the pre-commissioning tests involving the equipment/system and the interpretation of these tests against agreed specifications. It excludes the energisation of the equipment maintained in a highly complex, interdependent and interconnected electricity supply Network system, where the affects of unintended consequences on the system are high risk and appropriate personnel effect energisation.

Electrical equipment and associated hardware may include relevant transmission or distribution linework/network; switchgear (e.g. reclosers, sectionalisers, drop-out fuses, disconnectors, isolators, air break switches, gas filled switches, links, fuses, fuse switches and circuit breakers); transformers (e.g. padmount, pole-mounted and mobile); reactors; fault indicators; regulators; street lighting control points; capacitors; cables; underground/overhead cable terminations; relays (simple); mobile generators and surge arrestors; support brackets and the like.

It does not include the energisation of equipment in a highly complex, interdependent and interconnected electricity supply Network system, where the affects of unintended consequences on the system are high risk and appropriate personnel effect energisation.

Test and recording equipment includes voltage detectors, phasing equipment, tong

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RANGE STATEMENT

ammeters, voltmeters, recording meters and insulation resistance testers used for the purposes as intended and according to requirements, and does not include use of such in energising installed equipment in a highly complex, interdependent and interconnected electricity supply Network system, where the affects of unintended consequences on the system are high risk.

Equipment may include Pump, filter press, hoses, pipes, soil kits, sample bottles, storage vessels etc.

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
- 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

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RANGE STATEMENT

- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS07B Sample, test, filter, and reinstate insulating oil

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the filtering, sampling, testing and reinstating of insulating oil. This may include the dispatching of oil samples to a laboratory for higher level testing if required. Post operational servicing of equipment and or plant and, the identification of any related environment issues concerning disposal, safety and the like are also associated with this unit.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit requires 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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT **PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to sample, test, filter and reinstating insulating oil	1.1	Works 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 sampling, testing, filtering and reinstating insulating oil 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 and environmental risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.
	1.6	Relevant work permits are obtained to access and 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 rescue, release, CPR, pole top rescue 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

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ELEMENT		PERFORMANCE CRITERIA	
			and to minimise risk and damage to property, commerce, and individuals in accordance with 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	Traffic management plan is identified and implemented.
2	Carry out sampling, testing, filtering and reinstating of insulating oil	2.1	OHS, sustainable energy and environmental 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	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.
		2.3	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.
		2.4	Essential knowledge and associated skills are applied for the safe sampling, testing, filtering and reinstating of insulating oil are applied to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
		2.5	Sampling, testing, filtering and reinstating of the insulating oil is carried out, in accordance with the work schedule and to requirements and or established procedures.
		2.6	Unplanned events in the filtering, sampling and testing of insulating oil are undertaken within the scope of established procedures.
		2.7	Known solutions to a variety of problems are applied using acquired essential knowledge and

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ELEMENT	PERFORMANCE CRITERIA	
		associated skills.
	2.8	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the sampling, testing, filtering and reinstating of insulating oil	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 or disposed of in accordance with established procedures.
	3.5	Relevant work permit(s) are signed off and, equipment is returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 sampling, testing, filterering and reinstatement of insulating oil.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.1.10	Filtering and sampling of insulating oil
T2.1.11	Testing of insulating oil
T2.3.1	Powerline safety practices
T2.7.2	Material handling and the environment
T2.7.3	Filtering and sampling oil and the environment
T2.7.6	Disposal procedures for insulating materials
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions
T2.8.3	Enterprises specific - technical drawing and documents
T2.8.6	Enterprise specific - specialised tools
T2.10.11	Substation safety practices

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

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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 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 - UET09". 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	At least two of the following:	Tx Main Tank. Tx Tap Changer Switchgear Cable Reactor
B	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

9.3)

This unit should be assessed as it relates to normal work practice

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for assessment

using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual sampling, testing, filtering and reinstatement of insulating oils.

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)

There are no concurrent assessment recommendations for this unit

Range Statement

RANGE STATEMENT

8) 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 the filtering, sampling and testing of transformers, switchgear and cable insulating oil and may include tests for dielectric strength and moisture.

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RANGE STATEMENT

Equipment may include (pump) filter press, hoses, pipes, soil kits, sample bottles, storage vessels etc.

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
- 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

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Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	4	Numeracy	4

Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS08B Develop HV switching schedule

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the preparation of a basic switching schedule for interconnected HV network plant. It includes planning basic outages and taking into account loading of network components. It also includes the calculation of network loading conditions to ensure the network is operating within designed parameters.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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.

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Pre-Requisites

Prerequisite Unit(s) **2**)

2.1) **Competencies**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRIS03B	Perform LV field switching to a given schedule
or	UETTDRIS04B	Perform high voltage field switching operation to a given schedule
or	UETTDRIS05B	Perform substation switching to a given schedule
or	UETTDRRT10B	Perform rail traction switching to a given schedule

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements

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describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to develop HV switching schedules	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 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.4 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.5 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.6 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7 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.
	1.8 Clients/Customers are provided with possible solutions and/or options within the scope,

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ELEMENT	PERFORMANCE CRITERIA	
		acceptable cost and requirements.
	1.9	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
	1.10	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
2 Carry out the development of HV switching schedules	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
	2.2	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.
	2.3	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.4	Development of HV switching schedules is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.5	Essential knowledge and associated skills are applied in the safe development of HV switching schedules to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.6	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.7	On going 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

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ELEMENT	PERFORMANCE CRITERIA	
		to a community/industry standard.
3 Complete development of HV switching schedules	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	Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Ensure Relevant work permit(s) are signed off and plant is returned to service and advised to client/customer in accordance with requirements.
	3.4	Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 developing an HV switching schedule.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.48	Electrical equipment - HV and LV powerline
T2.4.3	High voltage switching principles
T2.4.4	High voltage fault switching principles
T2.4.5	High voltage distribution transformer principles
T2.4.6	High voltage SWER system

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REQUIRED SKILLS AND KNOWLEDGE

T2.4.7	Feeder automation system
T2.4.8	System switching operations and authorisation procedures - HV
T2.4.11	High voltage overhead and substation switching principles
T2.4.13	High voltage switching instruction preparation
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions
T2.8.3	Enterprises specific - technical drawing and documents
T2.8.4	Enterprise specific - switching diagrams

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 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 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 - UET09". 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

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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 authorities
B	At least one of the following:	Development of an interconnected switching schedule Development of a radial switching schedule
C	All of the following:	Planning of loading of network components, including standby generation. Evaluate load parameters and effects on system, including parralleling and off-loading. Identify unexpected sources of energisation, e.g. generators, UPS, etc. Implementing earthing procedures to reduce induced voltages.

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		Authorising issuance of work-permits.
D	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 development of HV switching schedules.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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

9.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

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other units	UETTDRIS09B	Develop LV switching schedule

Range Statement

RANGE STATEMENT

8) 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 the development of HV switching schedules and include the use of system diagrams, data schedules, system loading data and use of computer based systems.

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
- Assessing risk
- Assessment
- Authorisation
- Confined space
- 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
- Hazards
- Identifying hazards
- Inspect
- Legislation
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work

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RANGE STATEMENT

- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS09B Develop LV switching schedule

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the preparation of a basic switching schedule for LV network. It includes planning basic outages and taking into account loading of network components. It also includes the calculation of network loading conditions to ensure the network is operating within design parameters.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRIS03B	Perform LV field switching to a given schedule
or	UETTDRIS04B	Perform high voltage field switching operation to a given schedule
or	UETTDRIS05B	Perform substation switching to a given schedule
or	UETTDRRT10B	Perform rail traction switching to a given schedule

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to develop LV switching schedules	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 and established procedures for the work are communicated 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 including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.5 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.6 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 Clients/Customers are provided with possible solutions and/or options within the scope,

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ELEMENT	PERFORMANCE CRITERIA	
		acceptable cost and requirements.
	1.8	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
2 Carry out the development of LV switching schedules	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
	2.2	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.
	2.3	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.4	Development of LV switching schedules is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.5	Essential knowledge and associated skills are applied in the safe development of LV switching schedules to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.6	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.7	On going 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

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ELEMENT	PERFORMANCE CRITERIA	
		to a community/industry standard.
3 Complete development of LV switching schedules	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	Relevant work permit(s) are signed off and, plant is returned to service and advised to client/customer in accordance with requirements.
	3.3	Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 developing LV switching schedule.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.48	Electrical equipment - HV and LV powerline
T2.4.1	Switchgear installation
T2.4.2	Low voltage switching principles
T2.4.9	System switching operations and authorisation procedures - LV

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REQUIRED SKILLS AND KNOWLEDGE

T2.4.12	Low voltage overhead and substation switching principles
T2.4.14	Low voltage switching instruction preparation
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions
T2.8.3	Enterprises specific - technical drawing and documents

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 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

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that may be required and the critical nature of the competencies being assessed.

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 - UET09". 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

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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 authorities
B	All of the following:	Development of LV switching schedule to enterprise requirements
D	All of the following	Planning of loading of network components, including standby generation. Evaluate load parameters and effects on system, including parralleling and off-loading. Identify unexpected sources of energisation, eg genorators, UPS, solar, etc. Implementing earthing procedures to reduce induced voltages. Authorising issuance of work-permits.
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

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		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 development of LV switching schedules.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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 may be assessed concurrently with the following units:

UETTDRIS08B Develop HV switching schedule

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Range Statement

RANGE STATEMENT

8) 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 the development of a LV switching schedule and may include system diagram, system plant data and loading evaluation of network components.

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
- Assessing risk
- Assessment
- Authorisation
- 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
- Hazards
- Identifying hazards
- Inspect
- Legislation
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

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Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS10B Coordinate permit procedures

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the coordination of work procedures that require the issue of electrical permits to work and other permits for working on major parts of the electrical network. It encompasses the analysis and coordination of all work activities planned to be undertaken within more or less the same time timeframe to ensure that: the organisation's work safety and statutory requirements are complied with; the extent of power interruption, and hence inconvenience to customers, is minimised; and the effective utilisation of available resources, both from the organisation and from its contractors to ensure all planned activities are timely completed to specified standards and requirements.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit may require a licence/registration to

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

	UETTDRIS03B	Perform LV field switching to a given schedule
or	UETTDRIS04B	Perform high voltagefield switching operation to a given schedule
or	UETTDRIS05B	Perform substation switching to a given schedule
or	UETTDRRT10B	Perform rail traction switching to a given schedule

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare/plan to coordinate permit 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 and established procedures for the work are communicated 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 including emergency exits kept clear, to ensure safe systems of work are followed and according to established

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ELEMENT	PERFORMANCE CRITERIA	
		procedures.
	1.5	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.6	Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, scheduled and applied in the coordination of permit procedures according to established procedures.
	1.7	Clients/customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements.
	1.8	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
2 Carry out the co-ordination of permit procedures	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
	2.2	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.
	2.3	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.4	Co-ordination of permit procedures is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.5	Essential knowledge and associated skills are applied in the safe co-ordination of permit procedures to ensure completion in an agreed timeframe and, to quality standards with a

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ELEMENT	PERFORMANCE CRITERIA	
		minimum of waste according to requirements.
	2.6	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.7	On going 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 co-ordination of permit 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	Relevant work permit(s) are signed off and, plant is returned to service and advised to client/customer in accordance with requirements.
	3.3	Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.4	Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 coordinating permit procedures.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.49	Co-ordinating permit access authority procedures
T2.4.3	High voltage switching principles
T2.4.4	High voltage fault switching principles
T2.4.5	High voltage distribution transformer principles
T2.4.6	High voltage SWER system
T2.4.7	Feeder automation system
T2.4.8	System switching operations and authorisation procedures - HV
T2.4.9	System switching operations and authorisation procedures - LV
T2.4.11	High voltage overhead and substation switching principles
T2.4.12	Low voltage overhead and substation switching principles
T2.4.13	High voltage switching instruction preparation
T2.4.14	Low voltage switching instruction preparation
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions
T2.8.3	Enterprises specific - technical drawing and documents
T2.8.4	Enterprise specific - switching diagrams

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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 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 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

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 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 - UET09". 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:	Development of a permit schedule and/or permit

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EVIDENCE GUIDE

		issuing procedures. Facilitate and coordinate the delivery and issuing of permits.
B	Gather, collate and confirm data on different worksites relevant to:	Electrical network diagrams for the specific work site. Earth permits. Safe working area. Work to be carried out in confined space or in hazardous environment. Specific outsourcing procedures. Specific hazard identification Risk classification and management procedures. Regulatory requirements such as Occupational Health and Safety and electrical safety.
C	All of the following:	Receive and coordinate the cancellation of permits in readiness for restoration. Conduct audits permit correctness procedures.
D	At least two of the following:	Issue of other work permits such as working in confined space, if required. Co-ordination of permits. Engaging and briefing contractors on electrical and other work permits.
E	At Least one occasion:	Dealing with an unplanned event by drawing on essential knowledge and associated 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 coordinate permit procedures.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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)

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

8) This relates to the unit of competency as a whole providing the range of contexts and

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RANGE STATEMENT

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 the coordination of permit procedures and may include but not be limited to the following.

Enterprise/organisational specific co-ordination could involve:

Electrical network diagrams, electrical permit to work system, other work permit system such as work in confined space or in hazardous environment, outsourcing procedures, hazard identification, risk classification and management procedures.

Regulatory requirements include Occupational Health and Safety and electrical safety

Computer based systems can be used in the generation of work schedules, programs and/or resource allocation.

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
- Assessing risk
- Assessment
- Authorisation
- 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
- Hazards
- Identifying hazards
- Inspect
- Legislation
- Notification.
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Work clearance systems

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Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS11B Coordinate and direct switching schedules

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the co-ordination and direction of switching the HV and LV system. It includes coordinating switching between operating authorities and HV customers, etc. It also includes the direction of switching on the HV and LV electrical network.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRIS03B	Perform LV field switching to a given schedule
or	UETTDRIS04B	Perform high voltagefield switching operation to a given schedule
or	UETTDRIS05B	Perform substation switching to a given schedule
or	UETTDRRT10B	Perform rail traction switching to a given schedule

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare/plan to coordinate and direct switching schedules	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	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.4	Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.5	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.6	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7	Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and

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ELEMENT		PERFORMANCE CRITERIA	
			technical working order.
		1.8	Clients/customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements.
		1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
2	Carry out coordinate and direct switching schedules	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
		2.2	First Aid, Pole Top Rescue and other related work procedures are performed according to requirements and/or established procedures.
		2.3	Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
		2.4	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.
		2.5	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
		2.6	Coordination and direction of switching schedules is carried out, in accordance with the work schedule and requirements and/or established procedures.
		2.7	Essential knowledge and associated skills are applied in the safe the coordination and direction of switching schedules to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste

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ELEMENT	PERFORMANCE CRITERIA	
		according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.9	On going 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 coordinate and direct switching schedules	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	Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Relevant work permit(s) are signed off and electrical plant is returned to service and advise to client/customer in accordance with requirements.
	3.4	Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 coordinating and directing switching schedules.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.48	Electrical Equipment - HV and LV powerline
T2.4.1	Switchgear installation
T2.4.2	Low voltage switching principles
T2.4.3	High voltage switching principles
T2.4.4	High voltage fault switching principles
T2.4.5	High voltage distribution transformer principles
T2.4.6	High voltage SWER system
T2.4.7	Feeder automation system
T2.4.8	System switching operations and authorisation procedures - HV
T2.4.9	System switching operations and authorisation procedures - LV
T2.4.10	Co-ordinating and directing switching instructions
T2.4.11	High voltage overhead and substation switching principles
T2.4.12	Low voltage overhead and substation switching principles
T2.4.13	High voltage switching instruction preparation
T2.4.14	Low voltage switching instruction preparation
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions
T2.8.3	Enterprises specific - technical drawing and

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REQUIRED SKILLS AND KNOWLEDGE

	documents
T2.8.4	Enterprise specific - switching diagrams

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 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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EVIDENCE GUIDE

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 - UET09". 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

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EVIDENCE GUIDE

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:	Switching direction Switching co-ordination Autonomy of working with network control
C	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 coordination and direction of switching schedules.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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

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EVIDENCE GUIDE

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**) There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

8) 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 the co-ordination and directing of switching schedules and may include a switching schedule, electrical plans and schematics.

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
- Assessing risk
- Assessment
- Authorisation
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications
- Emergency
- Environmental and sustainable energy procedures

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RANGE STATEMENT

- Environmental legislation
- Environmental management documentation
- Established procedures
- Hazards
- Identifying hazards
- Inspect
- Legislation
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5)**

Industry Specific Cross-Discipline Units

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UETTDRIS12B Install and maintain poles/structures and associated hardware

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation and maintenance of poles and/or structures and associated hardware, other than towers, which may consist of wood, steel, concrete or composite type material. It includes the fixing and or securing of hardware associated as well as the repair and or replacement of poles and or structures used in the distribution and or rail traction industry sectors. It encompasses the implementation of a suitable traffic management plan.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDREL01B	Apply environment and sustainable energy procedures
and	UETTDREL02B	Operate plant and equipment near energised and exposed electrical conductors/apparatus
and	UETTDREL04B	Working safely near live electrical apparatus as a non-electrical worker
and	UEUNEEE001B	Apply OHS practices in the workplace
and	UEUNEEE002B	Dismantle, assemble and fabricate electrotechnology components
and	UEENEEE004B	Solve problems in multiple path d.c. circuits
and	UEENEEE005B	Fix and secure equipment
and	UEENEEE007B	Use drawing, diagrams, schedules and service manuals
and	UEENEEG001B	Solve problems in electromagnetic circuits

For the full prerequisite chain details for this unit please

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Prerequisite Unit(s) **2)**

refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the installation and maintenance of poles and/or structures and associated hardware	1.1 Works 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 the installation and maintenance of poles and/or structures and associated hardware are obtained and confirmed for the purposes of the work to be

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ELEMENT	PERFORMANCE CRITERIA	
		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	Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.
	1.7	Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.
	1.8	Relevant personnel at worksite are confirmed current in First Aid, Pole Top Rescue 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 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	Traffic management plan is identified and implemented.
2 Carry out installation and maintenance of poles and/or structures	2.1	OHS, sustainable energy and environmental principles and practices to reduce the incidents of accidents and minimise waste are monitored and

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ELEMENT	PERFORMANCE CRITERIA	
and associated hardware		followed in accordance with requirements and/or established procedures.
	2.2	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.
	2.3	Lifting, climbing, working aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
	2.4	Essential knowledge and associated skills are applied in the safe installation of poles and/or structures and their associated hardware to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.5	Poles and/or structures and their associated hardware to be installed are stabilised according to requirements.
	2.6	Installation is carried out, in accordance with the work schedule and requirements/established procedures.
	2.7	Maintenance, including repair and/or replacement of poles and/or structures is carried out, in accordance with the work schedule and requirements/established procedures.
	2.8	Unplanned events in the installation of poles and/or structures and associated hardware are undertaken within the scope of established procedures.
	2.9	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.10	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the installation and	3.1	Work undertaken is checked against works schedule for conformance with requirements and

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ELEMENT	PERFORMANCE CRITERIA	
maintenance of poles and/or structures and associated hardware.		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 or disposed of in accordance with established procedures.
	3.5	Relevant work permit(s) are signed off and, poles and/or structures and their associated hardware are returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing and maintaining poles/structures and associated hardware.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.8.2.2 Alternating current principles - power

E2.8.6 Electromagnetic principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.1.1.	Engineering applications of mathematical principles
T2.1.2.	Engineering applications of mechanical principles
T2.1.3.	Engineering applications of material properties
T2.1.4.	Basic rigging techniques
T2.1.9.	Stores procedures
T2.2.5	Powerline installation safety
T2.2.6	Pole and hardware installation and maintenance
T2.3.1	Powerline safety practices

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 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

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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 - UET09". 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

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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	At least one of the following	Wood pole/structure Steel pole/structure Concrete pole/structure Composite pole/structure
B	At least three of the following:	Insulators Cross arm braces Crossarms Pole steps Shackle straps Earth leads Traction supports Traction registration Bonding
C	At least one of the following:	Baulking Stays Concreting including foundation

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D	At least one of the following:	Crane Auger/erector 'A' frame Lifting beam Pole pikes Helicopter lift
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 to undertake actual installation of poles and or structures and their associated hardware.

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.

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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 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 the installation of poles and or structures which may include basic inspection, removal, repair and replacement of poles and/or structures, including welding, pole staking and rebutting.

Equipment may include:

Pole types and structures may include wood, concrete, steel and composite.

Maintenance may include the basic inspection, removal, repair and replacement of poles including welding, pole staking and rebutting.

Associated hardware includes insulators, crossarms, stays, earth down leads and bond wires, crossarm braces, pole steps, shackle straps and associated bolts and clamps, cantilever assembly, pull off, head span, portal, drop tube

Pole stabilisation techniques include back-fill consolidation, concreting, baulking, reinforcement nailing, approved steel reinforcing and temporary and permanent stay-wires.

Methods of erection may include crane, auger/erector, winch/'A' frame, lifting apparatus and helicopter lift.

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
- Assessment
- Authorisation
- Confined space

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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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Competency Field

Competency Field **5)**

Industry Specific Cross-Discipline Units

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UETTDRIS13B Install and maintain public lighting systems

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation, maintenance and repair of public lighting systems. This also includes the inspection, testing and commissioning of the system associated with the street lighting circuit, the associated hardware and the earthing system. Installation will include the installation of, the associated hardware and components and, the wiring and earthing system. Maintenance may also include work on energised LV overhead or underground public lighting systems including the diagnosis of faults and the updating of relevant system data and or public lighting maintenance records.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables
or	UETTDRCJ07B	Install and maintain de-energised HV underground polymeric insulated cables
or	UETTDRIS02B	Maintain electrical equipment (network infrastructure)
or	UETTDRIS14B	Install and maintain overhead conductors and cables (poles and structures)
or	UETTDRTP09B	Install and maintain overhead conductors and cables (towers)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the installation and maintenance of public lighting systems	1.1 Works 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 the installation and maintenance of public lighting systems 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

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ELEMENT		PERFORMANCE CRITERIA	
			control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.
		1.6	Relevant work permits are obtained to access and 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, Pole Top Rescue 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 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	Traffic management plan is identified and implemented.
2	Carry out installation and maintenance of public lighting systems	2.1	OHS, sustainable energy and environmental 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.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Essential knowledge and associated skills are applied in the safe installation and maintenance of public lighting systems to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.4	Excavation/foundation construction is inspected, and confirmed as being in accordance with established procedures.
	2.5	Associated hardware, fittings and control gear are installed as per established procedures.
	2.6	Earthing system and street lighting circuit is installed as per established procedures.
	2.7	Inspection of public lighting and associated hardware is conducted to ascertain that it conforms to requirements/established procedures.
	2.8	Maintenance, including repair and/or replacement of the public lighting system is carried out, in accordance with the work schedule and requirements/established procedures.
	2.9	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.
	2.10	Unplanned events in the installation and maintenance of public lighting systems are undertaken within the scope of established procedures.
	2.11	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.12	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the installation and maintenance of public lighting systems	3.1	Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures

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ELEMENT	PERFORMANCE CRITERIA	
	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 or disposed of in accordance with established procedures.
	3.5	Relevant work permit(s) are signed off and, the public lighting system is returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing and maintaining public lighting 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.22	Installation and maintenance of public lighting and associated 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 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 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

9.2)

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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 - UET09". 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	At least one of the following:	Wood Concrete

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		Steel Composite
B	At least two of the following:	HP mercury vapour, LP and HP sodium vapour Fluorescent Quartz-halogen
C	At least three of the following:	Voltage detectors* Insulation resistance testers Clamp-on ammeters Continuity testers Fault indicators (* must use)
D	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 installation and maintenance of public lighting systems.

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".

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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**) There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

8) 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.

Competency shall be demonstrated in relation to the installation, maintenance and repair of public lighting systems, including the inspection, testing and commissioning of the system associated with the street lighting circuit, the associated hardware and the earthing system.

Maintenance may include the removal, repair, replacement and cleaning of public lighting and associated hardware.

Public lighting system may include lanterns/luminaires, lamps or control equipment in overhead and underground reticulated areas, poles and columns.

Associated hardware may include brackets, choke boxes, photo-electric cells, time switches, contactor boxes and appropriate nuts and bolts.

Testing equipment may include LV detectors and fault indicators.

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.

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RANGE STATEMENT

- Assessing risk
- 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

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS14B Install and maintain overhead conductors and cables (poles and structures)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This Competency Standard Unit covers the installation and maintenance of overhead conductors and cables used on poles and structures (excluding towers) which includes the stringing, tensioning and terminating of the conductor/cable, as well as the cleaning of insulators (de-energised), the securing of the conductor to the insulators or supports and the undertaking of the electrical connections. It also covers maintenance work associated with the diagnosing of faults, the conducting of visual inspections, the confirmation of phasing and the completion of other enterprise tests. It also encompasses the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits and the updating of system data/maintenance records according to requirements and established procedures.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRIS12B	Install and maintain poles/structures and associated hardware

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the installation and maintenance of overhead conductors and cables used on poles and/or structures	1.1 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 the installation and maintenance of overhead conductors and cables used on poles and/or structures 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 work permits are obtained to access and 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.

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ELEMENT		PERFORMANCE CRITERIA	
		1.8	Relevant personnel at worksite are confirmed current in First Aid, Pole Top Rescue 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 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	Traffic management plan is identified and implemented.
2	Carry out installation and maintenance of overhead conductors and cables used on poles and/or structures	2.1	OHS, sustainable energy and environmental 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 aloft, rescue and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
		2.3	Confirm systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures.
		2.4	Essential knowledge and associated skills are applied in the safe installation and maintenance of overhead conductors and cables used on poles and/or structures to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.

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ELEMENT	PERFORMANCE CRITERIA	
	2.5	Overhead conductor/cables are strung, tensioned and terminated as per requirements/established procedures.
	2.6	Insulators are cleaned and conductors and anti-vibration devices, spaces/spreaders are secured as per established procedures.
	2.7	Electrical connections are made in accordance with the requirements/established procedures.
	2.8	Maintenance, including repair and/or replacement of overhead conductors and cables used on poles and/or structures is carried out, in accordance with the work schedule and requirements/established procedures.
	2.9	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.
	2.10	Unplanned events in the installation and maintenance of overhead conductors and cables used on poles and/or structures are undertaken within the scope of established procedures.
	2.11	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.12	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the installation and maintenance of overhead conductors and cables used on poles and/or structures	3.1	Work undertaken is checked against works schedule for confirmation of phasing and 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.

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ELEMENT	PERFORMANCE CRITERIA
	3.4 Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage or disposed of in accordance with established procedures.
	3.5 Relevant work permit(s) are signed off and, overhead conductors and cables used on poles and/or structures are returned to service in accordance with requirements.
	3.6 Conductors/Cables are tested and commissioned in accordance with enterprise requirements and procedures.
	3.7 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing and maintaining overhead conductors and cables (poles and structures).

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.4 Powerline distribution installation

T2.2.5 Powerline installation safety

T2.2.7 Low voltage electrical service installation

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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 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 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

9.2)

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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 - UET09". 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	At least two of the following:	Copper Aluminium

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		Steel LV abc Aluminium/steel reinforced HV abc HV iuc Pilot
B	At least two of the following:	EWP Portable platform Ladder
C	At least three of the following:	Tension equipment* Cable drum stands Cable trailers Ropes Rollers Sheaves Stockings Stringing equipment Swivels Winches (* must do one)
D	At least two of the following:	Voltage indicators * Phasing sticks Fault indicators Field intensity meter Operating rods (*must do)
E	Any one of the following:	Lay-out (stringing method) Pull through (stringing method) Pilot rope (stringing method)
F	Any one of the	Dynamometer

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	following:	Site board Beat (wave sagging) Abney level Theodolite
G	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 installation and maintenance of overhead conductors and cables on poles and other structures.

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

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

8) 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 the installation and maintenance of overhead conductors and cables used on poles and structures.

Installation and Maintenance may include the stringing, tensioning, terminating of the conductor/cable and the removal, repair and replacement of cables, conductors and associated hardware and includes the cleaning of insulators. May include pre-energised/energisation checks and tests. Visual inspections, diagnosing maintenance work associated with the fault diagnosis, conducting of visual inspections, confirmation of phasing, and the completion of other enterprise tests is also included. It also encompasses the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits and the updating of system data/maintenance records according to requirements and established procedures.

Structures include poles and columns.

Types of conductor include copper, aluminium, steel, aluminium conductor steel reinforced (ACSR), low voltage aerial bundled cable (LVABC), high voltage aerial bundled cable (HVABC), insulated unscreened cable (IUC), service cable and fibre optic, pilot and control cables.

Overhead systems include their associated earthing systems, e.g. MEN and CMEN LV systems, bridging/bonding and conventional and SWER HV systems.

Plant may include elevating work platform, winches and capstans, specialist tension stringing equipment, cable trailers and cable drum stands.

Testing and recording equipment (LV) includes voltage detectors, tong ammeters, polarity testers, insulation resistance testers, recording meters and phase sequence indicators.

Testing and recording equipment (HV) includes phasing sticks, fault indicators, radio frequency interference detectors and voltage detectors.

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

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RANGE STATEMENT

integral part of the Range Statement of this unit:

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform
- Assessing risk
- 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

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS15B Install and maintain low voltage services (underground)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation, maintenance and connection of low voltage underground service lines and associated equipment (between the connection point and the point of supply - customers' premises). Maintenance includes the repair and replacement of service cables, service fuses and the replacement and repair of service hardware, the identification and rectification of faults. It also covers insulation, voltage, polarity testing and phase rotation.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables
or	UETTDRCJ07B	Install and maintain de-energised HV underground polymeric insulated cables
or	UETTDRIS02B	Maintain electrical equipment (network infrastructure)
or	UETTDRIS14B	Install and maintain overhead conductors and cables (poles and structures)
or	UETTDRTP09B	Install and maintain overhead conductors and cables (towers)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare for the installation and maintenance of LV underground services and associated equipment	1.1	Works 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 the installation and maintenance of LV underground services and associated equipment 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

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ELEMENT		PERFORMANCE CRITERIA	
			control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.
		1.6	Relevant work permits are obtained to access and 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, Rescue 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 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 installation and maintenance of LV underground services and associated equipment	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.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Essential knowledge and associated skills are applied in the safe installation and maintenance of LV underground services and associated equipment to ensure completion to quality standards with a minimum of waste according to requirements.
	2.4	LV underground services and associated equipment are installed according to the work schedule and requirements/established procedures.
	2.5	Maintenance, including repair and/or replacement of LV services and associated equipment is carried out, in accordance with the work schedule and requirements/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 during the installation and maintenance of LV services and associated equipment are undertaken within the scope of established procedures.
	2.8	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.9	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the installation and maintenance of LV underground services and associated equipment	3.1	Work undertaken is checked/tested 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

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ELEMENT	PERFORMANCE CRITERIA	
		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 work permit(s) are signed off and, the LV services and associated equipment are returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing and maintaining low voltage services (underground).

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.5	Powerline installation safety
T2.2.55	Low voltage electrical underground service installation

Evidence Guide

EVIDENCE GUIDE

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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 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

9.2)

Before the critical aspects of evidence are considered all

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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 - UET09". 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	At least two of the following:	Underground pillar/pit connection (single phase) Underground pillar/pit

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		connection (three phase*) Underground to overhead connection (* must do)
B	At least one of the following:	Fuse units Circuit breakers Service links
C	At least four of the following:	Polarity test * Phase rotation test Continuity test Voltage test Insulation resistance test (* must do)
D	At least one of the following:	Aluminium LV cable XLPE cable Copper LV cable
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 to undertake actual installation and maintenance of underground LV services.

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

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	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)** There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

8) 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 the installation and maintenance of underground low voltage services as they relate to distribution circuits and associated equipment and includes the identification of faults.

Installation may include, the laying and connection of service cables, connection of the service cable to underground equipment, the fitting and connection of fuses or circuit breakers and the testing and commissioning of the service

Service includes the connection between the customers' point of supply and the underground pillar/pit connection (single phase), underground pillar/pit connection (three phase) and or underground to overhead connection.

Maintenance may include the identification and diagnosis of faults, the removal, replacement or repair of service cables and associated hardware and the temporary installation of services and associated equipment and the testing and commissioning of

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RANGE STATEMENT

the service.

Testing procedures may include continuity, polarity, phase rotation, insulation resistance and voltage.

Testing equipment may include, digital/analogue voltage testers, multimeters, phase rotation testers, load testers, insulation resistance and continuity testers.

Associated hardware may include fuse units, circuit breakers, contactors, mains connection boxes.

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
- 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

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RANGE STATEMENT

- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS16B Install and maintain low voltage services (overhead)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation, maintenance and connection of low voltage overhead service lines and associated equipment (between the connection point and the point of supply - customers' premises). Maintenance includes the repair and replacement of service cables, service fuses and the replacement and repair of service hardware, the identification and rectification of faults. It also covers insulation, voltage, polarity testing and phase rotation.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables
or	UETTDRCJ07B	Install and maintain de-energised HV underground polymeric insulated cables
or	UETTDRIS02B	Maintain electrical equipment (network infrastructure)
or	UETTDRIS14B	Install and maintain overhead conductors and cables (poles and structures)
or	UETTDRTP09B	Install and maintain overhead conductors and cables (towers)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the installation and maintenance of LV overhead services and associated equipment	1.1 Works 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 the installation and maintenance of LV overhead services and associated equipment 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

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ELEMENT	PERFORMANCE CRITERIA	
		control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.
	1.6	Relevant work permits are obtained to access and 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, Pole Top Rescue 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 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 installation and maintenance of LV overhead services and associated equipment	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 aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Essential knowledge and associated skills are applied in the safe installation and maintenance of LV overhead services and associated equipment to ensure completion to quality standards with a minimum of waste according to requirements.
	2.4	LV overhead services and associated equipment are installed according to the work schedule and requirements/established procedures.
	2.5	Maintenance, including repair and/or replacement of LV overhead services and associated equipment is carried out, in accordance with the work schedule and requirements/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 during the installation and maintenance of LV services and associated equipment are undertaken within the scope of established procedures.
	2.8	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.9	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the installation and maintenance of LV overhead services and associated equipment	3.1	Work undertaken is checked/tested 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

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ELEMENT	PERFORMANCE CRITERIA	
		materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures.
	3.5	Relevant work permit(s) are signed off and, the LV overhead services and associated equipment are returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing and maintaining low voltage services (overhead).

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.4	Powerline distribution installation
T2.2.5	Powerline installation safety
T2.2.54	Low voltage electrical overhead service installation

Evidence Guide

EVIDENCE GUIDE

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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 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

9.2)

Before the critical aspects of evidence are considered all

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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 - UET09". 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	At least two of the following:	Overhead service line (three phase)* Overhead service line (single

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		phase) Overhead service line (two phase) (* must do)
B	At least one of the following:	Service fuse Circuit breakers (pole) Service link
C	All of the following:	Polarity test * Phase rotation test Continuity test Voltage test (* must do)
D	At least one of the following:	Aluminium LV mains Copper LV mains LV ABC mains
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 to undertake actual installation and maintenance of overhead LV services.

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

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	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**) There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

8) 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 the installation and maintenance of overhead low voltage services as they relate to distribution circuits and associated equipment and includes the identification of faults.

Installation may include, the erection and connection of service lines, the fitting and connection of pole fuses or circuit breakers and the testing and commissioning of the service.

Maintenance may include the identification and diagnosis of faults, the removal, replacement or repair of service lines and associated hardware and the temporary installation of services and associated equipment and the testing and commissioning of the service.

Testing procedures may include continuity, polarity, phase rotation, insulation resistance and voltage.

Testing equipment may include, digital/analogue voltage testers, multimeters, phase

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RANGE STATEMENT

rotation testers, load testers, insulation resistance and continuity testers.

Associated hardware may include pole fuse units, circuit breakers, contactors, mains connection boxes.

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
- 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

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Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS17B Conduct visual checking and treatment of poles and structures

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the conducting of ground line inspection and treatment of poles and structures in accordance with enterprise procedures. It includes work associated with testing or examining, at eye level to below ground and the visual checking above ground of the crossarm and hardware attached with the use of binoculars, so as to determine the integrity of the poles, structures and hardware attached to them. It also encompasses the completion of inspection reports and the updating of records to enterprise requirements.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRIS12B	Install and maintain poles/structures and associated hardware

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of

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competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to perform visual checking and treatment of poles and structures	1.1 Works 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 the visual checking and treatment of poles and structures 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 work permits are obtained to access and 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, Rescue and other related work procedures according to requirements.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and

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ELEMENT	PERFORMANCE CRITERIA	
		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 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 visual checking and treatment of poles and structures	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, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
	2.3	Essential knowledge and associated kills are applied for the safe performance of visual checking and treatment of poles and structures to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.4	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.
	2.5	Visual checking by testing or examining pole and/or structures from approximately eye level to below ground according is performed .to requirements and established procedures.
	2.6	Defective or suspect poles are identified according to established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.7	Treatment of poles and/or structures is carried out, in accordance with the work schedule and requirements/established procedures.
	2.8	Unplanned events during the visual checking and treatment of poles and structures are undertaken within the scope of established procedures.
	2.9	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.10	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the visual checking and treatment of poles and structures	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 work permit(s) are signed off and, of poles and structures are returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 conducting visual checking and treatment of poles and structures.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.8 Poles and structures inspection principles

T2.2.9 Powerline inspection principles

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 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 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 - UET09". 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

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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	At least one of the following:	Wood Steel Concrete Composite
B	At least one of the following:	Stress tester Drill test. Non intrusive test
C	At least one of the following:	Chemical treatment Re-butting Nailing Welding Stays/guys
D	All of the following:	Recording Reporting
E	At least two of the following:	Cross-arms Insulators Surge arrestors

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		Support brackets
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 visual checking and treatment of poles and structures.

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)

There are no concurrent assessment recommendations for this unit.

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Range Statement

RANGE STATEMENT

8) 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 the conducting of ground line inspection and treatment, including testing or examining of to determine the integrity of the poles and structures.

Poles and structure types include wood, steel, concrete and composite.

Hardware attached to poles/structures include cross-arms, insulators, surge arrestors and support brackets.

Inspection/testing devices may include electronic data capture devices, computers, sonic testing devices, stress tester, binoculars and drilling tests.

Maintenance may include chemical treatment, emergency repair or welding, or life extension by re-butting or nailing.

Recording and reporting systems

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
- 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

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5)**

Industry Specific Cross-Discipline Units

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UETTDRIS18B Locate faults in underground power cables

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the diagnosis and location of faults in underground power cables. It includes obtaining the required "access to test" or equivalent permit, setting up of the fault location test equipment and following the procedure to carry out the cable fault location test plan. It also encompasses the interpreting test results, documenting the actual fault location and likely cause and, listing the recommendations for correcting the cable fault to meet client requirements.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables
or	UETTDRCJ07B	Install and maintain de-energised HV underground polymeric insulated cables
or	UETTDRIS02B	Maintain electrical equipment (network infrastructure)
or	UETTDRIS14B	Install and maintain overhead conductors and cables (poles and structures)
or	UETTDRTP09B	Install and maintain overhead conductors and cables (towers)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to locate faults in underground power cables	1.1	Works schedule(s), including cable specifications and standards, cable route data, history, and characteristics, 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 the location of faults in underground power cables 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.

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ELEMENT	PERFORMANCE CRITERIA	
	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 work permits are obtained to access and 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	Test equipment is assembled and checked for calibration status as per established procedures.
	1.9	Cable fault location test procedures/plan is prepared taking account the range of tests required and according to requirements/established procedures.
	1.10	Relevant personnel at worksite are confirmed current in First Aid, and other related work procedures according to requirements.
	1.11	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved to carry out work where necessary.
	1.12	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.13	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures.
	1.14	Road signs, barriers and warning devices are positioned in accordance with requirements.
2 Carry out the location of faults in	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents

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ELEMENT		PERFORMANCE CRITERIA	
	underground power cables		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 location of faults in underground power cables, to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
		2.4	Cable is tested to determine the location of the relevant faults according to the work schedule, cable fault location test procedures/plan and requirements/established procedures.
		2.5	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.
		2.6	Unplanned events in the location of faults in underground power cables are undertaken within the scope of established procedures.
		2.7	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
		2.8	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3	Complete the location of faults in underground power cables	3.1	Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures Test results are interpreted to determine the cable fault location, the type of fault and/or possible cause.

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ELEMENT	PERFORMANCE CRITERIA	
	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 work permit(s) are signed off and, cable/site are returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 locating faults in underground power cables.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.12	Underground cable installation
T2.2.14	Cable fault location principles
T2.2.16	Fundamentals of jointing LV polymeric cable
T2.2.17	LV polymeric cable jointing principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.2.18	HV polymeric underground cable jointing principles
T2.2.19	LV paper lead cable jointing principles
T2.2.20	HV paper lead cable jointing principles
T2.2.23	Underground cable construction
T2.2.24	Aluminium and lead cable sheathed - jointing 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 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 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

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being assessed.

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 - UET09". 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

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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	At least three of the following:	Time domain reflectometry Popie Differential TDR radar Current impulse Murray loop Varley loop Radio detection Capacitance/inductance Continuity tests Insulation tests Voltage detection
B	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.

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EVIDENCE GUIDE

- Suitable work environment, facilities, equipment and materials to undertake actual locating of faults in underground power cables.

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)

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

8) 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 the diagnosis and location of faults as it relates to underground power cables (Distribution and Transmission) and includes the receipt of the relevant permit(s).

Relevant cable specifications and standards may include but are not limited to cable ageing effects, test voltage de-rating, velocity of propagation, insulation, screened, armoured, burial status drawings, network diagrams, maker's installations, cable age

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RANGE STATEMENT

and/or service history, owners/clients requests.

Cable fault test procedures may include but are not limited to time domain reflectometry (TDR), TDR radar, digital arc reflection, differential digital arc reflection, current impulse test (thumper test), differential current impulse, decay, differential decay, pool of potential in earth (POPIE), Murray loop test (including Fisher modification), radio detection, Varley loop test, capacitance inductance test.

Test equipment may include but are not limited to the calibration certificated for test equipment being current and valid for AF signals, bridges, pulse echo techniques, capacitors, seismophone, POPIE.

Hazards associated with the testing and location procedures may include but are not limited to environmental, traffic, chemical, fuel gas, warning notices, water or gas flooding, test voltages, public barriers.

Range of testing required may include but are not limited to the order in which testing will be applied, from where tests are to be applied, communication arrangements and who will be directing the tests.

Selected test procedures may include but are not limited to recognised standard test methods, client requirements.

Recorded results of the tests may include but are not limited to the requirements specified by the client or enterprise.

Results interpreted may include but are not limited to physical location notes, depth and distance.

Identified actual fault location may include but are not limited to the reports and test data, within how many metres of the measured position the fault was actually located, relationship between type of fault and possible cause, location and protection relay operations, known events related to the fault.

Correcting the cable fault may include but is not limited to providing recommendations for corrective action, preventative action.

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
- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration
- Documenting detail work events, record keeping and or storage of information

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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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Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS19B Conduct high potential testing of underground power cables

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the conducting of high potential testing of underground power cables. It includes obtaining the required "access to test" or equivalent permit, setting up of the fault location test equipment and following the procedure to carry out the cable test plan. It also encompasses the interpreting test results, documenting the actual testing and, recommendations to meet client requirements.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables
or	UETTDRCJ07B	Install and maintain de-energised HV underground polymeric insulated cables
or	UETTDRIS02B	Maintain electrical equipment (network infrastructure)
or	UETTDRIS14B	Install and maintain overhead conductors and cables (poles and structures)
or	UETTDRTP09B	Install and maintain overhead conductors and cables (towers)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to conduct high potential testing	1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analysed, if necessary, by site inspection and the extent of the preparation of the work determined for planning and coordination.
	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 the high potential testing are obtained and confirmed for the purposes of the work to be performed and communicated.
	1.4 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.

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ELEMENT	PERFORMANCE CRITERIA	
	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 work permits are secured to coordinate the performance of 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	Clients/Customers are provided with alternative methods within the: scope, acceptable cost and 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 established procedures.
	1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
	1.12	Positioning of road signs, barriers and warning devices is planned in accordance with requirements.
2 Carry out high potential testing	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
	2.2	First Aid, Pole Top Rescue and other related work procedures are performed according to requirements and/or established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
	2.4	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.
	2.5	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.6	Conduction of high potential testing is carried out, in accordance with the work schedule and requirements and/or established procedures
	2.7	Essential knowledge and associated skills are applied in the safe conduction of high potential testing to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.9	On going 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 high potential testing	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	Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable.
	3.3	Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA
	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 work permit(s) are signed off and, underground cables are returned to service and advised to client/customer in accordance with requirements.
	3.6 Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 conducting high potential testing of underground power cables.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.12 Underground cable installation

T2.2.14 Cable fault location principles

T2.2.16 Fundamentals of jointing LV polymeric cable

T2.2.17 LV polymeric cable jointing principles

T2.2.18 HV polymeric underground cable jointing principles

T2.2.19 LV Paper lead cable jointing principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.2.20	HV Paper lead cable jointing principles
T2.2.23	Underground cable construction
T2.2.24	Aluminium and lead sheathed cable - jointing procedures
T2.4.2	Low voltage switching principles

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 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 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 - UET09". 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 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

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- 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:	Tests to be conducted on HV distribution cable Tests to be conducted on HV transmission cable
B	At least one of the following:	HV polymeric HV paper Insulated Oil Filled Gas Filled
C	At least four of the following:	Phasing instruments* DC high potential tester* Voltage detectors Insulation testers* Continuity testers Cable identification instrument (*must do)
D	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

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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 conducting of high potential testing of underground cables.

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 may be assessed concurrently with the following units:

UETTDRIS18B Locate faults in underground power cables

Range Statement

RANGE STATEMENT

8) 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 conducting high potential testing of underground power cables and may including the following:

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RANGE STATEMENT

Cable type includes: distribution and transmission polymeric, solid paper insulated, oil filled and gas filled underground cables.

Test and recording equipment may include voltage detectors, cable identification equipment, , insulation resistance, DC High Potential testers, phasing instruments.

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
- 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

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Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS20B Install and replace energy meters and associated equipment

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation and replacement of whole current energy meters and associated equipment, where replacement may include the identification of faults in accordance with established procedures and return to service. It includes the requirements to ascertain if normal functions of the meters and associated equipment are in accordance with established procedures.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables
or	UETTDRCJ07B	Install and maintain de-energised HV underground polymeric insulated cables
or	UETTDRIS02B	Maintain electrical equipment (network infrastructure)
or	UETTDRIS14B	Install and maintain overhead conductors and cables (poles and structures)
or	UETTDRTP09B	Install and maintain overhead conductors and cables (towers)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the installation and replacement of energy meters and associated equipment	1.1 Works 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 the installation and replacement of energy meters and associated equipment 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

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ELEMENT	PERFORMANCE CRITERIA	
		control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.
	1.6	Resources including personnel, equipment, tools and Resources including personnel, equipment, tools and personnel protective equipment required for the job are obtained and confirmed in working order.
	1.7	Relevant personnel at worksite are confirmed current in First Aid, Rescue and other related work procedures according to requirements.
	1.8	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved to carry out work where necessary.
	1.9	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.10	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures.
	1.11	Road signs, barriers and warning devices are positioned in accordance with requirements.
2 Carry out the installation and replacement of energy meters and associated equipment	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, 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 in the safe installation and replacement of energy meters and associated equipment to ensure completion in an agreed timeframe and, to quality

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ELEMENT	PERFORMANCE CRITERIA	
		standards with a minimum of waste according to requirements.
	2.4	Installation and/or replacement of energy meters and associated equipment is carried out, including, as required, wiring, testing, programming and sealing and of meter(s) and associated equipment in accordance with requirements and enterprise requirements.
	2.5	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.
	2.6	Unplanned events during the installation and replacement of energy meters and associated equipment are undertaken within the scope of established procedures.
	2.7	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.8	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the installation and replacement of energy meters and associated equipment	3.1	Work undertaken is checked/tested 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	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and

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ELEMENT	PERFORMANCE CRITERIA
	appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing and replacing energy meters 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.1.1	Cable protection and support
E2.1.2	Cable types and applications
E2.1.3	Cables in buildings, structures and premises
E2.1.4	Basic cable and conductor terminations
E2.1.5.1	Power cable and conductor terminations
E2.1.6.1	Telecommunication cable and conductor terminations
E2.1.8	Electronic cable and conductor terminations
T2.2.15	Metering Installations
T2.3.1	Powerline safety practices

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be

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EVIDENCE GUIDE

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 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

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

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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 - UET09". 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	Any one of the following:	Induction disk energy meter Electronic energy meters Maximum demand meters Electronic summators

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B	At least one of the following:	Service fuses Service links Meter boards Meter panels
C	At least one of the following:	Time switches Frequency injection relays Controlled output meters Contactors
D	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 installation and replacement of energy meters and associated equipment.

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

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	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

8) 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 the installation and replacement of whole current energy meters and associated equipment, where replacement may include the identification of faults and the return to service.

Installation may include single and polyphase meters and associated equipment.

Replacement may include the removal and return to service of "like for like' energy meters and associated equipment in a variety of environments and contexts.

Associated equipment includes load control devices such as time switches and audio frequency injection relays, plug in meter bases, service fuses and links, contactors and meter boards and panels where the installation uses direct-wired (non-current transformer) metering.

Meters include induction disc energy meters, electronic energy meters, maximum demand meters, electronic summators, time switches and relays, provided that they are basic direct-wired instruments. Current transformer metering is not included.

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
- Assessment

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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"

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2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS21B Install mobile generation set for synchronised Genset LV

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers installation of temporary portable generation sets to LV distribution assets thereby maintaining supply in accordance with requirements, industry regulations, and established procedures. It encompasses the operation, connection and disconnection of a temporary portable generator and includes the estimation of LV load and assessing the appropriateness of the generator for the required outcome.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables
or	UETTDRCJ07B	Install and maintain de-energised HV underground polymeric insulated cables
or	UETTDRIS02B	Maintain electrical equipment (network infrastructure)
or	UETTDRIS14B	Install and maintain overhead conductors and cables (poles and structures)
or	UETTDRTP09B	Install and maintain overhead conductors and cables (towers)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to install mobile generation set for synchronised genset LV	1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analysed, if necessary, by site inspection and the extent of the preparation of the work determined for planning and coordination.
	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 the work are used and actioned to ensure safe systems of work are followed.
	1.4 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.
	1.5 Hazards are identified, OHS risks assessed and

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ELEMENT	PERFORMANCE CRITERIA	
		control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.
	1.6	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7	Resources including personnel, equipment, tools and personnel protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and technical working order.
	1.8	Clients/customers are provided with alternative methods within the scope, acceptable cost and requirements.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
	1.12	Positioning of road signs, barriers and warning devices is planned in accordance with requirements.
2 Carry out the installation of mobile generation set for synchronised genset LV	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
	2.2	First Aid and other related work procedures are performed according to requirements and/or established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Lifting, climbing, working in confined spaces and aloft, rescue procedures and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
	2.4	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.
	2.5	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.6	The installation of mobile generation set for synchronised genset LV is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied in the safe installation of mobile generation set for synchronised genset LV to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.9	On going 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 installation of mobile generation set for synchronised genset LV	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	Accidents and/or injuries are reported in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and

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ELEMENT	PERFORMANCE CRITERIA	
		confirmed 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 work permit(s) are signed off and, synchronised genset LV apparatus is returned to service and advised to client/customer in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing mobile generation set for synchronised genset LV.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.25	Operation principles of a portable generator
T2.2.26	Installation of a mobile generator - LV
T2.2.27	Generator control systems -LV
T2.3.1	Powerline safety practices
T2.4.2	Low voltage switching principles

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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 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 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.

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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 - UET09". 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**

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A	All of the following:	Operation of the generator Connection of the generator Disconnection of the generator
B	All of the following:	The synchronising of generator control systems onto the network without interruption to supply The synchronising of generator control systems off the network without interruption to supply
C	All of the following:	Estimation of LV load of the generator Assessing the appropriateness of the generator
D	All of the following:	Operating a generator in parallel to a single LV job
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 to undertake actual installation of a synchronised generation set.

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.

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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)** There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

8) 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 the installation of temporary portable generation sets to LV distribution assets for maintenacne of supply that is in accord with requirements, industry regulations and established procedures. It includes the operation, connection and disconnection of a temporary portable generator and includes the estimation of LV load and assessing the appropriateness of the generator for the required outcome, and may include the following:

Overhead systems, Indoor systems, Customer Installations, Kiosk Substations, LV genset and control system to LV Distribution assets.

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

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RANGE STATEMENT

- Appropriate work platform
- Assessing risk
- 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

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS22B Implement and monitor the organisational OHS policies, procedures and programs

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the implementation and monitoring of the participative arrangements for the management of the organisational OHS policies procedures, programs and issues, including disseminating information on hazards and risk assessment to meet OHS standards. It also encompasses the collation of work group input, as well as implementation of enterprise procedures for resolving OHS issues.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UEENEEE001B	Apply OHS practices in the workplace
and	UETTDREL04B	Working safely near live electrical apparatus as a non-electrical worker

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements
describe the essential

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outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/Plan to implement and monitor the organisational OHS policies, procedures and programs	1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analysed, if necessary, by site inspection and the extent of the preparation of the work determined for planning and coordination.
	1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4 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.
	1.5 Risk control measures are identified, prioritised, implemented and evaluated against the work schedule.
	1.6 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7 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.
	1.8 Clients/Customers are provided with alternative methods within the scope, acceptable cost and

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ELEMENT	PERFORMANCE CRITERIA	
		requirements.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Site is prepared according to the work schedule and to minimise OHS risk, damage to property, commerce, and individuals in accordance with established procedures.
	1.11	Personnel participating in the work, including contractors, are fully briefed and respective responsibilities authorised and coordinated where applicable in accordance with established procedures.
	1.12	Positioning of road signs, barriers and warning devices is planned in accordance with traffic control management requirements and established procedures.
2 Carry out the implementation and monitoring of the organisational OHS policies, procedures and programs	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are implemented and monitored in accordance with requirements and/or established procedures.
	2.2	First Aid, Pole Top Rescue and other related work procedures are performed according to requirements and/or established procedures.
	2.3	Lifting, climbing, working in confined spaces, working at heights, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
	2.4	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are risk control measures are implemented, preventative action taken and monitored and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures.
	2.5	Remedial actions are taken to overcome any

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ELEMENT	PERFORMANCE CRITERIA	
		shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.6	Implementation and monitoring of the participative arrangements for the systematic management of organisational OHS policy procedures, programs and issues are carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied in the safe implementation and monitoring of the participative arrangements for the management of organisational OHS policy procedures, programs and issues to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.9	On going checks of quality of the work are undertaken in accordance with requirements and established procedures to ensure a quality outcome is achieved for the client/customer and to a community/industry standard.
3 Complete the implementation and monitoring of the organisational OHS policies, procedures and programs	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	Accidents, incidents and/or injuries are reported in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and confirmed 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.

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ELEMENT	PERFORMANCE CRITERIA
	3.5 Relevant work permit(s) are signed off and, the work completed/returned to service and advised to client/customer in accordance with requirements.
	3.6 Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 implementing and monitoring the organisational OHS policies, procedures and 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.5	Powerline installation safety
T2.3.1	Powerline safety practices
T2.3.2	Powerline safety - implementation and monitoring
T2.8.1	Enterprise specific - policies and procedure instructions
T2.8.2	Enterprise specific - OHS instructions
T2.8.3	Enterprise specific - technical drawings and documents

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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 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 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

9.**2**)

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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 - UET09". 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	Relevant OHS Acts Regulations

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		Codes of practice
B	All of the following	Application of organisation management systems and procedures to OHS Organisation's procedure for maintaining OHS records
C	All of the following applications of risk management procedures	Undertake hazard identification Risk assessment and risk control in accordance with the hierarchy of control Application of the characteristics of the workforce impacting on the management of OHS
D	All of the following implementation and monitoring procedures.	Provision of relevant information to the workgroup about OHS and the organisation's OHS policies, procedures and programs. Participative arrangements for the management of OHS. Organisation's procedures for identifying hazards and assessing risks. Organisation's procedures for controlling risks. Organisation's procedures for dealing with hazardous events. Organisation's procedure for providing OHS training.
E	At least one occasion	Dealing with an unplanned event by drawing on essential knowledge and associated 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.
- Access to a range of emergencies and hazardous events (may be gathered through simulations)
- Access to workplace environment.
- Access to document on current OHS Acts, regulations and enterprise OHS policies and procedures.
- Access to personal protective equipment (PPE)

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions

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 may be assessed concurrently with the following units:

UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures

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Range Statement

RANGE STATEMENT

8) 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 the organisational OHS, policies and procedures and may include the following:

In accordance with all relevant OHS legislation, particularly: general duty of care; requirements for 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; health and safety representatives and OHS committees; issue resolution.

Hazardous events include accidents, fire and emergencies such as chemical spills or bomb scares. Procedures for dealing with them include evacuation, chemical containment and first aid procedures.

In accordance with workplace procedures for: risk assessment and management; inspection; housekeeping; participative arrangements , either general or specific to OHS training and assessment; specific hazard policies and procedures; OHS information; OHS record keeping; maintenance of plant and equipment; purchasing of supplies and equipment; and counselling/disciplinary processes.

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
- Assessment
- Authorisation
- Confined space
- Documenting detail work events, record keeping and or storage of information
- Emergency
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Inspect
- Legislation
- MSDS

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RANGE STATEMENT

- Notification.
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS23B Implement and monitor environmental and sustainable energy management policies and procedures

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit specifies the outcomes for the collecting, interpretation and application of environmental management information, identification of environmental impacts and assessment of risks and establishment of best practice procedures for implementation of the management plans to ensure compliance. It also consists of monitoring during the implementing of, environmental and sustainable energy policies and plans and, development of modifications as part of the review process.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDREL01B	Apply environment and sustainable energy procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of

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competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to implement and monitor environmental and sustainable energy 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 and established procedures for the work are 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 including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.5 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.6 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 Clients/Customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements.
	1.8 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities

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ELEMENT	PERFORMANCE CRITERIA	
		coordinated to carry out work.
	1.9	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities authorised and coordinated where applicable in accordance with established procedures.
	1.10	Site is prepared according to the work schedule and to minimise OHS risk, damage to property, commerce, and individuals in accordance with established procedures.
	1.11	Positioning of road signs, barriers and warning devices is planned in accordance with requirements, traffic control management requirements and established procedures.
2 Carry out the implementation and monitoring of environmental and sustainable energy management policies and procedures	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are implemented and monitored and actioned in accordance with requirements and/or established procedures.
	2.2	First Aid, Pole Top Rescue and other related work procedures are performed according to requirements and/or established procedures.
	2.3	Lifting, climbing, working in confined spaces, working at heights, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
	2.4	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are risk control measures are implemented, preventative action taken and monitored and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures.
	2.5	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.6	Implementation and monitoring of environmental

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ELEMENT	PERFORMANCE CRITERIA	
		and sustainable energy management policies and procedures are carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied in the safe implementation and monitoring of environmental and sustainable energy management policies and procedures to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.9	On going 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	Accidents, incidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and confirmed 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 work permit(s) are signed off and the work completed/returned to service and advised to client/customer in accordance with requirements.
	3.6	Works completion records, reports, as installed

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ELEMENT	PERFORMANCE CRITERIA
	/modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 implementing and monitoring environmental and sustainable energy management policies 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.7.1	Environmental fundamentals
T2.7.4	Powerline environmental impact - implementation and monitoring
T2.7.5	Powerline sustainable energy management - implementation and monitoring
T2.8.1	Enterprise specific - policies and procedure instructions
T2.8.2	Enterprise specific - OHS instructions
T2.8.3	Enterprise specific - technical drawings and documents
T2.8.5	Enterprise specific - sustainable energy principles

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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 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 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

9.2)

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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 - UET09". 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:	Gather environmental management information.

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		Implement and monitor environmental and sustainable energy policies and plans. Identify environmental impacts and assess risks. Implement and monitor the procedures for quantifying environmental impacts and controlling risks. Implement and monitor procedures for dealing with environmental incidents. Maintain environmental records, reports and plans.
B	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 implementation and monitoring of environmental and sustainable energy management policies and procedures.

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

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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 may be assessed concurrently with the following units:

UETTDRIS22B	Implement and monitor environmental and sustainable energy management policies and procedures

Range Statement

RANGE STATEMENT

8) 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 environmental and sustainable energy management policies and procedures and may include the following equipment:

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 (eg. land care agreements)

Incidents of environmental impact may include emissions to air; releases to/of water; releases to land; disposal of waste; contamination of land; impact on communities; destruction of habitat; use of energy sources; waste generation processes and technologies; extraction of water; changes to water temperature; changes to water salinity; regulation of water flow; land use; and may involve the implementation of emergency responses

Environmental management documentation may include information on applicable

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RANGE STATEMENT

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.

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
- Assessment
- Authorisation
- 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
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

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Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS24B Install mobile generation set for synchronised genset HV

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers installation of temporary portable generation sets to HV distribution assets thereby maintaining supply in accordance with industry regulations and established procedures. It encompasses the operation, connection and disconnection of a temporary portable generator and includes the estimation of HV load and assessing the appropriateness of the generator for the required outcome and networking of generators.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRIS03B	Perform LV field switching to a given schedule
or	UETTDRIS04B	Perform high voltagefield switching operation to a given schedule
or	UETTDRIS05B	Perform substation switching to a given schedule
or	UETTDRRT10B	Perform rail traction switching to a given schedule
and	UETTDRIS21B	Install Mobile generation set for synchronised genset LV

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to install mobile generation set for synchronised genset HV	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 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.
	1.4 Relevant requirements and established procedures for the work are to all personnel and identified for all work sites.

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ELEMENT	PERFORMANCE CRITERIA	
	1.5	OHS policies and procedures related to the work are identified to ensure safe systems of work are followed.
	1.6	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7	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.
	1.8	Clients/customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
	1.11	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.12	Positioning of road signs, barriers and warning devices is planned and coordinated in accordance with requirements.
2 Carry out the installation of mobile generation set for synchronised genset HV	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
	2.2	First Aid and other related work procedures are performed according to requirements and/or established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
	2.4	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.
	2.5	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.6	Installation of mobile generation set for synchronised genset HV is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied in the safe installation of mobile generation set for synchronised genset HV to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.9	On going 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 installation of mobile generation set for synchronised genset HV	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	Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and

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ELEMENT	PERFORMANCE CRITERIA	
		confirmed 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 work permit(s) are signed off and, synchronised genset HV apparatus is returned to service and advised to client/customer in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing mobile generation set for synchronised genset HV.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.33	Installation of a mobile generator - HV
T2.2.34	Generator control systems - HV
T2.3.1	Powerline safety practices

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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 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 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

9.**2**)

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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 - UET09". 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	Autonomous installation of a mobile generator set for

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	following:	synchronised genset HV incorporating operation, connection and disconnection of the generator Evaluating load characteristics associated with netorking of generators. Synchronisation of the generator control systems onto and off the network without interruption to supply. Estimation of HV load and assessing the appropriateness of the generator Operating a generator in parallel to a single HV job
B	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 installation of mobile generation set for synchronised genset HV

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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

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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**)

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

8) 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 the installation of mobile generation set for synchronised genset HV and may include overhead systems, indoor systems, customer installations, Kiosk Substations, HV genset and control system associated with loads for networking generator sets.

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
- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration
- Documenting detail work events, record keeping and or

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RANGE STATEMENT

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

Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

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Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS25B Contribute to coordinated high voltage live line work

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit specifies the outcomes required of live line working team members to work effectively as a cohesive team to ensure safety of all team members and the community when undertaking high voltage (HV) live line work. It includes the pre-work briefing on tasks to be undertaken, roles of individual team members, identification of possible hazards, risk management analysis and implementation of palliative measures to control or mitigate the risk to acceptable levels. It also encompasses the monitoring of work performance to ensure safety, and the post-work debriefing to identify areas for continuous improvement.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit may require a licence/registration to

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1.2) License to practice

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) **2)**

2.1) Competencies

There are no prerequisite competencies to this unit.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of competency

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan to contribute to a coordinated High Voltage Live Line work team.	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 by the team.
	1.2	Relevant requirements and established procedures for the work are communicated to all team members and identified for all work sites.
	1.3	OHS policies and procedures related to requirements and established procedures for the working on HV live lines are obtained and confirmed for the purposes of the work to be performed and discussed among all team members.
	1.4	Work is prioritised and sequenced following consultation with all team members to ensure safe systems of work are followed for completion within acceptable timeframes and in accordance with established procedures.
	1.5	OHS and live line work hazards are identified, risk assessments conducted and control measures are identified, prioritised, implemented and documented against the work schedule, including the checking of site weather and environmental conditions to ensure that live line work can be undertaken safely.
	1.6	Relevant live line work permits or authority for live line work are secured to coordinate the performance of work by the team according to requirements and/or established procedures.
	1.7	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.

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ELEMENT	PERFORMANCE CRITERIA	
	1.8	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.11	All team members to be engaged in the work discuss and agree, without ambiguity, on their respective roles, and possible role changes during the course of work.
	1.12	Positioning of road signs, barriers and warning devices is planned and coordinated in accordance with requirements.
2 Carry out the contribution to coordinated High Voltage Live Line work.	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures. In particular, established live line working procedures are strictly adhered to.
	2.2	First Aid, Rescue and other related work procedures are performed according to requirements and/or established procedures
	2.3	Lifting, climbing, working aloft, and use of power tools/equipment, techniques and practices, where applicable are safely exercised according to requirements.
	2.4	Live line permits and other provisions for live line work are in place as required, in accordance with the requirements and established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.5	Essential knowledge and associated skills are applied in the safe contribution to coordinated High Voltage Live Line work to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.6	Work is undertaken on HV Live Line in a team environment work according to the work schedule and requirements/established procedures.
	2.7	Work is shared among all team members in a coordinated manner as discussed and agreed during pre-work briefing.
	2.8	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are discussed with team members and reported to the immediate authorised persons for directions according to established procedures.
	2.9	Unplanned events in the maintenance of HV Live Line work are discussed among all team members and appropriate action undertaken accordingly.
	2.10	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.11	On going 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 contribution to coordinated High Voltage Live Line work.	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	Accidents and/or injuries are reported and followed up in accordance with

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ELEMENT	PERFORMANCE CRITERIA	
		requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and confirmed 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 work permit(s) are signed off and, High Voltage Live Line work is returned to service and advised to client/customer in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.
	3.7	Aspects of work schedule are discussed identified via feedback with fellow team members and information on improvement forwarded to appropriate personnel according to established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 contributing to coordinated high voltage live line 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.2	Electrical safe working practice
T2.3.1	Powerline safety practices
T2.3.3	Statutory and safety considerations
T2.5.3	Fundamentals for working safely near live electrical apparatus
T2.8.1	Enterprise Specific - policy and procedures instructions
T2.8.2	Enterprise Specific - OHS Instructions
T2.8.6	Enterprise specific - specialised tools
T2.8.9	Enterprise Specific - team work high voltage live line

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 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

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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 - UET09". 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

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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:	Facilitate communication/consultation process in a HV live line work team environment. Contribute to pre-work briefings and securing of live line permits or authority to work in a HV live line work team environment. Implement OHS policies and procedures in a HV live line work team environment. Contribute to the work schedule in a HV live line work team environment. Contribute to feedback consultation on improving safe working in a HV live line work team environment.

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B	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 HV Live Line work as a team.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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 may be assessed concurrently with the following units:

UETTDRDP04B	Maintain energised high voltage distribution overhead electrical apparatus

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	(glove)
UETTDRRT13B	Maintain energised traction overhead electrical apparatus (glove and barrier)
UETTDRTP14B	Maintain energised lines (transmission) using bare hand technique
UETTDRTP15B	Maintain energised lines (transmission) using bare hand technique on a helicopter platform

Range Statement

RANGE STATEMENT

8) 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 contributing to coordinated high voltage live line work and may include the following:

This is a common unit for all developed live line working techniques such as hot stick, gloves and barrier, or bare hand. Technical details utilising these live line techniques are covered in other respective units of competency for live line work.

HV Live Line work may include the maintenance of energised HV electrical apparatus, conductors and cables.

Work may be undertaken on ladders, insulated elevating work platforms or through the use of a work platform secured to a helicopter.

The emphasis of this unit is to foster and promote effective team work live line work to ensure safety of all team members and the community during the course of work.

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
- Assessment
- Authorisation

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- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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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Competency Field

Competency Field **5)**

Industry Specific Cross-Discipline Units

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UETTDRIS26B Manage an electricity supply industry OHS management system

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

The competency standard is to be applied to establish, maintain and manage systematic approaches to managing OHS in the Electricity Supply Industry. It will be applied in a management context in terms of responsibility to ensure that the workplace is as far as practicable safe and without risk to employees, clients and other present visitors.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

There are no prerequisite competencies to this unit.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan to manage an ESI OHS management	1.1 Purpose of the OHS management system is established after data is analysed and expected outcomes of the work are confirmed with the

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ELEMENT	PERFORMANCE CRITERIA	
system		appropriate personnel.
	1.2	Legislative requirements and established procedures on policies and specifications for the OHS management system are obtained or established with the appropriate personnel.
	1.3	Establish procedures and processes for identifying hazards, assessing and controlling risks as well as dealing with hazardous events.
	1.4	Work roles and tasks are allocated according to requirements and individual's competencies.
	1.5	Work is prioritised and sequenced for the most efficient outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.6	Establish and maintain appropriate participative processes with employees and their representatives in accordance with relevant industry standards consistent with enterprise procedures.
	1.7	Deal with and resolve issues raised through participation and consultation promptly and effectively in accordance with procedures for issues resolution.
	1.8	Provide information to employees about the outcome of participation and consultation in a manner accessible to employees.
2 Manage an ESI OHS management system	2.1	OHS management system(s) decisions are made on the basis of safety and effective outcomes according to requirements and established procedures.
	2.2	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.3	Work teams are arranged to ensure planned goals are met according to established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.4	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.5	Quality of work is monitored against personal performance agreement and established organisational and professional standards.
	2.6	Strategic plans are developed incorporating organisation initiatives as per established procedures.
	2.7	Develop workplace procedures for hazard identification, assessment and control of risks as well as dealing with hazardous events.
	2.8	Manage and maintain OHS procedures and processes as well as dealing with hazardous events according to requirements and established procedures.
	2.9	Address identification of all hazards at the planning, design and evaluation stages of any changes in the workplace to ensure that new hazards are not created by the proposed changes.
	2.10	Develop and maintain procedures for selection and implementation of risk control measures in accordance with the hierarchy of control.
	2.11	Identify inadequacies in existing control measures in accordance with the hierarchy of control and provide promptly resources enabling implementation of new measures.
3 Complete the management of an ESI OHS management system.	3.1	Final inspections of the OHS management systems are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and completion documents are finalised.
	3.3	Reports and completion documents are submitted to relevant personnel for approval and, where

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ELEMENT	PERFORMANCE CRITERIA	
		applicable, statutory or regulatory approval.
	3.4	Approved copies of the OHS management systems documents are issued and records are updated in accordance with established procedures.
	3.5	OHS Training needs are identified and an OHS induction and training program developed to fulfil employee's OHS training needs as a part of the enterprise general training program.
	3.6	Training management system(s) are maintained so that individual employee's OHS training needs are easily identified, training attendance monitored and non attendance followed up.
	3.7	Monitoring systems for keeping OHS records to meet regulatory requirements are maintained according to OHS legislative arrangements including identification of patterns of occupational injury and disease within area of managerial responsibility.
	3.8	OHS system including policies, procedures and programs is assessed according to organisational aims with respect to OHS.
	3.9	Recommendations and improvements to the OHS system are developed, documented and implemented to ensure effectiveness according to established procedures.
	3.10	Compliance with OHS legislative requirements and established procedures is assessed to ensure that legal OHS standards are maintained as a minimum.
	3.11	Appropriate personnel are notified on the outcomes of the evaluation(s) and recommendations and completion documents are finalised/commissioned according to established procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 managing an electrical supply industry OHS management 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.5	Powerline installation safety
T2.3.1	Powerline safety practices
T2.3.2	Powerline safety - implementation and monitoring
T2.8.1	Enterprise specific - policies and procedure instructions
T2.8.2	Enterprise specific - OHS instructions

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)

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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 the "Assessment Guidelines - UET09". 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

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- 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:	Develop OHS policies and procedures. Implement OHS policies and procedures. Maintain OHS policies and procedures. Report on the principles and practices of the management of OHS including, hierarchy of control, risk management and the impact of the characteristics and composition of the workforce.
B	All of the following:	Management of system approach to OHS. Management of the

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		organisation's procedure for maintaining OHS records.
C	All of the following applications of risk management procedures:	Develop and implement organisation's procedures for identifying hazards and assessing risks. Develop and implement organisation's procedures for controlling risks. Develop and implement organisation's procedures for dealing with hazardous events. Analysis and manage risk assessment and risk control in accordance with the hierarchy of control in the workplace. Design and implement appropriate OHS management systems
D	All of the following:	Investigation into OHS training requirements, incidents and accidents with recommendations on action plan. Provide and make readily available relevant information to the workgroup about OHS and the organisation's OHS policies, procedures and programs on an ongoing basis. Develop and conduct two (2) information/training sessions on current OHS issues for the workforce.
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

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		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.
- Appropriate environmental regulation and work practices.
- Appropriate organisational requirements.
- Appropriate work environment, equipment and tools.

Assessment of this competency must also be undertaken in either an actual workplace or under a simulated work environment. Assessment must also integrate the key competencies in section 6.7 of this competency standard

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 may be assessed concurrently with the following units:

BSBMGT507B Manage environmental performance

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Range Statement

RANGE STATEMENT

8) 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 managing a electricity supply industry (ESI) OHS management system to be performed in an ESI work environment.

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
- Assessment
- Authorisation
- Confined space
- Documenting detail work events, record keeping and or storage of information
- 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
- Safe design principles
- Testing procedures

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RANGE STATEMENT

- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS27B Install and maintain overhead distribution network infrastructure

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation and maintenance of poles and/or structures and associated hardware, other than towers, which may consist of wood, steel, concrete or composite type material. It includes installation and maintenance of overhead conductors and cables used on poles and structures (excluding towers) which includes the stringing, tensioning and terminating of the conductor/cable, as well as the cleaning of insulators (de-energised), the securing of the conductor to the insulators or supports and the undertaking of the electrical connections. It also covers maintenance work associated with the diagnosing of faults, the conducting of visual inspections, the confirmation of phasing and the completion of other enterprise tests. It also encompasses the isolation of systems and circuits, the fixing and or securing of hardware associated as well as the repair and or replacement of poles and or structures used in the distribution and or rail traction industry sectors. It encompasses the implementation of a suitable traffic management plan.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit requires 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) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

	UETTDREL02B	Operate plant and equipment near energised and exposed electrical conductors/apparatus
and	UETTDRIS22B	Implement and monitor the organisational OHS policies, procedures and programs
and	UETTDRIS23B	Implement and monitor the environmental and sustainable energy management policies and procedures

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Prerequisite Unit(s) **2)**

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan for the installation and maintenance of overhead network infrastructure	1.1 Works 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 the installation and maintenance of poles and/or

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ELEMENT	PERFORMANCE CRITERIA	
		structures, overhead conductors and cables and associated hardware 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	Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.
	1.7	Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.
	1.8	Relevant personnel at worksite are confirmed current in First Aid, Pole Top Rescue 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 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	Traffic management plan is identified and implemented.
2 Carry out installation and maintenance of	2.1	OHS, sustainable energy and environmental principles and practices to reduce the incidents of

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ELEMENT	PERFORMANCE CRITERIA
overhead network infrastructure	accidents and minimise waste are monitored and followed in accordance with requirements and/or established procedures.
	2.2 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.
	2.3 Lifting, climbing, working aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
	2.4 Confirm systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures.
	2.5 Essential knowledge and associated skills are applied in the safe installation of poles and/or structures, overhead conductors and cables and their associated hardware to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.6 Poles and/or structures and their associated hardware to be installed are stabilised according to requirements.
	2.7 Overhead conductor/cables are strung, tensioned and terminated as per requirements/established procedures.
	2.8 Insulators are cleaned and conductors and anti-vibration devices, spaces/spreaders are secured as per established procedures.
	2.9 Electrical connections are made in accordance with the requirements/established procedures.
	2.10 Installation is carried out, in accordance with the work schedule and requirements/established procedures.
	2.11 Maintenance, including repair and/or replacement of poles and/or structures, and overhead conductors and cables is carried out, in accordance with the

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ELEMENT	PERFORMANCE CRITERIA	
		work schedule and requirements/established procedures.
	2.12	Unplanned events in the installation of poles and/or structures, overhead conductors and cables and associated hardware are undertaken within the scope of established procedures.
	2.13	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.14	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the installation and maintenance of overhead network infrastructure	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 or disposed of in accordance with established procedures.
	3.5	Relevant work permit(s) are signed off and, poles and/or structures, overhead conductors and cables and their associated hardware are returned to service in accordance with requirements.
	3.6	Conductors/cables are tested and commissioned in accordance with enterprise requirements and procedures.
	3.7	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing and maintaining poles/structures and associated hardware.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.8.2.2	Alternating current principles - power
E2.8.6	Electromagnetic principles
T2.1.1.	Engineering applications of mathematical principles
T2.1.2.	Engineering applications of mechanical principles
T2.1.3.	Engineering applications of material properties.
T2.1.4.	Basic rigging techniques
T2.1.9.	Stores procedures
T2.2.1	Generation power systems
T2.2.2	Transmission, distribution and rail power systems
T2.2.3	Substations, power transformers and reactors
T2.2.4	Powerline distribution installation
T2.2.5	Powerline installation safety
T2.2.6	Pole and hardware installation and maintenance
T2.2.7	Low voltage electrical service installation

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REQUIRED SKILLS AND KNOWLEDGE

T2.3.1 Powerline safety practices

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 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

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EVIDENCE GUIDE

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 - UET09". 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

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Group No	The minimum number of items on which skill is to be demonstrated	Item List
A	Install and maintain at least one of the following:	Wood pole/structure Steel pole/structure Concrete pole/structure Composite pole/structure
B	With regards to "A" incorporate at least three of the following:	Insulators Cross arm braces Crossarms Pole steps Shackle straps Earth leads Traction supports Traction registration Bonding
C	With regards to "A" incorporate at least one of the following:	Baulking Stays Concreting including foundation
D	With regards to "A" incorporate at least one of the following:	Crane Auger/erector 'A' frame Lifting beam Pole pikes Helicopter lift
E	Install and maintain at least two of the following overhead	Copper Aluminium Steel LV abc

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	conductors and cables:	Aluminium/steel reinforced HV abc HV iuc Pilot
F	With regards to "E" incorporate at least two of the following:	EWP Portable platform Ladder
G	With regards to "E" incorporate at least three of the following:	Tension equipment* Cable drum stands Cable trailers Ropes Rollers Sheaves Stockings Stringing equipment Swivels Winches (* must do one)
H	With regards to "E" incorporate at least two of the following:	Voltage indicators * Phasing sticks Fault indicators Field intensity meter Operating rods (*must do)
I	With regards to "E" incorporate any one of the following:	Lay-out (stringing method) Pull through (stringing method) Pilot rope (stringing method)
J	With regards to "E" incorporate at any one of	Dynamometer Site board

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	the following:	Beat (wave sagging) Abney level Theodolite
K	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 installation and maintenance of overhead distribution network infrastructure

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

9.5)

There are no concurrent assessment recommendations for this

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other units unit.

Range Statement

RANGE STATEMENT

8) 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 the installation of poles and or structures and overhead conductors and cables used on poles and structures.

Equipment may include:

Pole types and structures may include wood, concrete, steel and composite.

Maintenance of poles and or structures may include the basic inspection, removal, repair and replacement of poles including welding, pole staking and rebutting.

Structures include poles and columns.

Associated hardware includes insulators, crossarms, stays, earth down leads and bond wires, crossarm braces, pole steps, shackle straps and associated bolts and clamps, cantilever assembly, pull off, head span, portal, drop tube

Pole stabilisation techniques include back-fill consolidation, concreting, baulking, reinforcement nailing, approved steel reinforcing and temporary and permanent stay-wires.

Methods of erection may include crane, auger/erector, winch/'A' frame, lifting apparatus and helicopter lift.

Installation and Maintenance of overhead conductors and cables may include the stringing, tensioning, terminating of the conductor/cable and the removal, repair and replacement of cables, conductors and associated hardware and includes the cleaning of insulators. May include pre-energised/energisation checks and tests. Visual inspections, diagnosing maintenance work associated with the fault diagnosis, conducting of visual inspections, confirmation of phasing, and the completion of other enterprise tests is also included. It also encompasses the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits and the updating of system data/maintenance records according to requirements and established procedures.

Types of conductor include copper, aluminium, steel, aluminium conductor steel reinforced (ACSR), low voltage aerial bundled cable (LVABC), high voltage aerial bundled cable (HVABC), insulated unscreened cable (IUC), service cable and fibre optic, pilot and control cables.

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RANGE STATEMENT

Overhead systems include their associated earthing systems, e.g. MEN and CMEN LV systems, bridging/bonding and conventional and SWER HV systems.

Plant may include elevating work platform, winches and capstans, specialist tension stringing equipment, cable trailers and cable drum stands.

Testing and recording equipment (LV) includes voltage detectors, tong ammeters, polarity testers, insulation resistance testers, recording meters and phase sequence indicators.

Testing and recording equipment (HV) includes phasing sticks, fault indicators, radio frequency interference detectors and voltage detectors.

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
- 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

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RANGE STATEMENT

- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Industry Specific Cross-Discipline Units

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UETTDRIS28A Analyse and develop solutions for problems in extra-low voltage, single path circuits

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This Competency Standard Unit covers the analysis and development of solutions for problems in single path circuits operated at extra-low voltage as they apply to various electricity supply industry work functions. It encompasses working safely, problem solving procedures, including the use of voltage, current and resistance measuring devices.

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 6 or higher.

Licensing/Regulatory Information

1.2) **License to practice**

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

There are no prerequisite competencies for this unit.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan to analyse and develop solutions for problems in extra-low voltage single path electrical circuits	1.1 OHS practices/procedures and Environmental and sustainable energy procedures, which may influence the analysis and development of solutions for problems in extra-low voltage single path electrical circuits, are reviewed and determined.
	1.2 Purpose of analysis and development of solutions for problems in extra-low voltage single path electrical circuits is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the analysis and develop solutions for problems in extra-low voltage single path electrical circuits are obtained or established with the appropriate personnel.
	1.4 Testing procedures are discussed with appropriate personnel in order to ascertain the project brief.
	1.5 Testing parameters are established from organisational established procedures on policies and specifications.
	1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7 Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.8 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.9 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.10 Relevant work permits are secured to coordinate the performance of work according to

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ELEMENT	PERFORMANCE CRITERIA	
		requirements and/or established procedures.
2 Carry out analysis and develop solutions for problems in extra-low voltage, single path circuits	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the analysis and development of solutions for problems in extra-low voltage single path electrical circuits in accordance with requirements and/or established procedures.
	2.3	Decisions for the analysis and development of solutions for problems in extra-low voltage single path electrical circuits are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical/engineering models for the analysis and development of solutions for problems in extra-low voltage single path electrical circuits are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of extra - low voltage, single path circuits is undertaken according to requirements and established procedures.
	2.8	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.

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ELEMENT	PERFORMANCE CRITERIA	
	2.9	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete the analysis and development of solutions for problems in extra-low voltage, single path circuits	3.1	Final review of the analysis and implementation of solutions for problems in extra-low voltage, single path circuits are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of required documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 analysing and developing solutions for problems in extra-low voltage, single path circuits.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.8.1.2 Fundamental electrical principles

E2.18.1 Occupational Health and Safety principles

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.2 Electrical safe working practice

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)

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

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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 - UET09". 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 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

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Group No	The minimum number of items on which skill is to be demonstrated	Item List
A	At least two occasions	Determining the operating parameters of an existing circuit.
B	All of the following on at least two occasions	Identifying and locating: Open-circuits Short-circuits
C	At least two occasion	Altering an existing circuit to comply with specified operating parameters.
D	At least two occasions	Developing circuits to comply with a specified function and operating parameters.
E	At least two occasions	Identifying loss of supply.
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 analyse and development of solutions for problems in extra-low voltage, single path circuits.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show

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EVIDENCE GUIDE

	demonstrated competency working in realistic environment and a variety of conditions
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 Transmission, Distribution and Rail/Tram Industry. 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

8) 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 the analysis, develop and implementation of solutions for problems in extra-low voltage, single path circuits and may be demonstrated using the following:

Single source single path circuits as they apply to problems related to installation, fault finding, maintenance or development work functions in any of the following disciplines; Transmission. Distribution and Rail/Tram.

Determining the operating parameters of an existing circuit, identifying and locating open-circuits, identifying and locating short-circuits and identifying loss of supply.

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:

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RANGE STATEMENT

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform
- Assessing risk
- 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
- 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

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	3

Competency Field

Competency Field **5)**

Industry Specific Cross-Discipline Units

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UETTDRIS29A Analyse and develop solutions for problems in multiple path d.c. circuits

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers determining correct operation of single source d.c. parallel and series-parallel circuits and the analysis and development of solutions for problems in multi path d.c. circuits as they apply to various electricity supply industry work functions. It encompasses working safely, problem solving procedures, the use of voltage, current and resistance measuring devices as well as providing solutions to problems in multiple path circuit derived by the use of measurements and calculations

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 6 or higher.

Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit requires a license to practice in the workplace where plant and equipment is directly connected to installation wiring that operates 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 workplace and during training is also subject to regulations directly related to

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRIS28A	Analyse and develop solutions for problems in extra-low voltage, single path circuits

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency

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standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan to analyse and develop solutions for problems in multiple path d.c. circuits	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the analysis and development of solutions for problems in multiple path d.c. circuits, are reviewed and determined.
	1.2 Purpose of the analysis and development of solutions for problems in multiple path d.c. circuits is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the analysis and development of solutions for problems in multiple path d.c. circuits are obtained or established with the appropriate personnel.
	1.4 Testing procedures are discussed with appropriate personnel in order to ascertain the project brief.
	1.5 Testing parameters are established from organisational established procedures on policies and specifications.
	1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7 Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8 Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities

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ELEMENT	PERFORMANCE CRITERIA	
		coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the analysis of and develop solutions for problems in multiple path d.c. circuits	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the analysis and development solutions for problems in multiple path d.c. circuits in accordance with requirements and/or established procedures.
	2.3	Decisions for the analysis and development solutions for problems in multiple path d.c. circuits are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models for the analysis and development of solutions for problems in multiple path d.c. circuits are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.

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ELEMENT	PERFORMANCE CRITERIA	
	2.7	Testing of multiple path d.c. circuits is undertaken according to requirements and established procedures.
	2.8	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.9	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete the analysis of and develop solutions for problems in multiple path d.c. circuits	3.1	Final review of the analysis and implementation of solutions for problems in multiple path d.c. circuits are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of required documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 analysis of and development of solutions for problems in multiple path d.c. circuits.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.8.2.1 Direct current circuit principles

E2.18.1 Occupational Health and Safety principles

E2.18.2 Electrical safe working practice

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)

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

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EVIDENCE GUIDE

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 - UET09". 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 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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EVIDENCE GUIDE

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	At least one occasion	Determining the operating parameters of an existing circuit.
B	At least two occasion	Altering an existing circuit to comply with specified operating parameters.
C	At least two occasion	Developing circuits to comply with a specified function and operating parameters.
D	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 analysis of and development of solutions for problems in multiple path d.c. circuits.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

Method of

9.4)

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EVIDENCE GUIDE

assessment	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 Transmission, Distribution and Rail/Tram Industry. 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

8) 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 analysis and implementation of solutions for problems in multiple path d.c. circuits and may be demonstrated using the following:

Single source parallel and series-parallel d.c. circuits as they apply to problems related to installation, fault finding, maintenance or development work functions in any of the following disciplines; Transmission, Distribution and Rail/Tram.

Determining the operating parameters of an existing circuit, alternating an existing circuit to comply with specified operating parameters and developing circuits to comply with a specified function and operating parameters.

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

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RANGE STATEMENT

- Assessing risk
- 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
- 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

Custom Content Section

2.2) Literacy and numeracy skills

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"

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2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

Industry Specific Cross-Discipline Units

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UETTDRIS30A Analyse and develop solutions for problems in electromagnetic circuits

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers determining correct operation of electromagnetic circuits and analysing, providing solutions to problems as they apply to electrical installations and equipment used in the electricity supply industry. 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 problems in multiple path circuit.

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 6 or higher.

Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit requires a license to practice in the workplace where plant and equipment is directly connected to installation wiring that operates 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 workplace and during training is also subject to regulations directly related to

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

There are no prerequisite competencies for this unit.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the analysis of and develop solutions for, problems in electromagnetic circuits	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the analysis and development of solutions for problems in electromagnetic circuits, are reviewed and determined.
	1.2 Purpose of analysis and development of solutions for problems in electromagnetic circuits is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the analysis and development of solutions for problems in electromagnetic circuits are obtained or established with the appropriate personnel.
	1.4 Testing procedures are discussed with appropriate personnel in order to ascertain the project brief.
	1.5 Testing parameters are established from organisational established procedures on policies and specifications.
	1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7 Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8 Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10 Risk control measures are identified, prioritised and evaluated against the work schedule.

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ELEMENT	PERFORMANCE CRITERIA	
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the analysis of and develop solutions for problems in electromagnetic circuits	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Decisions for the analysis and development of solutions for problems in electromagnetic circuits are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models for the analysis and development of solutions for problems in electromagnetic circuits are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of electromagnetic circuits is undertaken according to requirements and established procedures.
	2.8	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.

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ELEMENT	PERFORMANCE CRITERIA	
	2.9	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete the analysis of and develop solutions for problems in electromagnetic circuits	3.1	Final review of the analysis and developed solutions for problems in electromagnetic circuits are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the project documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 analysis of and development of solutions for problems in electromagnetic circuits

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.8.6	Electromagnetic principles
2.11.1	Hand tools
E2.18.1	Occupational Health and Safety principles

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.2 Electrical safe working practice

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)

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

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EVIDENCE GUIDE

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 - UET09". 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 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

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EVIDENCE GUIDE

Group No	The minimum number of items on which skill is to be demonstrated	Item List
A	On at least two occasions, all of the following:	Determining the operating parameters of an existing electromagnetic circuit. Providing practical uses in electromagnets. Listing control measures that apply to electrical devices and machines operating at low voltage. Correctly and safely using voltage, current and resistance measuring devices and providing solutions derived from measurements and calculations to predictable problems in electromagnetic circuits. Altering an existing electromagnetic circuit to comply with specified operating parameters.
B	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 analysis of and development of

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EVIDENCE GUIDE

	solutions for problems in electromagnetic circuits In addition to the resources listed above in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.
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 Transmission, Distribution and Rail Traction Industry. 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

8) 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 solving problems in electromagnetic circuits and may be demonstrated using the following:

Determining correct operation of electromagnetic circuits and providing solutions as they apply to electrical installations and equipment.

Solving electromagnetic circuit problems, using voltage, current and resistance measuring devices, listing practical application of electromagnets, providing solutions derived from measurements and calculations to predictable problems in electromagnetic circuits, determining the operating parameters of an existing electromagnetic circuit, altering an existing electromagnetic circuit to comply with specified operating

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RANGE STATEMENT

parameters, listing control measures that apply to electrical devices and machines operating at low voltage and developing circuits to comply with a specified function and operating parameters

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
- 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
- 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

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Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

Industry Specific Cross-Discipline Units

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UETTDRIS31A Analyse and develop solutions for problems in single and three phase low voltage circuits

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers ascertaining correct operation of single and three phase 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

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 6 or higher.

Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit require a license to practice in the workplace subject to regulations for undertaking of electrical work. However other conditions may apply in some jurisdictions subject to regulations related to 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

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1.2) License to practice

discrimination and training. Commonwealth, State/Territory or Local Government legislation and regulations may exist that limits the age of operating certain equipment.

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

There are no prerequisite competencies for this unit.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the analysis of and develop solutions for, problems in single and three phase low voltage circuits	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the analysis and development of solutions for problems in single and three phase low voltage circuits, are reviewed and determined.
	1.2 Purpose of the analysis and development of solutions for problems in single and three phase low voltage circuits is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the analysis and development of solutions for problems in single and three phase low voltage circuits are obtained or established with the appropriate personnel.
	1.4 Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5 Testing parameters are established from organisational established procedures on policies and specifications.
	1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7 Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8 Work is prioritised and sequenced for the most efficient/effective outcome, completed within an

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ELEMENT	PERFORMANCE CRITERIA	
		acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the analysis of and develop solutions for problems in single and three phase low voltage circuits	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Decisions for the analysis and development of solutions for problems in single and three phase low voltage circuits are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models of the analysis and development of solutions for problems in single and three phase low voltage circuits are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it

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ELEMENT		PERFORMANCE CRITERIA	
			with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
		2.7	Testing of single and three phase low voltage circuits is undertaken according to requirements and established procedures.
		2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
		2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
		2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
		2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3	Complete the analysis of and develop solutions for problems in single and three phase low voltage circuits	3.1	Final review of the analysis and implementation of developed solutions for problems in single and three phase low voltage circuits is undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
		3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
		3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
		3.4	Approved copies of required documents are issued and records are updated in accordance with established procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 analysis of and development of solutions for problems in single and three phase low voltage circuits.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.8.2.2	Alternating current principles - power
E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice

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)

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

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realistically simulated 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 the "Assessment Guidelines - UET09". 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

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- Demonstrate an understanding of the essential knowledge and associated skills 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	At least two occasion	Determining the operating parameters of existing circuits.
B	At least two occasion	Altering an existing circuit to comply with specified operating parameters.
C	At least two occasion	Developing circuits to comply with a specified function and operating parameters.
D	At least two occasion	Determining the cause of low power factor in an existing circuit.
E	At least two occasion	Determining conditions causing an existing circuit to be unsafe.
F	At least one occasion	Dealing with an unplanned event by drawing on essential

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		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 analysis of and develop solutions for problems in single and three phase low voltage circuits.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions

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 Transmission, Distribution and Rail/Tram Industry. 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.

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Range Statement

RANGE STATEMENT

8) 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 the analyse and development of solutions for problems in single and three phase low voltage circuits and may be demonstrated using the following:

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 (operating parameters include voltage, current, impedance, power and power factor), determining the cause of low power factor in an existing circuit and determining conditions causing an existing circuit to be unsafe (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).

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
- 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
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Inspect
- Legislation
- MSDS
- Notification
- OHS practices

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RANGE STATEMENT

- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

Industry Specific Cross-Discipline Units

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UETTDRIS81A Install telecommunications infrastructure on electricity supply industry assets

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1)**

1.1) Descriptor

This Competency Standard Unit covers the installation of telecommunications infrastructure equipment within the communications corridor, such as cables, cable support, termination enclosures, which are relevant to the transmission of data. It includes the termination/connection of the telecommunication equipment in accordance to enterprise requirements.

Application of the Unit

Application of the Unit **4)**

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

1.2) License to practice

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 telecommunication 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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

and	UETTDREL04B	Working safely near live electrical apparatus as a non-electrical worker
and	UEENEEE001B	Apply OHS practices in the workplace
and	UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
and	UEENEEE005B	Fix and secure equipment

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare for the installation of telecommunications infrastructure equipment	1.1	Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received.
	1.2	Relevant requirements and established procedures for the work are communicated to relevant personnel and identified for the work site.
	1.3	OHS policies and procedures related to requirements and established procedures for the installation of telecommunications infrastructure equipment are obtained and confirmed for the purposes of the work to be performed.
	1.4	Work is prioritised and sequenced following consultation with supervisor 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 according to established procedures.
	1.6	Relevant work permits are received to access and perform work according to requirements and/or established procedures.
	1.7	Resources including 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 with currency in First Aid, Pole Top Rescue and other related work procedures according to requirements.

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ELEMENT		PERFORMANCE CRITERIA	
		1.9	Site is prepared in accordance with established procedures to minimise risk and damage to property, commerce, and individuals.
2	Carry out installation of telecommunications infrastructure equipment	2.1	OHS and sustainable energy principles and practices to reduce waste are monitored and followed in accordance with requirements and/or established procedures.
		2.2	Lifting, climbing, working at heights, and use of power tools/equipment, techniques and practices are safely followed.
		2.3	Essential knowledge and associated skills are applied to the safe installation of telecommunications infrastructure equipment to ensure completion in an agreed timeframe, to quality standards with a minimum of waste according to requirements.
		2.4	Telecommunications infrastructure equipment and associated hardware is positioned, secured and terminated/connected in accordance with requirements and established procedures.
		2.5	Telecommunications infrastructure equipment and associated hardware is maintained in accordance with requirements and established procedures.
		2.6	Unplanned events in the installation of telecommunications infrastructure equipment are resolved and dealt with.
		2.7	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
		2.8	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3	Complete the installation of telecommunications infrastructure	3.1	Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
equipment	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 cleaned, checked and returned to storage in accordance with established procedures.
	3.5	Relevant work permit(s) are signed off.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing telecommunications infrastructure 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

KS01-TIS81A	Telecommunication network installations

Evidence Guide

EVIDENCE GUIDE

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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 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

9.2)

Before the critical aspects of evidence are considered all

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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 - UET09". 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	Any two of the following:	Cable support Support brackets

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		Junction boxes Enclosures
B	Any two of the following:	Ribbon optical fibre cable Single mode optical fibre cable Multi mode optical fibre cable Structured aerial cabling
C	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 installation of telecommunications infrastructure equipment.

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)

There are no concurrent assessment recommendations for this unit.

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Range Statement

RANGE STATEMENT

8) 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 the installation, termination/connection of overhead telecommunications infrastructure cabling and equipment relevant to the national broadband networks for the transmission and distribution of data.

Telecommunications infrastructure equipment and associated hardware may include relevant transmission or distribution cabling networks; cables, splices, lead-in cables, junction boxes, enclosures, cable support, support brackets.

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
- Assessment
- Authorisation
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications
- Emergency
- Environmental and sustainable energy procedures
- Environmental legislation
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Legislation
- MSDS
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work

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RANGE STATEMENT

- Personnel
- Quality assurance systems
- Requirements
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5)**

Industry Specific Cross-Discipline Units

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UETTDRRF01A Apply ESI safety rules, codes of practice and procedures for work on or near electrical apparatus

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor 1)

1.1) Descriptor

This Competency Standard Unit covers the knowledge and application of Electricity Supply Industry (ESI) safety rules and codes of practice for work on or near electrical apparatus it includes the application of relevant State and Territory safety rules, codes of practice and enterprise based procedures and how they apply in the context of transmission, distribution or rail work functions. It encompasses responsibilities for, health, safety and 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

Application of the Unit 4)

This competency standard unit shall be selected as part of an endorsed skill set for the purposes of refresher training and/or to meet regulatory and/or network requirements.

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.

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Application of the Unit

4)

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

1.2) License to practice

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, 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.

ESI employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks.

Pre-Requisites

Prerequisite Unit(s)

2)

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

nil

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Employability Skills Information

Employability Skills 3)

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

6) **Elements**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to apply ESI safety rules, codes of practice and procedures for work on or near electrical apparatus	1.1 Relevant safety rules, codes of practice and procedures are identified and obtained
	1.2 Hazards and risk control measures for specific work functions/areas are identified and obtained.
	1.3 The requirement for access authority/work permits required for work are identified and obtained from appropriate personnel according to established procedures.
	1.4 Safety systems and equipment for work are prepared and placed to minimise and control hazards in accordance with established procedures
2 Carry out application	2.1 Workplace procedures and work instructions for

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ELEMENT	PERFORMANCE CRITERIA	
of ESI safety rules, codes of practice and procedures for work on or near electrical apparatus		controlling risk are followed.
	2.2	Safety rules, codes of practice and workplace procedures for induction to a worksite, are followed.
	2.3	Specific workplace systems and equipment isolation procedures are followed.
	2.4	Restricted workplace areas are identified including ingress and egress procedures.
	2.5	Emergency procedures are identified including assembly areas, communication systems including audible alarms and processes according to established procedures.
3 Complete the application of ESI safety rules, codes of practice and procedures for work on or near electrical apparatus	3.1	Processes for completing work are applied, access authority/work permits where required are completed in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 the application of ESI safety rules, codes of practice and procedures for work on or near electrical apparatus.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

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REQUIRED SKILLS AND KNOWLEDGE

T2.5.5 Powerline clearances and approach distances

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)
	In accordance with the National Refresher Training Recognition Protocol for the Electricity Supply Industry, this unit is identified as a Refresher Training unit and is only available for use by industry to meet industry protocols and regulatory requirements.
	Industry has defined Refresher Training as:
	"A competency confirmation event which may include training, the purpose of which is to compensate for or prevent deterioration in a previously achieved standard of performance"
	Under the protocol and the applicable State or Territory legislative and regulatory requirements, Electricity Supply Industry employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks.
	Industry accepts that opportunities to practice emergency procedures are generally restricted to simulated exercises in a controlled environment during competency confirmation programs.
	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.
	Methods chosen for a particular assessment will be influenced

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

These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments.

An industry endorsed Learning Assessment Plan has been developed to support this unit.

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 at each competency confirmation event.

In accordance with State and Territory regulations and the "Assessment Guidelines - UET09". Evidence shall also comprise:

A performance demonstrated within the timeframes typically expected of the procedure. In particular the assessment of this unit shall confirm that 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
- 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

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EVIDENCE GUIDE

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, to the satisfaction of the network operator's assessor	Application of SAD's to • Personnel • Vehicles • Insulated mobile plant • Non insulated mobile plant
B	All, to the satisfaction of the network operator's assessor	Hazard Identification Risk assessment&control Consultation&Communications Personal Protective Equipment Use of Safety observers Work within electric and magnetic fields
C	All, to the satisfaction of the network operator's assessor	Access Authority/Permits to work

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to safely undertake actual application of ESI safety rules, codes of practice and procedures for work on or near electrical apparatus in the workplace.

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EVIDENCE GUIDE

	In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.
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

8) 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 the application of ESI safety rules, codes of practice and procedures for work on or near electrical apparatus and may include the following:

Applying work procedures and instructions as they apply to risk control and personal safety measures.

Participation in consultation processes, identifying hazards and implementing and monitoring control measures at the work site.

Application of minimum approach distances for personnel, vehicles and insulated/non

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RANGE STATEMENT

insulated mobile plant.

Application of access procedures and or permit systems. (access authority/access permit/work permit)

Laying out and delineating a work area within a high risk work environment.

Application of control measures for spurious currents and voltages in inductive environments.

Work within electric and magnetic fields

It may also include the application of control measures to create equipotential work areas,

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
- Assessing risk
- Assessment
- Authorisation
- Confined space
- Emergency
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Inspect
- Legislation
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field	5)
	Refresher Training Unit.

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UETTDRRF02A Perform pole top rescue

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor 1)

1.1) Descriptor

This Competency Standard Unit covers the performance of pole top rescue procedures as an emergency procedure required in the work place. It specifies the mandatory requirements of rescue from a pole top and how they apply in the context of transmission, distribution and rail work functions. It encompasses responsibilities for rescue, health, safety and 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

Application of the Unit 4)

This competency standard unit shall be selected as part of an endorsed skill set for the purposes of refresher training and/or to meet regulatory and/or network requirements.

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,

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Application of the Unit 4)

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

1.2) License to practice

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, , 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.

ESI employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks.

Pre-Requisites

Prerequisite Unit(s) 2)

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

nil

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Employability Skills Information

Employability Skills 3)

This unit contains employability skills

Elements and Performance Criteria Pre-Content

6) **Elements**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare to perform pole top rescue	1.1	Instruction in hazards and risk control measures for specific work functions and work areas are identified and obtained. (this will include the risk assessment and control measures taken by the individual performing the rescue)
		1.2	Tools and equipment needed for rescue are checked for inspection date, safety, and functionality and placed in an accessible location.
2	Carry out pole top rescue.	2.1	Workplace procedures and work instructions for controlling risk are followed.
		2.2	Workplace procedures for accessing the pole top, removing the victim from contact with live apparatus and lowering the victim to the ground are followed.
		2.3	Workplace procedures for applying first aid at the site and treatment by a medical professional are followed.
		2.4	The worksite is secured and entry controlled until appropriate authorities inspect and release the site.

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ELEMENT	PERFORMANCE CRITERIA
3 Complete the pole top rescue procedure	3.1 Processes for reporting accidents and/or incidents to authorised personnel are confirmed in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 pole top rescue equipment 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.5.5 Powerline clearances and approach distances

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) In accordance with the National Refresher Training Recognition Protocol for the Electricity Supply Industry, this unit is identified as a Refresher Training unit and is only available for use by industry to meet industry protocols and regulatory requirements.

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EVIDENCE GUIDE

Industry has defined Refresher Training as:

"A competency confirmation event which may include training, the purpose of which is to compensate for or prevent deterioration in a previously achieved standard of performance"

Under the protocol and the applicable State or Territory legislative and regulatory requirements, Electricity Supply Industry employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks.

Industry accepts that opportunities to practice emergency procedures are generally restricted to simulated exercises in a controlled environment during competency confirmation programs.

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.

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

These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments.

An industry endorsed Learning Assessment Plan has been developed to support this unit.

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 at each competency confirmation event.

In accordance with State and Territory regulations and the "Assessment Guidelines - UET09". Evidence shall also comprise:

- A performance demonstrated within the timeframes typically expected of the rescue procedure. In particular the

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EVIDENCE GUIDE

assessment of this unit shall confirm that 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
- 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.
- 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, to the satisfaction of the network operator's assessor:	Inspection and placement of rescue equipment
B	All, to the satisfaction of the network operator's assessor	Perform pole top rescue

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to organisational rescue practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to safely undertake actual performance of pole top rescue procedures in the workplace.

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EVIDENCE GUIDE

	In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in a realistic environment and a variety of conditions.
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

8) 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 performing pole top rescue procedures in the workplace and will include the following:

Applying rescue procedures as applicable to poles which may include; wood, spun concrete, steel/concrete, steel, and composites with cross arms which may include; wood, steel, and composites.

Inspection and placement of rescue equipment to facilitate a prompt response and rescue from an incident at the pole top.

Applying work procedures and instructions to risk control and personal safety

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RANGE STATEMENT

measures.

Accessing the pole top and placing, securing and attaching the rescue equipment/lowering device to the victim in accordance with workplace procedures.

Removing the victim from contact with any live conductors/apparatus and performing first aid at the pole top in accordance with workplace procedures.

Lowering the victim to the ground and performing first aid in accordance with workplace procedures.

Facilitating treatment by medical professionals when and where required

Participation in consultation processes, identifying hazards and implementing and monitoring control measures at the work site.

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
- Assessing risk
- Assessment
- Authorisation
- Emergency
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Inspect
- Legislation
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Requirements
- Rescue Equipment Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field	5) Refresher Training Unit.

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UETTDRRF03A Perform EWP rescue

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor 1)

1.1) Descriptor

This Competency Standard Unit covers the performance of rescue procedures from an Elevating Work Platform (EWP) in the work place. It specifies the mandatory requirements of rescue from a raised EWP by a work party member on the ground and how they apply in the context of transmission, distribution or rail work functions. It encompasses responsibilities for, health, safety and 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

Application of the Unit 4)

This competency standard unit shall be selected as part of an endorsed skill set for the purposes of refresher training and/or to meet regulatory and/or network requirements.

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

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Application of the Unit 4)

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

1.2) License to practice

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, 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.

ESI employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks.

Pre-Requisites

Prerequisite Unit(s) 2)

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

HLTCPR201A - Perform CPR

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Employability Skills Information

Employability Skills 3)

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

6) **Elements**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare to perform EWP rescue procedures	1.1	Instruction in hazards and risk control measures for specific work areas and work activities are identified and obtained.
		1.2	Systems for emergency rescue are checked for operation according to mobile plant instructions and established procedures.
		1.3	Tools and equipment needed for rescue are identified checked for safety, functionality and accessibility according to established procedures.
2	Carry out EWP rescue procedure.	2.1	Workplace procedures and work instructions for controlling risk are followed accurately.
		2.2	Workplace procedures for removing the victim, where necessary, from contact with or in vicinity of live apparatus and lowering the EWP to the ground are followed accurately
		2.3	Workplace procedures for removing the victim from the EWP and applying CPR at the site where applicable are followed completely.

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ELEMENT	PERFORMANCE CRITERIA	
	2.4	Workplace procedures to access treatment by medical professionals are followed accurately.
	2.5	Hazards are controlled and monitored through active participation in consultation with employer and other employees.
	2.6	The worksite is secured and entry controlled until appropriate authorities inspect and release the site.
3 Complete the EWP rescue procedure	3.1	Processes for reporting accidents and/or incidents to authorised personnel are confirmed in accordance with established procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 EWP rescue procedure.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.5.5 Powerline clearances and approach distances

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 component parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	9.1) Overview: In accordance with the National Refresher Training Recognition Protocol for the Electricity Supply Industry, this unit is identified as a Refresher Training unit and is only available for use by industry to meet industry protocols and regulatory requirements. Industry has defined Refresher Training as: "A competency confirmation event which may include training, the purpose of which is to compensate for or prevent deterioration in a previously achieved standard of performance" Under the protocol and the applicable State or Territory legislative and regulatory requirements, Electricity Supply Industry employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks. Industry accepts that opportunities to practice emergency procedures are generally restricted to simulated exercises in a controlled environment during competency confirmation programs. 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. Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. An industry endorsed Learning Assessment Plan has been developed to support this unit.
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 at each competency confirmation event.

In accordance with State and Territory regulations and the "Assessment Guidelines - UET09". Evidence shall also comprise:

- Performance demonstrated within the timeframes typically expected of the rescue procedure. In particular the assessment of this unit shall confirm that 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
- 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, to the satisfaction of the network operator's	Applying work procedures and instructions to manage and control personal risk and safety.

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EVIDENCE GUIDE

	assessor	
B	All, to the satisfaction of the network operator's assessor	Identification of operational instructions and confirmation of the function of emergency equipment to facilitate rescue from an incident in an EWP
C	All, to the satisfaction of the network operator's assessor	Accessing controls and lowering the EWP in accordance with mobile equipment instructions/workplace procedures.
D	All, to the satisfaction of the network operator's assessor	Removing the victim from the EWP to the ground and performing CPR in accordance with workplace procedures
E	All, to the satisfaction of the network operator's assessor	Participation in consultation processes, identifying hazards and implementing and monitoring control measures at the work site

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to safely undertake actual performance of EWP rescue procedures in the workplace.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

Method of assessment

9.4)

This Competency Standard Unit shall be assessed by methods given in Volume 1, Part 3 "Assessment Guidelines".

Note:

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EVIDENCE GUIDE

	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

8) 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 EWP rescue procedures in the workplace and will include the following:

Applying work procedures and instructions as they apply to risk control and personal safety measures.

Inspection and function of emergency equipment to facilitate a prompt response and rescue from a raised EWP.

Accessing emergency lowering device in accordance with mobile equipment instructions/workplace procedures.

Removing the victim from contact with or in vicinity of live apparatus in accordance with workplace procedures.

Operation of emergency lowering device in accordance with mobile equipment instructions/workplace procedures.

Lowering the victim to the ground and performing CPR in accordance with workplace procedures.

Participation in consultation processes, identifying hazards and implementing and monitoring control measures at the work site.

The following constants and variables included in the element/Performance Criteria in

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RANGE STATEMENT

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
- Assessing risk
- Assessment
- Authorisation
- Emergency
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Inspect
- Legislation
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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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Competency Field

Competency Field 5)

Refresher Training Unit.

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UETTDRRF04A Perform tower rescue

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor 1)

1.1) Descriptor

This Competency Standard Unit covers the performance of rescue procedures from a tower in the work place. It specifies the mandatory requirements of rescue from a tower and how they apply in the context of transmission, distribution or rail work functions. It encompasses responsibilities for, health, safety and 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

Application of the Unit 4)

This competency standard unit

shall only be selected as part of an endorsed skill set for the purposes of refresher training and/or regulatory and/or network requirements.

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

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Application of the Unit 4)

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

1.2) License to practice

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, , 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.

ESI employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks.

Pre-Requisites

Prerequisite Unit(s) 2)

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

nil

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Employability Skills Information

Employability Skills 3)

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

6) **Elements**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare to perform tower rescue	1.1	Instruction in hazards and risk control measures for specific work areas and work activities are identified and obtained.
		1.2	Preparations are carried out and systems and equipment placed to prevent and control hazards according to established procedures.
		1.3	Tools and emergency equipment are checked for safety, functionality and placed in an accessible location to facilitate response and rescue according to established procedures.
2	Carry out tower rescue	2.1	Workplace procedures and work instructions for controlling risk are followed.
		2.2	Workplace procedures for accessing the tower, removing the victim, where necessary, from contact with live apparatus and attaching the emergency lowering equipment are followed.
		2.3	Workplace procedures for lowering the victim to the ground and applying first aid at the site are followed.

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ELEMENT		PERFORMANCE CRITERIA	
		2.4	Workplace procedures for gaining access to medical professional for further treatment as required are followed.
		2.5	The worksite is secured and entry controlled until appropriate authorities inspect and release the site.
3	Complete the performance of the tower rescue procedure	3.1	Processes for reporting to accidents and/or incidents to authorised personnel are confirmed in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 with regard to the performance of tower rescue procedure.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.3.1 Powerline safety practices

T2.5.5 Powerline Clearances and approach distances

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 component parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	9.1) In accordance with the National Refresher Training Recognition Protocol for the Electricity Supply Industry, this unit is identified as a Refresher Training unit and is only available for use by industry to meet industry protocols and regulatory requirements. Industry has defined Refresher Training as: "A competency confirmation event which may include training, the purpose of which is to compensate for or prevent deterioration in a previously achieved standard of performance" Under the protocol and the applicable State or Territory legislative and regulatory requirements, Electricity Supply Industry employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks. Industry accepts that opportunities to practice emergency procedures are generally restricted to simulated exercises in a controlled environment during competency confirmation programs. 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. Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. An industry endorsed Learning Assessment Plan has been developed to support this unit.
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 at each competency confirmation event.

In accordance with State and Territory regulations and the "Assessment Guidelines - UET09". Evidence shall also comprise:

- A performance demonstrated within the timeframes typically expected of the rescue procedure. In particular the assessment of this unit shall confirm that 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
- 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, to the satisfaction of the network operator's assessor	Participation in consultation processes, identifying hazards and implementing and monitoring control measures at the work site

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EVIDENCE GUIDE

B	All, to the satisfaction of the network operator's assessor	Inspection and placement of rescue equipment to facilitate prompt response and rescue from an incident in a tower
C	All, to the satisfaction of the network operator's assessor	Applying work procedures and instructions for personal risk control and safety
D	All, to the satisfaction of the network operator's assessor	Accessing the tower and placing, securing and attaching the emergency lowering equipment
E	All, to the satisfaction of the network operator's assessor	Removing the victim from contact with any live conductors/apparatus and performing first aid in the tower in accordance with workplace procedures
F	All, to the satisfaction of the network operator's assessor	Attaching the emergency lowering equipment to the victim, lowering the victim to the ground and performing first aid in accordance with workplace 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 safely undertake actual performance of tower rescue procedures in the workplace.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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EVIDENCE GUIDE

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

8) 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 performing tower rescue procedures in the workplace and will include the following:

Inspection and placement of rescue equipment to facilitate a prompt response and rescue from an incident at the workplace.

Applying work procedures and instructions as they apply to risk control and personal safety measures.

Accessing the tower and placing, securing and attaching the lowering device to the victim in accordance with workplace procedures.

Removing the victim from contact with any live conductors/apparatus and performing first aid at the tower in accordance with workplace procedures.

Lowering the victim to the ground and performing first aid in accordance with workplace procedures.

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RANGE STATEMENT

Participation in consultation processes, identifying hazards and implementing and monitoring control measures at the work site.

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
- Assessing risk
- Assessment
- Authorisation
- Emergency
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Inspect
- Legislation
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2 Literacy and numeracy skills

2.2 Literacy and numeracy skills

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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Competency Field

Competency Field 5)

Refresher Training Unit

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UETTDRRF05A Perform rescue from switchyard structures at heights

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor 1)

1.1) Descriptor

This Competency Standard Unit covers the performance of rescue procedures from switchyard structures at heights in the work place. It specifies the mandatory requirements of rescue from switchyard structures and how they apply in the context of transmission, distribution or rail work functions. It encompasses responsibilities for health, safety and 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

Application of the Unit 4)

This competency standard unit shall be selected as part of an endorsed skill set for the purposes of refresher training and/or to meet regulatory and/or network requirements.

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:

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Application of the Unit 4)

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

1.2) License to practice

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, , 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.

ESI employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks.

Pre-Requisites

Prerequisite Unit(s) 2)

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

nil

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Employability Skills Information

Employability Skills 3)

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to perform rescue from switchyard structures at heights	1.1 Instruction in hazards and risk control measures for specific work areas and work activities are identified and obtained.
	1.2 Systems and emergency rescue equipment are identified and placed to minimise and control hazards according to established procedures.
	1.3 Tools and emergency equipment needed for a rescue are checked for safety, functionality and placed according to established procedures.
2 Carry out rescue from switchyard structures at heights	2.1 Workplace procedures and work instructions for controlling risk are followed.
	2.2 Workplace procedures for accessing the switchyard structure, removing the victim where necessary, from contact with live apparatus are followed.
	2.3 Workplace procedures for attaching the emergency lowering equipment and lowering the victim to the ground are followed.
	2.4 Workplace procedures for applying first aid at

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ELEMENT	PERFORMANCE CRITERIA	
		the site and gaining access to treatment by a medical professional if necessary are followed.
	2.5	The worksite is secured and entry controlled until appropriate authorities inspect and release the site.
3 Complete rescue procedures from switchyard structures at heights	3.1	Processes for reporting accidents and/or incidents to authorised personnel are confirmed in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 procedures required to perform rescue at heights from switchyard structures.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.5.5 Powerline clearances and approach distances

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.

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EVIDENCE GUIDE

Overview of Assessment	9.1) In accordance with the National Refresher Training Recognition Protocol for the Electricity Supply Industry, this unit is identified as a Refresher Training unit and is only available for use by industry to meet industry protocols and regulatory requirements. Industry has defined Refresher Training as: "A competency confirmation event which may include training, the purpose of which is to compensate for or prevent deterioration in a previously achieved standard of performance" Under the protocol and the applicable State or Territory legislative and regulatory requirements, Electricity Supply Industry employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks. Industry accepts that opportunities to practice emergency procedures are generally restricted to simulated exercises in a controlled environment during competency confirmation programs. 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. Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. An industry endorsed Learning Assessment Plan has been developed to support this unit.
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 at each competency

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confirmation event.

In accordance with State and Territory regulations and the "Assessment Guidelines - UET09". Evidence shall also comprise:

- A performance demonstrated within the timeframes typically expected of the rescue procedure. In particular the assessment of this units shall confirm that 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
- 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, to the satisfaction of the network operator's assessor	Participation in consultation processes, identifying hazards and implementing and monitoring control measures at the work site.

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B	All, to the satisfaction of the network operator's assessor	Applying work procedures and instructions as they apply to personal risk control and safety
C	All, to the satisfaction of the network operator's assessor	Inspection and placement of emergency rescue equipment to facilitate rescue from an accident/incident on a switchyard structure
D	All, to the satisfaction of the network operator's assessor	Accessing the switchyard structure, attaching and securing the emergency rescue equipment in accordance with workplace procedures
E	All, to the satisfaction of the network operator's assessor	Removing the victim from contact with any live conductors/apparatus, attaching the emergency rescue equipment and, where appropriate performing first aid in the switchyard structure in accordance with workplace procedures
F	All, to the satisfaction of the network operator's assessor	Lowering the victim to the ground and performing first aid in accordance with workplace procedures
G	All, to the satisfaction of the network operator's assessor	Initiating additional assistance and treatment by medical professional in accordance with workplace 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.

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EVIDENCE GUIDE

- Suitable work environment, facilities, equipment and materials to safely undertake actual performance of rescue procedures at heights from switchyard structures in the workplace.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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

8) 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 performing rescue procedure at heights from switchyard structures in the workplace and will include the following:

Inspection and placement of rescue equipment to facilitate a prompt response and rescue from an incident from switchyard structures.

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RANGE STATEMENT

Applying work procedures and instructions as they apply to risk control and personal safety measures.

Accessing switchyard structures and placing, securing and attaching the lowering device to the victim in accordance with workplace procedures.

Removing the victim from contact with any live conductors/apparatus and performing first aid at the switchyard structure in accordance with workplace procedures.

Lowering the victim to the ground and performing first aid in accordance with workplace procedures.

Initiating additional assistance and treatment by medical professional in accordance with workplace procedures.

Participation in consultation processes, identifying hazards and implementing and monitoring control measures at the work site.

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
- Assessing risk
- Assessment
- Authorisation
- Emergency
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Inspect
- Legislation
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Requirements
- Testing procedures
- Work clearance systems

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Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field	5)
	Refresher Training Unit

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UETTDRRF06A Perform rescue from a live LV panel

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor 1)

1.1) Descriptor

This Competency Standard Unit covers the performance of rescue procedures from live LV apparatus, not including overhead lines and underground cables in the work place. It specifies the mandatory requirements of rescue from a live LV panel and how they apply in the context of transmission, distribution or rail work functions. It encompasses responsibilities for, health, safety and 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

Application of the Unit 4)

This competency standard unit shall be selected as part of an endorsed skill set for the purposes of refresher training and/or to meet regulatory and/or network requirements.

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

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Application of the Unit 4)

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

1.2) License to practice

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, 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.

ESI employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks.

Pre-Requisites

Prerequisite Unit(s) 2)

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

HLTCPR201A - Perform CPR

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Employability Skills Information

Employability Skills 3)

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

6) **Elements**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare to perform rescue procedures from live LV panel	1.1	Instruction in hazards and risk control measures for specific work functions and work areas are identified and obtained.
		1.2	Electricity isolation point is identified and labelled where appropriate.
		1.3	Tools and equipment needed for a rescue are checked for safety, functionality and placed in an accessible location according to established procedures.
2	Carry out rescue from live LV panel	2.1	Workplace procedures and work instructions for controlling risk are followed.
		2.2	Workplace procedures for accessing and isolating the LV panel are followed.
		2.3	Workplace procedures for removing the victim, where necessary, from contact with live apparatus are followed.
		2.4	Workplace procedures for applying CPR at the worksite and where required, treatment by

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ELEMENT		PERFORMANCE CRITERIA	
			medical professionals are followed.
		2.5	Hazards are controlled and monitored through active participation in consultation with employer and other employees.
		2.6	The worksite is secured and entry controlled until appropriate authorities inspect and release the site.
3	Complete the LV panel rescue procedure	3.1	Processes for reporting accidents and/or incidents to authorised personnel are confirmed in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 rescue from LV panel 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.5.5 Powerline clearances and approach distances

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

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EVIDENCE GUIDE

accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	9.1) In accordance with the National Refresher Training Recognition Protocol for the Electricity Supply Industry, this unit is identified as a Refresher Training unit and is only available for use by industry to meet industry protocols and regulatory requirements. Industry has defined Refresher Training as: "A competency confirmation event which may include training, the purpose of which is to compensate for or prevent deterioration in a previously achieved standard of performance" Under the protocol and the applicable State or Territory legislative and regulatory requirements, Electricity Supply Industry employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks. Industry accepts that opportunities to practice emergency procedures are generally restricted to simulated exercises in a controlled environment during competency confirmation programs. 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. Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. An industry endorsed Learning Assessment Plan has been developed to support this unit.
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

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Criteria shall be demonstrated at each competency confirmation event.

In accordance with State and Territory regulations and the "Assessment Guidelines - UET09". Evidence shall also comprise:

- A performance demonstrated within the timeframes typically expected of the rescue procedure. In particular the assessment of this unit shall confirm that 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
- 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, to the satisfaction of the network operator's assessor:	Participation in consultation processes, identifying hazards and implementing and monitoring control measures at the work site
B	All, to the	Inspection and placement of

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	satisfaction of the network operator's assessor	rescue equipment to facilitate a prompt response and rescue from an accident/incident in a live LV panel
C	All, to the satisfaction of the network operator's assessor	Identification and labelling of the isolation point
D	All, to the satisfaction of the network operator's assessor	Applying work procedures and instructions as they apply to risk control and personal safety measures
E	All, to the satisfaction of the network operator's assessor	Removing the victim from contact with live conductors/apparatus in accordance with workplace procedures
F	All, to the satisfaction of the network operator's assessor	Perform CPR in accordance with workplace procedures.
G	All, to the satisfaction of the network operator's assessor	Demonstrating knowledge of the process to access treatment from medical professionals in accordance with workplace 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 safely undertake performance of LV panel rescue procedures in the workplace.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show

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EVIDENCE GUIDE

	demonstrated competency working in a realistic environment and a variety of conditions.
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

8) 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 performing rescue procedures from live LV panel in the workplace and will include the following:

Inspection and placement of rescue equipment to facilitate a prompt response and rescue of a victim from an incident in a live LV panel.

Identification and labelling of the isolation point

Applying work procedures and instructions as they apply to risk control and personal safety measures.

Isolating the electricity supply by utilizing the appropriate apparatus

Removing the victim from contact with live conductors/apparatus and perform CPR

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RANGE STATEMENT

Participation in consultation processes, identifying hazards and implementing and monitoring control measures at the work site.

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
- Assessing risk
- Assessment
- Authorisation
- Confined space
- Emergency
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Inspect
- Legislation
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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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Competency Field

Competency Field 5)

Refresher Training Unit.

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UETTDRRF07A Perform cable pit/trench/excavation rescue

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor 1)

1.1) Descriptor

This Competency Standard Unit covers the performance of cable pit/trench/excavation rescue procedures as they apply to live LV cable jointing in the work place. It specifies the mandatory requirements of rescue from a cable pit/trench/excavation and how they apply in the context of transmission, distribution or rail work functions. It encompasses responsibilities for health, safety and 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

Application of the Unit 4)

This competency standard unit shall be selected as part of an endorsed skill set for the purposes of refresher training and/or to meet regulatory and/or network requirements.

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

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Application of the Unit 4)

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

1.2) License to practice

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, , 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.

ESI employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks.

Pre-Requisites

Prerequisite Unit(s) 2)

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

HLTCPR201A - Perform CPR

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Employability Skills Information

Employability Skills 3)

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

6) **Elements**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare to perform cable pit/trench/excavation rescue	1.1	Instruction in hazards and risk control measures for specific work functions and work areas are identified and obtained.
		1.2	Preparations for pit/trench/excavation rescue are carried out and systems and equipment placed according to established procedures.
		1.3	Tools and emergency equipment needed for a rescue are checked for safety, functionality and accessible according to established procedures.
2	Carry out cable pit/trench/excavation rescue	2.1	Workplace procedures and work instructions for controlling risk are followed.
		2.2	Workplace procedures for accessing the cable pit/trench/excavation, removing the victim, where necessary, from contact with live apparatus are followed.
		2.3	Workplace procedures for carrying out CPR at the site and treatment where necessary by medical professionals are followed.

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ELEMENT		PERFORMANCE CRITERIA	
		2.4	Hazards are controlled and monitored through active participation in consultation with employer and other employees.
		2.5	The worksite is secured and entry controlled until appropriate authorities release the site.
3	Complete the cable pit/trench/excavation rescue procedures	3.1	Processes for reporting accidents and/or incidents to authorised personnel are confirmed in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 cable pit/trench/excavation rescue 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.3.1 Powerline safety practices

T2.5.5 Powerline clearances and approach distances

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

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accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	9.1) In accordance with the National Refresher Training Recognition Protocol for the Electricity Supply Industry, this unit is identified as a Refresher Training unit and is only available for use by industry to meet industry protocols and regulatory requirements. Industry has defined Refresher Training as: "A competency confirmation event which may include training, the purpose of which is to compensate for or prevent deterioration in a previously achieved standard of performance" Under the protocol and the applicable State or Territory legislative and regulatory requirements, Electricity Supply Industry employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks. Industry accepts that opportunities to practice emergency procedures are generally restricted to simulated exercises in a controlled environment during competency confirmation programs. 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. Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. An industry endorsed Learning Assessment Plan has been developed to support this unit. 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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competency in this unit

- Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated at each competency confirmation event.

In accordance with State and Territory regulations and the "Assessment Guidelines - UET09". Evidence shall also comprise:

- A performance demonstrated within the timeframes typically expected of the rescue procedure. In particular the assessment of this unit shall confirm that 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
- 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, to the satisfaction of the network operator's	Participation in consultation processes, identifying hazards and implementing and monitoring control measures

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	assessor:	at the work site
B	All, to the satisfaction of the network operator's assessor	Applying work procedures and instructions as they apply to personal risk control and safety
C	All, to the satisfaction of the network operator's assessor	Inspection and placement of rescue equipment to facilitate a prompt response and rescue from an accident/incident in a cable pit/trench/excavation
D	All, to the satisfaction of the network operator's assessor	Accessing the cable pit/trench/excavation in accordance with workplace procedures
E	All, to the satisfaction of the network operator's assessor	Removing the victim from contact with any live conductors/apparatus and removing the victim from the pit/trench/excavation in accordance with workplace procedures
F	All, to the satisfaction of the network operator's assessor	Performing CPR in accordance with workplace 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 safely undertake performance of cable pit/trench/excavation rescue procedures in the workplace.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in a realistic environment

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	and a variety of conditions.
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

8) 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 performing cable pit/trench/excavation rescue procedures in the workplace and will include the following:

Inspection and placement of rescue equipment to facilitate a prompt response and rescue from an incident at the cable pit/trench/excavation.

Applying work procedures and instructions as they apply to risk control and personal safety measures.

Accessing the cable pit/trench/excavation in accordance with workplace procedures.

Removing the victim from contact with any live conductors/apparatus and performing first aid in the cable pit/trench/excavation in accordance with workplace procedures.

Removing the victim from the cable pit/trench/excavation and performing CPR in

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RANGE STATEMENT

accordance with workplace procedures.

Participation in consultation processes, identifying hazards and implementing and monitoring control measures at the work site.

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
- Assessing risk
- Assessment
- Authorisation
- Confined space
- Emergency
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Inspect
- Legislation
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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"

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2.2) Literacy and numeracy skills

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

Competency Field

Competency Field 5)

Refresher Training Unit..

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UETTDRRF08A Perform EWP controlled descent escape

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor 1)

1.1) Descriptor

This Competency Standard Unit covers the performance of Elevating Work Platform (EWP) controlled descent escape procedures in the work place. It specifies the mandatory requirements for self rescue from a raised EWP and how they apply in the context of transmission, distribution or rail work functions. It encompasses responsibilities for, health, safety and 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

Application of the Unit 4)

This competency standard unit shall be selected as part of an endorsed skill set for the purposes of refresher training and/or to meet regulatory and/or network requirements.

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,

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Application of the Unit 4)

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

1.2) License to practice

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, 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.

ESI employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks.

Pre-Requisites

Prerequisite Unit(s) 2)

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

nil

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Employability Skills Information

Employability Skills 3)

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

6) **Elements**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare to perform EWP controlled descent escape	1.1	Instruction in hazards and risk control measures for specific work areas and work activities are identified and obtained.
		1.2	Preparations for work are carried out and emergency systems and equipment are identified according to established procedures.
		1.3	Tools and emergency descent equipment is checked for safety, function and placed to ensure accessibility according to established procedures.
2	Carry out EWP controlled descent escape	2.1	Workplace procedures and work instructions for controlling risk are followed accurately.
		2.2	Workplace procedures for evacuating a EWP bucket employing emergency descent equipment are followed accurately.
		2.3	Hazards are controlled and monitored through active participation in consultation with employer and other employees.
		2.4	The worksite is secured and entry controlled until appropriate authorities inspect and release

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ELEMENT		PERFORMANCE CRITERIA	
			the site.
3	Complete the EWP controlled descent escape procedure	3.1	Processes for reporting accidents and/or incidents to authorised personnel are confirmed in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 EWP controlled descent escape 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.3.1	Powerline safety practices
T2.5.5	Powerline clearances and approach distances

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) In accordance with the National Refresher Training Recognition Protocol for the Electricity Supply Industry, this

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unit is identified as a Refresher Training unit and is only available for use by industry to meet industry protocols and regulatory requirements.

Industry has defined Refresher Training as:

"A competency confirmation event which may include training, the purpose of which is to compensate for or prevent deterioration in a previously achieved standard of performance"

Under the protocol and the applicable State or Territory legislative and regulatory requirements, Electricity Supply Industry employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks.

Industry accepts that opportunities to practice emergency procedures are generally restricted to simulated exercises in a controlled environment during competency confirmation programs.

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.

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

These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments.

An industry endorsed Learning Assessment Plan has been developed to support this unit.

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 at each competency confirmation event.

In accordance with State and Territory regulations and the "Assessment Guidelines - UET09". Evidence shall also

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comprise:

- A performance demonstrated within the timeframes typically expected of the rescue procedure. In particular the assessment of this unit shall confirm that 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
- 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, to the satisfaction of the network operator's assessor:	Participation in consultation processes, identifying hazards and implementing and monitoring control measures at the work site
B	All, to the satisfaction of the network operator's assessor	Applying work procedures and instructions as they apply to personal risk control and safety

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C	All, to the satisfaction of the network operator's assessor	Applying work procedures to ensure accessibility, inspection and functioning of emergency descent equipment to facilitate evacuation from a raised EWP
D	All, to the satisfaction of the network operator's assessor	Accessing, securing and attaching emergency descent equipment to self in accordance with workplace procedures
E	All, to the satisfaction of the network operator's assessor	Evacuating the EWP and descending to the ground in accordance with workplace 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 safely undertake actual performance of EWP controlled descent escape procedures in the workplace.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in a realistic environment and a variety of conditions.

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

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	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

8) 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 performing EWP controlled descent escape procedures in the workplace and will include the following:

Inspection of rescue equipment to facilitate a controlled descent from a EWP.

Applying work procedures and instructions as they apply to risk control and personal safety measures.

Accessing, securing and attaching the lowering device to self in accordance with workplace procedures.

Lowering self to the ground from the raised EWP.

Participation in consultation processes, identifying hazards and implementing and monitoring control measures at the work site.

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
- Assessing risk
- Assessment
- Authorisation
- Emergency
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Inspect

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RANGE STATEMENT

- Legislation
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field 5)

Refresher Training Unit

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UETTDRRF09A Apply access procedures to work on or near electrical network infrastructure

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor 1)

1.1) Descriptor

This Competency Standard Unit covers the performance of the procedures to gain access for work on or near electrical network infrastructure in the context of transmission, distribution or rail work functions. It encompasses responsibilities for, safety and 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

Application of the Unit 4)

This competency standard unit shall be selected as part of an endorsed skill set for the purposes of refresher training and/or to meet regulatory and/or network requirements.

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

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Application of the Unit 4)

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

1.2) License to practice

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, , 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.

ESI employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks.

Pre-Requisites

Prerequisite Unit(s) 2)

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

nil

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Employability Skills Information

Employability Skills 3)

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

6) **Elements**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to apply access authority procedures for work on or near electrical network infrastructure	1.1 Rules/Codes of Practice for work on or near electrical hazards and risk control measures for specific work areas and work activities are identified and obtained.
	1.2 Procedures for access authority/work permits including roles and responsibilities are obtained, learnt, understood and tested according to established procedures.
	1.3 Access authority/work permit document is identified, obtained, learnt, and understood for a specific work activity according to established procedures.
2 Carry out access authority procedures for work on or near electrical network infrastructure	2.1 Workplace procedures for confirming personal are appropriately qualified, fit for purpose and sign on to an Access Authority/Work Permit document is followed according to established procedures.
	2.2 Safe Approach Distances and Safety Measures applicable to the work activity are identified and

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ELEMENT	PERFORMANCE CRITERIA	
		confirmed according to established procedures
	2.3	Workplace procedures for signing on to an Access Authority/Work Permit are followed.
	2.4	Workplace procedures for individual sign on to a specific role/function identified for the work is followed according to established procedures
	2.5	Workplace procedures confirming issue and commencement of work under an Access Authority/Work Permit document are communicated according to established procedures.
3 Complete access authority procedures for work on or near electrical network infrastructure	3.1	Workplace procedures confirming work completion or suspension is communicated in accordance with established procedures.
	3.2	Workplace procedures to ensure all personnel signed on to an Access Authority/Work Permit document; sign off in accordance with established procedures.
	3.3	Workplace procedures to cancel or suspend an Access Authority/Work Permit document is performed in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 applying access procedures to work on or near electrical network infrastructure

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 (EKAS) required is given

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REQUIRED SKILLS AND KNOWLEDGE

in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.5.5 Powerline clearances and approach distances

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) In accordance with the National Refresher Training Recognition Protocol for the Electricity Supply Industry, this unit is identified as a Refresher Training unit and is only available for use by industry to meet industry protocols and regulatory requirements. Industry has defined Refresher Training as: "A competency confirmation event which may include training, the purpose of which is to compensate for or prevent deterioration in a previously achieved standard of performance" Under the protocol and the applicable State or Territory legislative and regulatory requirements, Electricity Supply Industry employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks. Industry accepts that opportunities to practice emergency procedures are generally restricted to simulated exercises in a controlled environment during competency confirmation programs. 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. 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. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. An industry endorsed Learning Assessment Plan has been developed to support this unit. .
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 at each competency confirmation event. In accordance with State and Territory regulations and the "Assessment Guidelines - UET09". Evidence shall also comprise: • A performance demonstrated within the timeframes typically expected of the rescue procedure. In particular the assessment of this unit shall confirm that 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 • 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:

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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, to the satisfaction of the network operator's assessor:	Identify Rules/Codes of Practice for work on or near electrical hazards and risk control measures for specific work areas and work activities
B	All, to the satisfaction of the network operator's assessor	Identify roles and responsibilities for individuals relating to Access Authority/Work Permit procedures
C	All, to the satisfaction of the network operator's assessor	Identify the Access Authority/Work Permit document for a specific work activity according to established procedures
D	All, to the satisfaction of the network operator's assessor	Workplace procedures for confirming personal are appropriately qualified, fit for purpose and sign on to an Access Authority/Work Permit document
E	All, to the satisfaction of the network operator's assessor	Identify Safe Approach Distances and Safety Measures applicable to the work activity according to established procedures
F	All, to the satisfaction of the network operator's	Workplace procedures for signing on to an Access Authority/Work Permit

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	assessor	
G	All, to the satisfaction of the network operator's assessor	Workplace procedures for sign on to a specific role/function identified on an Access Authority/Work Permit
H	All, to the satisfaction of the network operator's assessor	Workplace procedures to confirm issue and commencement of work under an Access Authority/Work Permit document
I	All, to the satisfaction of the network operator's assessor	Workplace communication procedures to confirm work is completed or suspended
J	All, to the satisfaction of the network operator's assessor	Workplace procedures to ensure all personnel signed on to an Access Authority/Work Permit document; sign off in accordance with established procedures
K	All, to the satisfaction of the network operator's assessor	Workplace procedures to cancel or suspend an Access Authority/Work Permit document

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to safely undertake network access/work permit procedures in the workplace.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in a realistic environment

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EVIDENCE GUIDE

	and a variety of conditions.
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

8) 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 performing access authority procedures for work on or near electrical network infrastructure in the workplace and will include the following:

Identification, learning and application of Rules/Codes of Practice as they apply to Access Authority/Work Permit systems for work on or near electrical network infrastructure.

Understanding safe approach distances and safety measures applicable to work on or near electrical network infrastructure

Applying work procedures and instructions as they apply to risk control and personal safety measures.

Understanding the roles and responsibilities applicable to the operation of an Access

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RANGE STATEMENT

Authority/Work Permit System for work on or near electrical network infrastructure.

Identifying and completing an Access Authority/Work Permit document for a designated role.

Understanding the processes and systems applicable to issue, suspension and cancellation of an Access Authority/Work Permit document.

Participation in consultation processes, identifying hazards and implementing and monitoring control measures at the work site.

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
- Assessing risk
- Assessment
- Authorisation
- Emergency
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Inspect
- Legislation
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field	5)
	Refresher Training Unit

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UETTDRRF10A Provide first aid in an ESI environment

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor 1)

1.1) Descriptor

This Competency Standard Unit covers the provision of first aid in an Electricity Supply Industry (ESI) environment. It includes the recognition and provision of an initial response where first aid is required in emergency situations by providing essential first aid using basic life support measures according to established workplace first aid policies and procedures.

Application of the Unit

Application of the Unit 4)

This competency standard unit shall be selected as part of an endorsed skill set for the purposes of refresher training and/or to meet regulatory and/or network requirements.

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

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Application of the Unit 4)

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

1.2) License to practice

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, 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.

ESI employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks

Pre-Requisites

Prerequisite Unit(s) 2)

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

nil

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Employability Skills Information

Employability Skills 3)

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

6) **Elements**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to provide first aid in an ESI environment	1.1 Identify physical hazards and risks to personal and others' health and safety according to established procedures.
	1.2 Minimize immediate risks to self and casualty's health and safety by controlling hazards in accordance with established procedures for occupational health and safety.
	1.3 Assess the situation and decide on actions required, promptly.
	1.4 Seek assistance from others, as required and at the appropriate time.
2 Carry out the provision of first aid in an ESI environment	2.1 Assess the victim's physical condition and visible vital signs.
	2.2 Provide first aid to stabilise the victim's physical and mental condition in accordance with enterprise policy on provision of first aid and recognised first aid procedures.
	2.3 Use available first aid equipment as appropriate.
	2.4 Identify and notify back-up services appropriate to the situation in accordance with established

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ELEMENT	PERFORMANCE CRITERIA	
		procedures.
	2.5	Convey information about the victim's condition accurately and clearly to emergency services personnel or health professionals.
3 Complete provision of first aid in an ESI environment	3.1	Processes for reporting accidents and/or incidents to authorised personnel are confirmed in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 the provision of first aid in an ESI environment.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.8.2 Enterprises specific OHS instructions

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 9.1)

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EVIDENCE GUIDE

Assessment	In accordance with the National Refresher Training Recognition Protocol for the Electricity Supply Industry, this unit is identified as a Refresher Training unit and is only available for use by industry to meet industry protocols and regulatory requirements. Industry has defined Refresher Training as: "A competency confirmation event which may include training, the purpose of which is to compensate for or prevent deterioration in a previously achieved standard of performance" Under the protocol and the applicable State or Territory legislative and regulatory requirements, Electricity Supply Industry employees are required to maintain currency in this Unit for authorisation/approval to work on ESI Networks. Industry accepts that opportunities to practice emergency procedures are generally restricted to simulated exercises in a controlled environment during competency confirmation programs. 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. Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. An industry endorsed Learning Assessment Plan has been developed to support this unit.
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 at each competency confirmation event.

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EVIDENCE GUIDE

In accordance with State and Territory regulations and the "Assessment Guidelines - UET09". Evidence shall also comprise:

- A performance demonstrated within the timeframes typically expected of the rescue procedure. In particular the assessment of this unit shall confirm that 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
- 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, to the satisfaction of the network operator's assessor	Check site for danger to self, casualty and others minimising the danger Check and maintain casualty's airway, breathing and circulation Monitor Consciousness

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EVIDENCE GUIDE

B	All, to the satisfaction of the network operator's assessor	Identification of immediate hazards - such as but not limited to: Electrical wires/cables Environmental hazards such as • chemical spills • fires • slippery surfaces • floods • wild animals • fumes, • violent persons • equipment, machinery and substances • bodily fluids • risk of further injury to the casualty • risks associated with the proximity of other workers and bystanders • road traffic
C	All, to the satisfaction of the network operator's assessor	Cardio-vascular failure Shock Unconsciousness Electrical burns Bites or stings Response to Bleeding
D	All, to the satisfaction of the network operator's assessor	Maintain site safety Minimise risk of further injury or injury to others Making the casualty comfortable Assessment of injury situations

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EVIDENCE GUIDE

		Manage bleeding Raising alarm with emergency services or health professionals

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to safely undertake actual performance of the provision of first aid, in an ESI environment, in the workplace.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in a realistic environment and a variety of conditions.

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.

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Range Statement

RANGE STATEMENT

8) 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 the provision of first aid in an ESI environment and may include the following:

Established first aid principles including; checking and maintaining the casualty's airway, breathing and circulation, and checking the site for danger to self, casualty and others and minimising the danger.

Physical and personal hazards may include; workplace hazards such as fire, floods, violent persons, and environmental hazards such as electrical faults, chemical spills, fires, slippery surfaces, floods, wild animals, fumes, and proximity of other people, and hazards associated with the casualty management processes.

Risks may include; worksite equipment, machinery and substances, and bodily fluids, and risk of further injury to the casualty, and risks associated with the proximity of other workers and bystanders, and road traffic.

First aid management will need to account for; Location and nature of the work environment, and Electrical hazards, and Environmental conditions and situations, such as, biological risks, weather and terrain, motor vehicle accidents, and Level of knowledge, skills, training and experience of the person administering first aid and Familiarity with particular injuries, and Legal issues that affect the provision of first aid in different industry sectors, and Characteristics of the site where the injury occurs, and Nature of the injury and its cause, and Infection control procedures, and Availability of first aid equipment, medications and kits or other suitable alternative aids, and Proximity and availability of trained paramedical and medical/health professional assistance, and Victim's cardio-vascular condition as indicated by vitals signs such as body temperature, pulse rate and breathing rates, and Unresolved dangers such as fire, chemical contamination or fume toxicity of the area where the injury occurs.

Vital signs include; breathing, circulation and consciousness

Injuries may include; Abdominal trauma, Allergic reactions, Bleeding, Chemical contamination, Choking, Cold injuries, Cardio-vascular failure, Dislocations and fractures, Drowning, Poisoning and toxic substances, Medical conditions including epilepsy, diabetes, asthma, Eye injuries, Head injuries, Minor skin injuries, Neck and spinal injuries, Needle stick injuries, Puncture wounds and cuts, Crush injuries, Shock, Smoke inhalation, Sprains and strains, Substance abuse, Unconsciousness, Infections, Bone and joint injuries, Electrical burns, Eye injuries, Burns and scalds, thermal, chemical and friction, Bites or stings, Inhalation of toxic fumes and airborne dusts.

Injuries may involve; Unconsciousness, Confusion, Tremors, Rigidity, Numbness, Inability to move body parts, Pain, Delirium, External bleeding, Internal bleeding, Heat exhaustion, Hypothermia and Pre-existing illness.

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RANGE STATEMENT

Appropriate others from whom assistance may be sought may include; emergency services personnel, health professionals, colleagues, customers, passers by

Assistance may include, as appropriate to emergency situations; Maintain site safety, and Minimise risk of further injury or injury to others, Making the casualty comfortable, Assessment of injury situations, Manage bleeding through the application of tourniquets, pressure and dressings, Giving reassurance and comfort, Raising alarm with emergency services or health professionals, and Removing debris.

First aid and emergency equipment may include; first aid kit, pressure and other bandages, thermometers, eyewash, thermal blankets, pocket face masks, rubber gloves, dressings, flags and flares, fire extinguishers, communication equipment such as mobile phones, satellite phone, radio.

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
- Assessing risk
- Assessment
- Authorisation
- Confined space
- Emergency
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Inspect
- Legislation
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field	5)
	Refresher Training Unit

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UETTDRRT01B Install overhead traction wiring systems

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation of overhead traction wiring systems to ensure their proper installation, in particular the correct registration of the contact wire with respect to the current collectors. It includes the undertaking of safe working practices on or about the running line/track and the preparation needed for stringing and profiling including the isolation of systems and circuits for safe working according to work plans. It may also encompass the correct positioning of road signs, barriers and or warning devices, and the procedure of issuing/accepting electrical permits. It also includes the visual and other necessary checks to confirm that equipment and associated hardware have been correctly installed according to design and are in a safe condition to undertake pre-commissioning tests prior to, putting into service, and updating of, installation data such as as-built drawings and relevant quality assurance documentation.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRIS14B	Install and maintain overhead structures and electrical apparatus (poles/structures)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to install overhead traction wiring systems	1.1 Works 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 the installation of overhead traction wiring systems 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 work permits are obtained to access and 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 CPR, First Aid, and other rescue

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ELEMENT	PERFORMANCE CRITERIA	
		procedures and 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 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	Rail/Road signs, barriers and warning devices are positioned in accordance with requirements
	1.13	Environmental constraints applicable to work are identified and control measures applied.
2 Carry out the installation of overhead traction wiring systems	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 aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
	2.3	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures.
	2.4	Essential knowledge and associated skills are applied in the safe installation of overhead traction wiring systems to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.

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ELEMENT	PERFORMANCE CRITERIA	
	2.5	Overhead traction wiring systems, including cables, fittings, traction conductors and associated equipment are installed according to design and work schedule requirements and established procedures.
	2.6	Profiling completed according to established procedures.
	2.7	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.
	2.8	Unplanned events in the installation of overhead traction wiring systems are undertaken within the scope of established procedures.
	2.9	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.10	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the installation of overhead traction wiring systems	3.1	Work undertaken is checked against design drawings and 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 work permit(s) are signed off and, the overhead traction wiring system is returned to service in accordance with requirements.

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ELEMENT	PERFORMANCE CRITERIA
	3.6 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing overhead traction wiring 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.6.1 Electrical traction principles

T2.6.2 Electrical traction protection requirements

T2.6.3 Electrical overhead traction wiring 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 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

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assessment, such as Profiling, require data to be reliably gathered in a 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 the "Assessment Guidelines - UET09". 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

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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; 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	At least four of the following:	Support structure, Span, Section insulator, Neutral section, Midpoint anchor, Support equipment, Tension regulators, Stay/guy wire, Tramway support network

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B	At least two of the following:	Catenary, Dropper, Contact/trolley*, Feeder, Earth conductor, Drape/potential jumper (*must do)
C	At least one of the following:	Elevating work platform, Ladder, Mobile platform
D	At least two of the following:	Tensioning equipment*, Specialised tools, Ropes, Geometry profiling equipment. (*must do)
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 to undertake actual installation of overhead traction wiring systems.

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

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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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with the following units:

UETTDRRT07B	Install overhead traction equipment and components

Range Statement

RANGE STATEMENT

8) 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 Unit shall/may be demonstrated in relation to the installation of overhead traction wiring systems as it relates to the correct registration of the contact wire with respect to the current collectors

Types of conductor may include HD, CAD, tin bearing and magnesium copper, aluminium, steel, aluminium conductor steel reinforced (ACSR), insulated screened and unscreened cable and pilot and control cables.

Materials and equipment may include porcelain, glass, ceramic, fibre glass and composite insulators, steel, brass, stainless steel, neoprene, copper, cast and galvanized fittings, drums, pulleys, hooks, yoke plate, line grips, tensioning devices, ropes, slings, hydraulic/manual crimping and cutting tools, specialized tools and dynamometers;

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RANGE STATEMENT

Conductors and support wires include droppers wire, catenary wire, contact/trolley wire, earth wire, feeder wire, drape/potential jumper wire, stay wire, cross-span, networks and head span wire.

Associated equipment to conductors may include registration arms, midpoint anchors, section insulators, neutral sections, supports, cantilevers, portals, drop verticals, surge diverters and tensioning devices.

Plant may include ladders, elevating work platform, winches and capstans, specialist tensioning stringing equipment, cable trailers and drum stands, rail and road rail mounted overhead wiring vehicles.

Installing tension regulators encompasses fitting, positioning and securing weight chains and pulley systems.

Permits may include access permits, permits to work and or other relevant permits and documents by recognized bodies.

Profiling encompasses sag, tension, encumbrances, offsets, cants and registration which involves horizontal and vertical calibration of the contact wire or trolley wire to a design height and stagger in reference to the running rail.

Current collectors may include pantographs and tram trolley poles.

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
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Rail Traction Units

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UETTDRRT02B Maintain overhead traction wiring systems

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance and repair of overhead traction wiring systems to ensure their serviceability, in particular the correct registration of the contact wire with respect to the current collectors. It includes the undertaking of safe working practises on or about the running line/track, the preparation needed for stringing and profiling including the isolation of systems and circuits for safe working according to work plans, the diagnosis of faults and the modification and re-adjustment to appropriate standards. It may also encompass the correct positioning of road signs, barriers and or warning devices and the procedure of issuing/accepting electrical permits, the re-commissioning tests as required to ensure the integrity of the traction system prior to returning to service and, the updating of system data and/or maintenance records.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRRT01B	Install overhead wiring systems

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to maintain overhead traction wiring systems	1.1 Works 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 the maintenance of overhead traction wiring systems 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 work permits are obtained to access and 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 CPR, First Aid, and other rescue

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ELEMENT	PERFORMANCE CRITERIA	
		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 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	Rail/road signs, barriers and warning devices are positioned in accordance with requirements.
	1.13	Environmental constraints applicable to work are identified and control measures applied.
2 Carry out maintenance on overhead traction wiring systems	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 aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
	2.3	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures.
	2.4	Essential knowledge and associated skills are applied for the safe maintenance of overhead traction wiring systems to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.5	Maintenance, including repair and/or replacement of overhead traction wiring systems, including the

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ELEMENT	PERFORMANCE CRITERIA	
		modification and re-adjustment of overhead traction conductors is carried out, in accordance with the work schedule and requirements/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 in the maintenance on overhead traction wiring systems are undertaken within the scope of established procedures.
	2.8	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.9	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
	2.10	Recommissioning checks and tests are undertaken to ensure the integrity of the system prior to returning to service.
3 Complete the maintenance on overhead traction wiring systems	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 work permit(s) are signed off and, the overhead traction wiring system is returned to service in accordance with requirements.

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ELEMENT	PERFORMANCE CRITERIA
	3.6 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining overhead traction wiring 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.6.1 Electrical traction principles

T2.6.2 Electrical traction protection requirements

T2.6.3 Electrical overhead traction wiring 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 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

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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'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 the "Assessment Guidelines - UET09". 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

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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; 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	At least four of the following:	Support structure Span Section insulator Neutral section Midpoint anchor Support equipment Tension regulators Stay/guy wire Tramway support network

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EVIDENCE GUIDE

B	At least two of the following:	Catenary Dropper Contact/trolley* Feeder Earth conductor Drape/potential jumper (* must do)
C	At least one of the following:	Elevating work platform Ladder Mobile platform
D	At least two of the following:	Tensioning equipment* Specialised tools Ropes Geometry profiling equipment (* must do)
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 to undertake actual maintenance of overhead traction wiring systems.

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.

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EVIDENCE GUIDE

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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with the following units:

UETTDRRT08B	Maintain overhead traction equipment and components
UETTDRRT09B	Operate road rail traction height access equipment

Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the maintenance of overhead traction wiring systems as it relates to the correct registration of the contact wire with respect to the current collectors

Maintenance may include the removal, repair and replacement of cables, conductors and associated hardware.

Types of conductor may include HD, CAD, tin bearing and magnesium copper, aluminium, steel, aluminium conductor steel reinforced (ACSR), insulated screened and unscreened cable and pilot and control cables.

Materials and equipment may include porcelain, glass, ceramic, fibre glass and

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RANGE STATEMENT

composite insulators, steel, brass, stainless steel, neoprene, copper, cast and galvanized fittings, drums, pulleys, hooks, yoke plate, line grips, tensioning devices, ropes, slings, hydraulic/manual crimping and cutting tools, specialized tools and dynamometers.

Conductors and support wires include droppers wire, catenary wire, contact/trolley wire, earth wire, feeder wire, drape/potential jumper wire, stay wire, cross-span, networks and head span wire.

Associated equipment to conductors may include registration arms, midpoint anchors, section insulators, neutral sections, supports, cantilevers, portals, drop verticals, surge diverters and tensioning devices.

Plant may include ladders, elevating work platform, winches and capstans, specialist tensioning stringing equipment, cable trailers and drum stands, rail and road rail mounted overhead wiring vehicles.

Installing tension regulators encompasses fitting, positioning and securing weight chains and pulley systems.

Permits may include access permits, permits to work and or other relevant permits and documents by recognized bodies.

Profiling encompasses sag, tension, encumbrances, offsets, cants and registration which involves horizontal and vertical calibration of the contact wire or trolley wire to a design height and stagger in reference to the running rail.

Current collectors may include pantographs and tram trolley poles.

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
- 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

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5)**

Rail Traction Units

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UETTDRRT03B Install traction bonds

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This Competency Standard Unit covers the installation of the temporary and permanent traction bonds and bonding cables. It includes the undertaking of safe working practices on or about the running line/track. It may also encompass the isolation of systems and circuits for safe working according to work plans and the correct positioning of road signs, barriers and or warning devices and the procedure of issuing/accepting electrical permits and includes the necessary checks to confirm that bonds, bonding cables and associated hardware have been correctly installed according to design and are in a safe condition to test prior to putting into service. It also includes the undertaking of pre-commissioning tests and the updating of installation data and relevant quality assurance documentation.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRIS14B	Install and maintain overhead conductors and cables (poles/structures)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to install traction bonds	1.1 Works 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 the installation of traction bonds 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 work permits are obtained to access and 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 CPR, First Aid, and other rescue

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ELEMENT		PERFORMANCE CRITERIA	
			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 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	Rail/road signs, barriers and warning devices are positioned in accordance with requirements.
		1.13	Environmental constraints applicable to work.
2	Carry out installation of traction bonds	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 aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
		2.3	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures.
		2.4	Essential knowledge and associated skills are applied in the safe installation of traction bonds and bonding cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
		2.5	Cable and surrounds, including rail and other surfaces, are prepared to enable joint and terminations to be carried out according to

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ELEMENT	PERFORMANCE CRITERIA	
		established procedures.
	2.6	Traction bonds are carried out according to requirements and established procedures.
	2.7	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.
	2.8	Unplanned events during the installation of traction bonds are undertaken within the scope of established procedures.
	2.9	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.10	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the installation of traction bonds	3.1	Work undertaken is checked and tested against design drawings and works schedule for conformance with requirements and anomalies reported in accordance with established procedures.
	3.2	Work site is rehabilitated, cleaned up and made 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 with established procedures.
	3.4	Relevant work permit(s) are signed off and, the system that has undergone the installation of a traction bond(s) is returned to service in accordance with requirements.
	3.5	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing traction bonds.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.6.4 Traction bonding

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)

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

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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 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 - UET09". 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

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- 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	At least two of the following:	Covered or bare aluminium bonds Copper bonds Steel bonds Steel rail
B	At least three of the following:	Bonding specific tools Crimping devices Thermal moulds Rail drill Bonding fittings Explosive power tools Portable hand tools
C	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 **9.3)**

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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 installation of traction bonds.

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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with the following units:

UETTDRRT01B Install overhead traction wiring systems

UETTDRRT07B Install overhead traction equipment and components

Range Statement

RANGE STATEMENT

8) 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

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RANGE STATEMENT

work environments and situations that will affect performance.

This Competency Standard Unit shall/may be demonstrated in relation to the installation of the temporary and permanent traction bonds and bonding cables according to work plans.

Installation includes but is not limited to fitting, setting up and putting in place structures, conductors, bonding cables, equipment, spark gaps and connecting terminals and conducting tests for operational soundness.

Earthing and bonding systems may be permanent or temporary.

Types of conductors may include steel, steel rail, copper, aluminium and steel, bare and sheathed cables, single core, stranded and flexible.

Cables may be surfaced mounted, buried and enclosed.

Permanent jointing and terminating materials include polymeric tape materials, polymeric heat shrink and covering materials, exothermic welds, crimped and bolted connections.

Temporary terminating components include screwed and clipped earth/rail/conductor clamps.

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
- 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

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5)**

Rail Traction Units

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UETTDRRT04B Maintain traction bonds

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance and repair of the temporary and permanent traction bonds and bonding cables. It includes the undertaking of OHS and safe working practices on or about the running line/track. It also encompasses the isolation of systems and circuits for safe working according to work plans and the correct positioning of road signs, barriers and or warning devices and the procedure of issuing/accepting electrical permits. It also includes the visual inspection and other necessary checks to confirm that equipment and associated hardware are in a safe condition to test and/or return to service and the undertaking of re-commissioning tests to ensure the integrity of the bonding system prior to a return to service and the updating of system data/maintenance records.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRRT03B Install traction bonds

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements

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describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare the maintenance of traction bonds	1.1 Works 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 the maintenance of traction bonds 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 work permits are obtained to access and 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 CPR, First Aid, and other rescue procedures according to requirements.

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ELEMENT		PERFORMANCE CRITERIA	
		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 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	Rail/Road signs, barriers and warning devices are positioned in accordance with requirements.
		1.13	Environmental constraints applicable to work are identified and control measures applied.
2	Carry out maintenance of traction bonds	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 aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
		2.3	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures.
		2.4	Essential knowledge and associated skills are applied in the safe maintenance and repair of traction bonds and bonding cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
		2.5	Cable and surrounds, including rail and other surfaces, are prepared to enable joint and terminations to be carried out according to

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ELEMENT	PERFORMANCE CRITERIA	
		established procedures.
	2.6	Maintenance is carried out, in accordance with the work schedule and requirements/established procedures.
	2.7	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.
	2.8	Unplanned events in the maintenance of traction bonds are undertaken within the scope of established procedures.
	2.9	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.10	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the maintenance of traction bonds	3.1	Work undertaken is checked and tested against design drawings and works schedule for conformance with requirements and anomalies reported in accordance with established procedures.
	3.2	Work site is rehabilitated, cleaned up and made 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 with established procedures.
	3.4	Relevant work permit(s) are signed off and, the system that has undergone the maintenance of a traction bond(s) is returned to service in accordance with requirements.
	3.5	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining traction bonds.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.6.4 Traction bonding

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)

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

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EVIDENCE GUIDE

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

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 - UET09". 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

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- 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	At least two of the following:	Covered or bare aluminium bonds Copper bonds Steel bonds Steel rail
B	At least three of the following:	Bonding specific tools Crimping devices Thermal moulds Rail drill Bonding fittings Explosive power tools Portable hand tools
C	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

9.3)

This unit should be assessed as it relates to normal work practice

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for assessment

using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual maintenance of traction bonds.

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 Transmission, Distribution and Rail Traction Industry. 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

8) 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/may be demonstrated in relation to the maintenance of the temporary and permanent traction bonds and bonding cables according to work plans.

Maintenance may include the removal, repair and replacement of bonds and bonding

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RANGE STATEMENT

cables, conductors and associated hardware.

Maintenance includes the carrying out of diagnostics and tests on structures, conductors, equipment, spark gaps, systems as well as the removal, repair and replacement of bonding cables, spark gaps, conductors, and associated hardware and returning such to operational service.

Earthing and bonding systems may be permanent or temporary.

Types of conductors may include steel, steel rail, copper, aluminium and steel, bare and sheathed cables, single core, stranded and flexible.

Cables may be surfaced mounted, buried and enclosed.

Permanent jointing and terminating materials include polymeric tape materials, polymeric heat shrink and covering materials, exothermic welds, crimped and bolted connections.

Temporary terminating components include screwed and clipped earth/rail/conductor clamps.

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
- 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

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5)**

Rail Traction Units

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UETTDRRT05B Install overhead traction configurations

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation of overhead traction configurations, which include overlaps, cross-overs, turnouts, crossings and/or train/tram crossing. It includes the undertaking of safe working practices on or about the running line/track. It also encompasses; the isolation of systems and circuits for safe working according to work plans, the correct positioning of road signs, barriers and/or warning devices and the procedure for issuing/accepting electrical permits. It also includes the visual inspection and necessary checks to confirm that equipment and associated hardware have been correctly installed according to design and are in a safe condition to test prior to putting into service, as well as the undertaking of pre-commissioning tests and the updating of installation data and relevant quality assurance documentation.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRRT02B	Maintain overhead traction wiring systems
and	UETTDRRT08B	Maintain overhead traction equipment and components

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the installation of overhead traction configurations	1.1 Works 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 the installation of overhead traction configurations 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 work permits are obtained to access and 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.

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ELEMENT	PERFORMANCE CRITERIA	
	1.8	Relevant personnel at worksite are confirmed current in CPR, First Aid, and other rescue 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 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	Rail/road signs, barriers and warning devices are positioned in accordance with requirements Environmental constraints applicable to work are identified and control measures applied.
	1.13	Environmental constraints applicable to work are identified and control measures applied.
2 Carry out the installation of overhead traction configurations	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 and aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
	2.3	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures.
	2.4	Essential knowledge and associated skills are applied in the safe installation of overhead traction configurations to ensure completion in an agreed timeframe and, to quality standards with a

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ELEMENT	PERFORMANCE CRITERIA	
		minimum of waste according to requirements.
	2.5	Electrical equipment and associated hardware is positioned, secured and terminated/connected in accordance with requirements.
	2.6	Overhead traction configurations are installed as per requirements and established procedures.
	2.7	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.
	2.8	Unplanned events during the installation of overhead traction configurations are undertaken within the scope of established procedures.
	2.9	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.10	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the installation of overhead traction configurations	3.1	Work undertaken is checked and tested against design drawings and works schedule for conformance with requirements and anomalies reported in accordance with established procedures.
	3.2	Work site is rehabilitated, cleaned up and made 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 with established procedures.
	3.4	Relevant work permit(s) are signed off after final inspections and the system is energised, tested and returned to service in accordance with requirements.
	3.5	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and

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ELEMENT	PERFORMANCE CRITERIA
	appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing overhead traction configurations.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.6.5 Electrical traction configurations

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**) 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,

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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 the "Assessment Guidelines - UET09". 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

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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	At least three of the following:	Overlap Cross-over Turnout crossings Train/tram crossing
B	At least one of the following:	Elevating work platform Road/rail traction height access equipment. Ladders
C	At least two of the following:	Height gauge Stagger gauge Cant gauge
D	At least one of the following:	Voltage detector (LV or HV) Voltmeter

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		Insulation resistance tester Field intensity tester
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 to undertake actual installation of overhead traction configuration.

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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with the following units:

UETTDRRT09B Operate road rail traction height access

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	equipment
UETTDRRT10B	Perform rail traction switching operations to a given schedule

Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the installation and pre-commissioning tests of overhead traction configurations according to work plans, encompassing the isolation of systems and circuits for safe working.

Installation includes but is not limited to fitting, setting up, putting in place structures, conductors, equipment, systems and conducting tests for operational soundness.

Types of track configurations may include, overlaps, cross-overs, turnouts, 15-90 degree crossings, diamond crossings, Insulated crossings, train/tram crossing and tram frogs.

Overhead traction systems include their associated earthing systems.

Plant may include elevating work platforms, road rail traction height access equipment or ladder.

Testing and recording equipment (LV) include voltage detectors, volt meters and insulation resistance testers.

Testing and recording equipment (HV) includes voltage detectors and field intensity testers.

Permits may include access permits, permits to work and other relevant permits and documents by recognized bodies.

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
- Assessment
- Authorisation

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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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Competency Field

Competency Field **5**)

Rail Traction Units

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UETTDRRT06B Maintain overhead traction configurations

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance and repair of overhead traction configurations, which include overlaps, cross-overs, turnouts, crossings and/or train/tram crossing. It includes the repair and/or replacement of "like for like" electrical equipment and associated hardware according to requirements and the undertaking of safe working practices on or about the running line/track, including the correct positioning of road signs, barriers and/or warning devices and the procedure for issuing/accepting electrical permits. It also encompasses the isolation of systems and circuits for safe working according to work plans and the visual inspection and necessary checks to confirm that equipment and associated hardware are in a safe condition to test and/or return to service as well as the undertaking of re-commissioning tests to ensure the integrity of the traction system prior to a return to service and the updating of system data and/or maintenance records.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRRT05B	Install overhead traction configurations

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to maintain overhead traction configurations	1.1 Works 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 the maintenance of overhead traction configurations 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 work permits are obtained to access and 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 CPR, First Aid, and other rescue

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ELEMENT	PERFORMANCE CRITERIA	
		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 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	Rail/road signs, barriers and warning devices are positioned in accordance with requirements.
	1.13	Environmental constraints applicable to work are identified and control measures applied.
2 Carry out the maintenance of overhead traction configurations	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 and aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
	2.3	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures.
	2.4	Essential knowledge and associated skills are applied in the safe maintenance of overhead traction configurations to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.5	Electrical equipment and associated hardware is tested in accordance with requirements and

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ELEMENT	PERFORMANCE CRITERIA	
		established procedures.
	2.6	Maintenance, including repair and/or replacement of overhead traction configurations is carried out, in accordance with the work schedule and requirements/established procedures.
	2.7	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.
	2.8	Unplanned events during the maintenance of overhead traction configurations are undertaken within the scope of established procedures.
	2.9	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.10	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the maintenance of overhead traction configurations	3.1	Work undertaken is checked and tested against works schedule for conformance with requirements and anomalies reported in accordance with established procedures.
	3.2	Work site is rehabilitated, cleaned up and made 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 with established procedures.
	3.4	Relevant work permit(s) are signed off after final inspections and recommissioning checks. The system is energised, tested and returned to service in accordance with requirements.
	3.5	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining overhead traction configurations.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.6.5 Electrical traction configurations

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)

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.

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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 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 - UET09". 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

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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	At least three of the following:	Overlap Cross-over Turnout crossings Train/tram crossing
B	At least one of the following:	Elevating work platform Road/rail traction height access equipment, ladders
C	At least two of the following:	Height gauge Stagger gauge Cant gauge
D	At least one of the following:	Voltage detector (LV or HV) Voltmeter Insulation resistance tester Field intensity tester
E	At least one occasion	Dealing with an unplanned event by drawing on essential knowledge and associated skills to provide appropriate

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		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 maintenance of overhead traction configuration.

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 Transmission, Distribution and Rail Traction Industry. 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

8) 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.

This Competency Standard Unit shall/may be demonstrated in relation to the maintenance and pre-commissioning tests of overhead traction configurations according to work plans, encompassing the isolation of systems and circuits for safe working.

Maintenance includes the carrying out of diagnostics and tests on structures, conductors, equipment, systems as well as the removal, repair and replacement of cables, conductors, and associated hardware and returning such to operational service. It includes the repair and/or replacement of "like for like" electrical equipment and associated hardware

Types of track configurations that relate to overhead wiring and may include, overlaps, cross-overs, turnouts, 15 - 90 degree crossings, diamond crossings, insulated crossings, train/tram crossing, and tram frogs.

Overhead traction systems include their associated earthing systems.

Plant may include elevating work platforms, road rail traction height access equipment or ladder.

Testing and recording equipment (LV) include voltage detectors, volt meters and insulation resistance testers.

Testing and recording equipment (HV) includes voltage detectors and field intensity testers.

Permits may include access permits, permits to work and other relevant permits and documents by recognized bodies.

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
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5)**

Rail Traction Units

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UETTDRRT07B Install overhead traction equipment and components

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation of the overhead traction electrical equipment and components as well as associated hardware including ancillary equipment. It includes the undertaking of safe working practices on or about the running line/track. It also encompasses the isolation of systems and circuits for safe working according to work plans and the correct positioning of road signs, barriers and or warning devices and the procedure of issuing/accepting electrical permits. It also includes the visual inspection and necessary checks to confirm that equipment, components and associated hardware have been correctly installed according to design and are in a safe condition to test prior to putting to service, the undertaking of pre-commissioning tests as required to ensure the integrity of the traction system prior to putting back into service and the updating of installation data and relevant quality assurance documentation.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRIS14B	Install and maintain overhead conductors and cables (poles/structures)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the installation of overhead traction equipment/components	1.1 Works 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 the installation of overhead traction equipment/components 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 work permits are obtained to access and 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.

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ELEMENT		PERFORMANCE CRITERIA	
		1.8	Relevant personnel at worksite are confirmed current in CPR, First Aid, and other rescue 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 established procedures
		1.11	Rail/road signs, barriers and warning devices are positioned in accordance with requirements.
		1.12	Environmental constraints applicable to work are identified and control measures applied.
2	Carry out the installation of overhead traction equipment/components	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 aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
		2.3	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures.
		2.4	Essential knowledge and associated skills are applied in the safe installation of overhead traction equipment/components to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
		2.5	Electrical components/equipment and associated hardware are positioned, secured and terminated/connected in accordance with requirements and established procedures.

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ELEMENT		PERFORMANCE CRITERIA	
		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 during the installation of overhead traction equipment/components are undertaken within the scope of established procedures.
		2.8	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
		2.9	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3	Complete the installation of overhead traction equipment/components	3.1	Work undertaken is checked against design drawings and works schedule for conformance with requirements and anomalies reported in accordance with established procedures.
		3.2	Work site is rehabilitated, cleaned up and made 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 with established procedures.
		3.4	Relevant work permit(s) are signed off and, overhead traction equipment/components are commissioned in accordance with requirements.
		3.5	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing overhead traction equipment 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.6.1	Electrical traction principles
T2.6.2	Electrical traction protection requirements
T2.6.7	Overhead traction equipment and components

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)

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

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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 - UET09". 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

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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	At least two of the following:	Fuse switches Dropout fuses Section insulators Switches/isolators Links Fuses Surge diverters Transformers
B	At least five of the following:	Cantilever hardware Head span Neutral sections Pull offs Registration fittings Steady span Tension regulators Cross spans Tramway support network Pendulum

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C	At least two of the following:	Preformed fittings Compression fittings Wedge fittings Bolted splices
D	At least three of the following:	Feeders Dissimilar conductors Lugs Bolted clamp Drapes/potential jumper Droppers
E	At least two of the following:	Voltage detectors Micrometer/gauge Tension wrench Dynamometer Specialised tools
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 installation of overhead traction equipment and components.

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.

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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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with the following units: UETTDRRT01B Install overhead traction wiring systems

Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the installation, visual inspection and pre-commissioning tests of the overhead traction electrical equipment and components as well as associated hardware including ancillary equipment.

Installation includes but is not limited to fitting, setting up and putting in place conductors, equipment, systems and conducting tests for operational soundness.

Types of traction wire support structures may consist of portals, pull-off, drop-pieces, head spans, cross spans and tramway support networks.

Types of traction components may include droppers, bay components, cantilever hardware, portal hardware, steady spans hardware, steady spans, insulators, pull-off, tension regulators, section insulators, neutral sections, tramway frogs, pendulums, crossing pans and ears/hangers, booster and auxiliary transformers, air break switches,

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in-span feeders, isolation switches knuckles (insulated and non-insulated), cross arms.

Traction system components may consist of metalwork, wires, hardware, fittings and insulators.

Types of conductor may include HD, CAD and tin bearing copper, aluminium, steel, aluminium conductor steel reinforced, copper cover steel.

Types of wiring arrangements include single wire/tram systems, simple and compound catenary systems.

Plant may include ladders, elevating work platforms, winches, specialist tension string equipment, cable trailers, work trains, rail mounted overhead wiring equipment/vehicles and road rail mounted overhead wiring equipment/vehicles.

Ancillary equipment may include, transformers, switches, and surge diverters.

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
- 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

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- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Rail Traction Units

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UETTDRRT08B Maintain overhead traction equipment and components

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance and repair of the overhead traction electrical equipment and components as well as associated hardware including ancillary equipment. It includes the repair or replacement of "like for like" electrical components/equipment and associated hardware and the undertaking of safe working practices on or about the running line/track. It also encompasses the isolation of systems and circuits for safe working according to work plans and the correct positioning of road signs, barriers and or warning devices and the procedure of issuing/accepting electrical permits. It also includes the visual inspection and necessary checks to confirm that equipment; components and associated hardware are in a safe condition to test and/or return to service, the re-commissioning tests of the electrical equipment, components and associated hardware and the updating of system data/maintenance records.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRRT07B	Install overhead traction equipment and components

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to the maintenance of overhead traction equipment/components	1.1 Works 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 the maintenance of overhead traction equipment/components 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 work permits are obtained to access and 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.

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ELEMENT	PERFORMANCE CRITERIA	
	1.8	Relevant personnel at worksite are confirmed current in CPR, First Aid, and other rescue 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 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	Rail/road signs, barriers and warning devices are positioned in accordance with requirements.
	1.13	Environmental constraints applicable to work are identified and control measures are applied.
2 Carry out the maintenance of overhead traction equipment/components	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 aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
	2.3	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures.
	2.4	Essential knowledge and associated skills are applied in the safe maintenance of overhead traction equipment/components to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.

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ELEMENT		PERFORMANCE CRITERIA	
		2.5	Electrical component/equipment and associated hardware is ascertained as operating within normal operating parameters and in accordance with requirements and established procedures.
		2.6	Maintenance, including repair and/or replacement of overhead traction equipment/components is carried out, in accordance with the work schedule and requirements/established procedures.
		2.7	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.
		2.8	Unplanned events during the maintenance of overhead traction equipment/components are undertaken within the scope of established procedures.
		2.9	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
		2.10	On going checks/visual inspection of quality of the work are undertaken in accordance with instructions and established procedures.
3	Complete the maintenance of overhead traction equipment/components	3.1	Work undertaken is checked and or tested against works schedule for conformance with requirements and anomalies reported in accordance with established procedures.
		3.2	Work site is rehabilitated, cleaned up and made 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 with established procedures.
		3.4	Relevant work permit(s) are signed off after final inspections and the system is energised, tested and returned to service in accordance with requirements.

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ELEMENT	PERFORMANCE CRITERIA
	3.5 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining overhead traction equipment 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.6.1 Electrical traction principles

T2.6.2 Electrical traction protection requirements

T2.6.7 Overhead traction equipment and components

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**) Longitudinal competency development approaches to

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assessment, such as Profiling, require data to be reliably gathered in a 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 the "Assessment Guidelines - UET09". 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

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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; 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	At least two of the following:	Fuse switches Dropout fuses Section insulators Switches/isolators Links Fuses Surge diverters Transformers
B	At least five of	Cantilever hardware

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	the following:	Head span Neutral sections Pull offs Registration fittings Steady span Tension regulators Cross spans Tramway support network Pendulum
C	At least two of the following:	Preformed fittings Compression fittings Wedge fittings Bolted splices
D	At least three of the following:	Feeders Dissimilar conductors Lugs Bolted clamp Drapes/potential jumper Droppers
E	At least two of the following:	Voltage detectors Micrometer/gauge Tension wrench Dynamometer Specialised tools
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 **9.3)**

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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 maintenance of overhead traction equipment and components.

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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with the following units:

UETTDRRT02B	Maintain overhead traction wiring systems
UETTDRRT07B	Install overhead traction equipment and components

Range Statement

RANGE STATEMENT

8) 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.

This Competency Standard Unit shall/may be demonstrated in relation to the maintenance, visual inspection and pre-commissioning tests of the overhead traction electrical equipment and components as well as associated hardware including ancillary equipment.

Maintenance may include the carrying out of diagnostics and tests on conductors, equipment, systems as well as the removal, repair and replacement of cables, conductors, and associated hardware and returning such to operational service.

Types of traction wire support structures may consist of portals, pull-off, drop-pieces, head spans, cross spans and tramway support networks.

Types of traction components may include droppers, bay components, cantilever hardware, portal hardware, steady spans hardware, steady spans, insulators, pull-off arms, tension regulators, section insulators, neutral sections, tramway frogs, pendulums, crossing pans, ears/hangers, booster and auxiliary transformers, air break switches, in-span feeders, isolation switches, knuckles (insulated and non-insulated) and cross arms..

Traction system components may consist of metalwork, wires, hardware, fittings and insulators.

Types of conductor may include HD, CAD, and tin bearing copper, aluminium, steel, aluminium conductor steel reinforced and copper cover steel.

Types of wiring arrangements include single wire/tram systems, simple and compound catenary systems.

Plant may include ladders, elevating work platforms, winches, specialist tension string equipment, cable trailers, work trains, rail mounted overhead wiring equipment/vehicles and road rail mounted overhead wiring equipment/vehicles.

Ancillary equipment may include, transformers, switches, and surge diverters.

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
- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration
- Documenting detail work events, record keeping and or storage of information

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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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Competency Field

Competency Field **5**)

Rail Traction Units

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UETTDRRT09B Operate road rail traction height access equipment.

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the operation and use of road rail traction height access equipment to install and maintain the overhead traction systems. It includes the pre-operational inspection, servicing of plant/equipment and the undertaking of safe working practices on or about the running line/track. It also encompasses the isolation of systems and circuits for safe working according to work plans and the correct positioning of road signs, barriers and/or warning devices.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRRT02B	Maintain overhead traction wiring systems
and	UETTDRRT08B	Maintain overhead traction equipment and components

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential

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outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to operate road rail traction height access equipment	1.1 Works 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 the operation of road rail traction height access equipment 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 work permits are obtained to access and 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 Pre-operational inspection servicing of plant/equipment is carried out as per established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	1.9	Relevant personnel at worksite are confirmed current in CPR, First Aid, and other rescue procedures and other related work procedures according to requirements.
	1.10	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved to carry out work where necessary.
	1.11	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.12	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures.
	1.13	Rail/road signs, barriers and warning devices are positioned in accordance with requirements.
	1.14	Environmental constraints applicable to work are identified and control measures applied.
2 Carry out the operation of road rail traction height access equipment	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 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 in the safe operation of road rail traction height access equipment to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.4	Road rail traction height access equipment is operated as per requirements and established

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ELEMENT	PERFORMANCE CRITERIA	
		procedures.
	2.5	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.
	2.6	Unplanned events during the operation of road rail traction height access equipment are undertaken within the scope of established procedures.
	2.7	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.8	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the operation of road rail traction height access equipment	3.1	Post operational checking and servicing of plant and equipment is carried out for conformance with requirements/established procedures and anomalies reported in accordance with established procedures.
	3.2	Work site is rehabilitated, cleaned up and made 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 with established procedures.
	3.4	Relevant work permit(s) are signed off and, the road rail traction height access equipment is returned in accordance with established procedures.
	3.5	Works completion records and reports, are processed and appropriate personnel notified.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 road rail traction height access 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.6.6 Road rail traction height access 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 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 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 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 - UET09". 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;

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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:

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:	Log books Work plan
B	At least one of the following:	Elevated work platforms in the performance of work associated with rail traction. Road rail platform vehicle in the performance of work associated with rail traction.
C	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 operation of road rail height access equipment.

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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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with the following units:

UETTDRRT02B	Maintain overhead traction wiring systems
UETTDRRT08B	Maintain overhead traction equipment and components

Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the operation and use of road rail traction height access equipment as it relates to installation and maintenance of the overhead traction systems, including any pre-operational inspection and servicing of plant/equipment.

Plant may include elevating work platforms, winches, specialist tension string

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RANGE STATEMENT

equipment, cable trailers, rail and road mounted overhead vehicles and vehicle mounted cranes. Excluding rail bound overhead wiring consist.

Equipment operation includes the horizontal and vertical operation of the work platform, pre-operational checks, obtaining appropriate relevant track or road authorities, observing relevant statutory electrical and mechanical clearances, and communication protocol between relevant personnel.

Operating environment may include off-track, on-track in the vicinity of live and dead traction and distribution equipment, live line working and within an operational road, rail or tram traffic environment.

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
- 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

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RANGE STATEMENT

- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Rail Traction Units

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UETTDRRT10B Perform rail traction switching operations to a given schedule

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the operation of circuit breaking and isolation devices associated with energy reticulation systems/networks, which applies to rail systems in field situations according to established procedures. It also encompasses the procedure 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 or rail-connected, the issuing/accepting or holding of electrical permits and the returning of the affected circuits to service

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRRT02B	Maintain overhead traction wiring systems
and	UETTDRRT08B	Maintain overhead traction equipment and components

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare for rail traction switching operations to a given schedule	1.1	Works 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 rail traction switching operations to a given schedule 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 work permits are obtained to access and 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 CPR, First Aid, and other rescue

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ELEMENT		PERFORMANCE CRITERIA	
			procedures and 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	Modifications to the scheduled which may be required after assessing the worksite is communicated to appropriate personnel for formal approval.
		1.11	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
		1.12	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures.
		1.13	Safe working, road signs, barriers and warning devices are in place in accordance with requirements.
2	Carry out rail traction switching operations to a given schedule	2.1	OHS principles and practices to reduce incidents and accidents are followed in accordance with requirements and/or established procedures.
		2.2	Lifting, climbing, working 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 in the safe switching of rail traction operations to ensure completion in an agreed timeframe and, to quality standards.
		2.4	Communications with Switching Control Officer are established and maintained throughout the isolation operation according to established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.5	Electrical equipment and associated circuits line/network or work site to be switched is isolated and proved de-energised using appropriate devices and earthed or rail connected where required according to requirements and established procedures.
	2.6	Rail traction switching to a schedule is carried out, in accordance with requirements/established procedures.
	2.7	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.
	2.8	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.9	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the rail traction switching operations 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 work permit(s) are signed off, safety devices are removed, and the system is made ready to be re-energised and returned to service in accordance with requirements/established procedures.

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ELEMENT	PERFORMANCE CRITERIA
	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.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 rail traction switching operations to a given schedule.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.4 Powerline distribution installation

T2.2.5 Powerline installation safety

T2.4.1 Switchgear installation

T2.4.2 Low voltage switching 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 component 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 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 - UET09". Evidence shall also comprise:

- A representative body of Performance Criteria 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; 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, Electrical/access permits
B	At least one of the following:	Voltage detectors, Field intensity meter, Polarity testers, Phase rotation indicators

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C	At least one of the following:	HV/LV circuit breakers, HV/LV switches, HV/LV isolators, HV/LV links, HV/LV bridges, HV/LV fuses
D	All of the following:	Portable earthing/rail-connecting equipment, Operating rods/sticks
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 to undertake actual performance of rail traction switching operations.

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 Transmission, Distribution and Rail Traction Industry. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and

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	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 may be assessed concurrently with the following units: UETTDRRT09B Operate road rail traction height access equipment

Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the switching of circuit breaking and isolation devices associated with energy reticulation systems/networks, which applies to rail systems in field situations.

Equipment may include; circuit breakers, isolators, links, fuses, field switches, air-break switches, gas switches, Low Voltage switches, combined rail isolating switches, siding switches, earthing/ rail connect equipment, test equipment, High Voltage gloves, High Voltage mats, operating rods/sticks, aerial switches and motor driven switches, voltage detectors

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
- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration
- Documenting detail work events, record keeping and or

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RANGE STATEMENT

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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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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Competency Field

Competency Field **5**)

Rail Traction Units

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UETTDRRT11B Maintain energised direct current traction overhead wiring system

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance and repair of energised DC traction Overhead Wiring system through the use of insulated ladder and working bare hand or insulated stick and includes the verification of the site conditions and the potential hazards, the conformance with and calculation of mechanical loads, the selection of appropriate tools and equipment, and authorised work method. It includes the undertaking of OHS and safe working practices to ensure that correct procedures and precautions to working live in accordance with the work plan and enterprise requirements are followed. It also includes; the visual inspection and necessary checks to confirm that overhead wiring components and associated hardware are in a safe condition to test and/or return to service, the re-commissioning tests of the components and associated hardware and the updating of system data/maintenance records.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

BSBWOR402A	Promote team effectiveness
UETTDRIS25B	Contribute to coordinated HV live line work
UETTDRRT06B	Maintain overhead traction configuration
UETTDRRT09B	Operate road rail traction height access equipment

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare/plan to maintain energised DC traction overhead wiring systems	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	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.4	Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.5	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented

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ELEMENT		PERFORMANCE CRITERIA	
			and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
		1.6	Relevant work authority/instructions are secured to coordinate the performance of work according to requirements and/or established procedures.
		1.7	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.
		1.8	Clients/Customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements.
		1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
		1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
		1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
		1.12	Positioning of road signs, barriers and warning devices is planned and coordinated in accordance with requirements.
2	Carry out maintenance of energised DC traction overhead wiring systems	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
		2.2	First Aid, Rescue and other related work

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ELEMENT	PERFORMANCE CRITERIA	
		procedures are performed according to requirements and/or established procedures.
	2.3	Lifting, climbing, working aloft, and use of tools/equipment, techniques and practices are safely exercised according to requirements.
	2.4	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.
	2.5	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.6	Maintenance of energised direct current traction overhead wiring systems is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied in the safe maintenance of energised direct current traction overhead wiring systems to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.9	On going 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 maintenance of energised DC traction overhead wiring	3.1	Work undertaken is checked against works schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
systems	3.2	Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and confirmed 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 work Authority/Instruction(s) are signed off or returned to client/customer in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining energised direct current traction overhead wiring 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.1.4.	Basic rigging techniques
T2.2.4	Powerline distribution installation.
T2.2.5	Powerline installation safety

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REQUIRED SKILLS AND KNOWLEDGE

T2.2.13	Low voltage - energised working practices for substations
T2.3.1	Powerline safety practices
T2.4.2	Low voltage switching principles
T2.6.8	DC traction - energised working practices
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions
T2.8.3	Enterprises specific - technical drawing and documents

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)

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.

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EVIDENCE GUIDE

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

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 - UET09". 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

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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	At least two of the following:	Span, cross-span, headspan, section insulator, support equipment, tramway support network
B	At least three of the following;	Catenary, dropper, contact/trolley, feeder/ in-span feeder, drape/potential jumper
C	At least two of the following:	Removal of trapped foreign objects Profiling Vertical adjustment of contact or trolley wire
D	At least one of the following;	Insulated elevating work vehicles Insulated ladder Insulated work platforms
E	At least two of the following:	Tensioning equipment Insulated sticks

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		Ropes Slings and chains Geometry profiling equipment.
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 maintenance of energised DC traction overhead wiring systems

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction Industry. 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.

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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 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/may be demonstrated in relation to the maintenance and repair of energised direct current traction overhead wiring systems, working bare handed on insulated ladders or insulated work platforms, or using insulated sticks.

The work may include installing, maintaining, repairing or replacing droppers, in-span feeders, catenary wire, contact/trolley wire, feeder wire, drape/potential jumper wire, cross-span, networks and head span wire, section insulators and components.

Work may also include removing foreign objects trapped on overhead wiring system.

Profiling encompasses sag, tension, encumbrances, offsets, cants and registration this involves horizontal and vertical adjustment of the contact wire or trolley wire to a design height and stagger in reference to the running rail.

Materials and equipment may include porcelain, glass, ceramic, fibre glass and composite insulators, steel, brass, stainless steel, neoprene, copper, cast and galvanized fittings, drums, pulleys, hooks, yoke plate, line grips, ropes, slings, hydraulic/manual crimping and cutting tools, specialized tools and dynamometers.

Types of traction components may include droppers, bay components, steady spans hardware, steady spans, pull-off, section insulators, neutral sections, tramway frogs, pendulums, crossing pans and ears/hangers, troughing, 15 - 90^{0} crossings, in-span feeders, isolation switches knuckles (insulated and non-insulated), and cross arms.

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

Custom Content Section

2.2) Literacy and numeracy skills

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"

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2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Rail Traction Units

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UETTDRRT12B Maintain energised traction overhead electrical apparatus (stick)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This Competency Standard Unit covers the maintenance and repair of energised traction overhead electrical apparatus via the use of approved live line insulated stick techniques and includes the verification of site conditions and the potential hazards, the conformance with and calculation of physical loads, the selection of appropriate tools and equipment, and authorised work methods. It encompasses the undertaking of correct procedures and precautions to working live line in accordance with the work plan and enterprise requirements. It also includes the visual inspection and necessary checks to confirm that; the electrical apparatus and components are in a safe condition to test and/or return to service, and the recommissioning tests of the electrical apparatus and components.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRRT11B	Maintain energised direct current traction overhead wiring system

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare/plan to maintain energised traction overhead electrical apparatus	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	Calculation of physical loads and authorised work methods are obtained and relevant requirements and established procedures for the work are communicated 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 including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.5	Identify hazards associated with the work and implement risk control measures including the rendering inoperative of automatic reclosing device.
	1.6	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7	Resources including personnel, equipment, tools

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ELEMENT	PERFORMANCE CRITERIA	
		and personal protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and technical working order.
	1.8	Relevant personnel at worksite are confirmed current in First Aid, CPR, Pole Top and other rescue procedures according to requirements.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
	1.12	Positioning of road signs, barriers and warning devices is planned and coordinated in accordance with requirements.
2 Carry out the maintenance of energised traction overhead electrical apparatus	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
	2.2	First Aid, CPR, Pole Top and other Rescue Procedures and other related work procedures are performed according to requirements and/or established procedures.
	2.3	Lifting, climbing, and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
	2.4	Auto-reclose devices associated with the circuits being worked on have been rendered inoperative and necessary work documentation acquired in

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ELEMENT	PERFORMANCE CRITERIA	
		accordance with enterprise requirements.
	2.5	Essential knowledge and associated skills are applied in the safe maintenance of energised traction overhead electrical apparatus to ensure completion within an agreed timeframe and to quality standards with a minimum of waste according to requirements.
	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	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.8	Unplanned events in the maintenance of energised traction overhead electrical apparatus are managed within the scope of established procedures.
	2.9	On going 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 maintenance of energised traction overhead electrical apparatus	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	Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and confirmed 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.

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ELEMENT	PERFORMANCE CRITERIA
	3.5 Relevant work documentation is signed off and, traction overhead electrical apparatus are returned to service, including returning of auto-reclosing device to normal, and advised to client/customer in accordance with requirements.
	3.6 Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining energised traction overhead electrical apparatus (stick).

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.35	Live line working up to 132kV with Hotstick
T2.2.39	Plant, equipment and tools used for HV live line work
T2.2.53	HV principles
T2.4.3	High voltage switching principles
T2.4.4	High voltage fault switching principles
T2.4.5	High voltage distribution transformer principles
T2.4.6	High voltage SWER system
T2.4.7	Feeder automation system
T2.6.9	Traction live line work

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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 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 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

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EVIDENCE GUIDE

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 - UET09". 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**

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EVIDENCE GUIDE

A	At least two of the following:	Support structure Span Section insulator Neutral section Midpoint anchor Support equipment Tension regulators
B	At least two of the following:	Catenary Dropper Contact feeder
C	At least one of the following:	Insulated elevating work platform Insulated ladder Insulated mobile platform
D	At least two of the following:	Specialised insulated tools Insulated sticks Tensioning equipment Geometry profiling equipment.
E	At least two of the following:	Air-break switches Insulators Surge arrestors Hardware and fittings
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

9.3)

This unit should be assessed as it relates to normal work practice

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EVIDENCE GUIDE

for assessment

using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual maintenance of energised traction overhead electrical apparatus.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with the following units:

UETTDRRT13B	Maintain energised traction overhead electrical apparatus (glove)

Range Statement

RANGE STATEMENT

8) 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

This Competency Standard Unit shall/may be demonstrated in relation to the maintenance of energised traction overhead electrical apparatus by the adoption of live line insulated stick techniques, without the need to interrupt traction power supply during the course of work undertaking. Competency shall be demonstrated in relation to the maintenance, visual inspection and pre-commissioning tests of the overhead traction electrical equipment and components as well as associated hardware including ancillary equipment.

Maintenance may include the carrying out of diagnostics and tests on conductors, equipment, systems as well as the removal, repair and replacement of cables, conductors, and associated hardware and returning such to operational service.

Types of traction wire support structures may consist of portals, pull-off, drop-pieces, head spans, and cross spans.

Types of traction components may include switches, surge arresters, insulators, droppers, bay components, cantilever hardware, portal hardware, steady spans hardware, steady spans, insulators, pull-off arms, tension regulators, section insulators, neutral sections, air break switches, in span feeders, isolation switches, knuckles (insulated and non-insulated) and cross arms.

Traction system components may consist of metalwork, wires, hardware, fittings and insulators.

Types of conductor may include HD, CAD, and Tin Bearing copper, aluminium, steel, aluminium conductor steel reinforced, copper cover steel.

Types of wiring arrangements include single wire systems, simple and compound catenary systems.

Plant may include live-line tools, insulated ladders, insulated elevating work platforms/vehicles/trains, specialist tension string equipment, wire drums

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
- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications
- Emergency

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

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Competency Field

Competency Field **5**)

Rail Traction Units

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UETTDRRT13B Maintain energised traction overhead electrical apparatus (glove)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This Competency Standard Unit covers the maintenance and repair of energised traction overhead electrical apparatus via the use of approved live line glove and barrier techniques and includes the verification of site conditions and the potential hazards, the conformance with and calculation of physical loads, the selection of appropriate tools and equipment, and authorised work methods. It encompasses the undertaking of correct procedures and precautions to working live line in accordance with the work plan and enterprise requirements. It also includes the visual inspection and necessary checks to confirm that the electrical apparatus and components are in a safe condition to test and/or return to service, and the recommissioning tests of the electrical apparatus and components.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRRT11B	Maintain energised direct current traction overhead wiring system

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare/plan to maintain energised traction overhead electrical apparatus (glove)	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	Calculation of physical loads and authorised work methods are obtained and relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4	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.
	1.5	Hazards associated with the work and implement risk control measures including the rendering inoperative of automatic reclosing device are identified.
	1.6	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7	Resources including personnel, equipment, tools

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ELEMENT		PERFORMANCE CRITERIA	
			and personal protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and technical working order.
		1.8	Relevant personnel at worksite are confirmed current in First Aid, CPR, Pole Top and other rescue procedures according to requirements.
		1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
		1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
		1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
		1.12	Positioning of road signs, barriers and warning devices is planned and coordinated in accordance with requirements.
2	Carry out the maintenance of energised traction overhead electrical apparatus (glove)	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
		2.2	First Aid, CPR, Pole Top and other Rescue Procedures and other related work procedures are performed according to requirements and/or established procedures.
		2.3	Lifting, climbing, and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
		2.4	Auto-reclose devices associated with the circuits being worked on have been rendered inoperative and necessary work documentation acquired in

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ELEMENT	PERFORMANCE CRITERIA	
		accordance with enterprise requirements.
	2.5	Essential knowledge and associated skills are applied in the safe maintenance of energised traction overhead electrical apparatus to ensure completion within an agreed timeframe and to quality standards with a minimum of waste according to requirements.
	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	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.8	Solutions to non-routine problems are identified and actioned in the maintenance of energised traction overhead electrical apparatus using acquired essential knowledge and associated skills according to requirements and established procedures.
	2.9	On going 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 maintenance of energised traction overhead electrical apparatus (glove)	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	Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.4	Tools, equipment and any surplus resources and materials are, where appropriate, cleaned,

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ELEMENT	PERFORMANCE CRITERIA
	checked and returned to storage in accordance with established procedures.
	3.5 Relevant work documentation is signed off and, traction overhead electrical apparatus are returned to service, including returning of auto-reclosing device to normal, and advised to client/customer in accordance with requirements.
	3.6 Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining energised traction overhead electrical apparatus (glove).

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.37	Live line working up to 33kV with glove and barrier
T2.2.38	Working on live lines to 33kV with glove and barrier/Hotstick combined
T2.2.39	Plant, equipment and tools used for HV live line work
T2.2.53	HV principles
T2.4.3	High voltage switching principles
T2.4.4	High voltage fault switching principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.4.5	High voltage distribution transformer principles
T2.4.6	High voltage SWER system
T2.4.7	Feeder automation system
T2.6.9	Traction live line 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 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)

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

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EVIDENCE GUIDE

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 - UET09". 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:

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EVIDENCE GUIDE

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	At least one of the following:	Elevating work platform Insulated ladder Insulated mobile platform
B	At least two of the following:	Specialised tools Insulated gloves and barriers Tensioning equipment Geometry profiling equipment.
C	At least two of the following:	Air-break switches Insulators Surge arrestors Hardware and fittings
D	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 maintenance of energised traction overhead electrical apparatus (glove).

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EVIDENCE GUIDE

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with the following units:

UETTDRDP12B	Maintain energised DC traction overhead electrical apparatus (stick)

Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the installation and maintenance of energised traction overhead electrical apparatus by the adoption of live line gloves and barrier techniques, without the need to interrupt traction power supply during the course of work undertaking. Competency shall be demonstrated in relation to the maintenance, visual inspection and pre-commissioning tests of the overhead traction electrical equipment and components as well as associated hardware

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RANGE STATEMENT

including ancillary equipment.

Maintenance may include the carrying out of diagnostics and tests on conductors, equipment, systems as well as the removal, repair and replacement of cables, conductors, and associated hardware and returning such to operational service.

Types of traction wire support structures may consist of portals, pull-off, drop-pieces, head spans, and cross spans.

Types of traction components may include switches, surge arresters, insulators, droppers, bay components, cantilever hardware, portal hardware, steady spans hardware, steady spans, insulators, pull-off arms, tension regulators, section insulators, neutral sections, air break switches, in span feeders, isolation switches, knuckles (insulated and non-insulated) and cross arms.

Traction system components may consist of metalwork, wires, hardware, fittings and insulators.

Types of conductor may include HD, CAD, and Tin Bearing copper, aluminium, steel, aluminium conductor steel reinforced, copper cover steel.

Types of wiring arrangements include single wire systems, simple and compound catenary systems.

Plant may include live-line tools, insulated ladders, insulated elevating work platforms/vehicles/trains, specialist tension string equipment, wire drums.

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
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5)**

Rail Traction Units

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UETTDRRT14B Install and maintain traction network wiring systems

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation and maintenance of overhead traction wiring systems to ensure their proper installation, in particular the correct registration of the contact wire with respect to the current collectors. It includes the undertaking of safe working practices on or about the running line/track and the preparation needed for stringing and profiling including the isolation of systems and circuits for safe working according to work plans, the diagnosis of faults and the modification and re-adjustment to appropriate standards. It may also encompass the correct positioning of road signs, barriers and or warning devices, and the procedure of issuing/accepting electrical permits. It also includes the visual and other necessary checks to confirm that equipment and associated hardware have been correctly installed according to design and are in a safe condition to undertake pre-commissioning tests prior to, putting into service, and updating of, installation and maintenance data such as as-built drawings and relevant quality assurance documentation.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit requires 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) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence. Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

UETTDRIS27B	Install and maintain overhead distribution network infrastructure

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to install and maintain traction network wiring systems	1.1 Works 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 the installation and maintenance of traction network wiring systems 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

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ELEMENT	PERFORMANCE CRITERIA	
		control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.
	1.6	Relevant work permits are obtained to access and 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 CPR, First Aid, and other rescue procedures and 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 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	Rail/Road signs, barriers and warning devices are positioned in accordance with requirements.
	1.13	Environmental constraints applicable to work are identified and control measures applied
2 Carry out the installation and maintenance of traction network wiring systems	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 aloft, and use of power tools/equipment, techniques and practices are

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ELEMENT	PERFORMANCE CRITERIA	
		safely followed and, currency according to requirements confirmed.
	2.3	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures.
	2.4	Essential knowledge and associated skills are applied in the safe installation and maintenance of traction network wiring systems to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.5	Overhead traction wiring systems, including cables, fittings, traction conductors and associated equipment are installed according to design and work schedule requirements and established procedures.
	2.6	Maintenance, including repair and/or replacement of overhead traction wiring systems, including the modification and re-adjustment of overhead traction conductors is carried out, in accordance with the work schedule and requirements/established procedures.
	2.7	Profiling completed according to established procedures.
	2.8	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.
	2.9	Unplanned events in the installation and maintenance of traction network wiring systems are undertaken within the scope of established procedures.
	2.10	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.11	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
3 Complete the installation and maintenance of traction network wiring systems	3.1	Work undertaken is checked against design drawings and 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 work permit(s) are signed off and, the overhead traction network wiring system is returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing overhead traction wiring 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.6.1 Electrical traction principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.6.2 Electrical traction protection requirements

T2.6.3 Electrical overhead traction wiring 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 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 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 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 - UET09". 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/oth

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er variables		
Group No	**The minimum number of items on which skill is to be demonstrated**	**Item List**
A	Install and maintain at least four of the following:	Support structure, Span, Section insulator, Neutral section, Midpoint anchor, Support equipment, Tension regulators, Stay/guy wire, Tramway support network
B	With regards to "A" incorporate at least two of the following:	Catenary, Dropper, Contact/trolley*, Feeder, Earth conductor, Drape/potential jumper (*must do)
C	With regards to "A" incorporate at least one of the following:	Elevating work platform, Ladder, Mobile platform
D	With regards to "A" incorporate at least two of the following:	Tensioning equipment*, Specialised tools, Ropes, Geometry profiling equipment. (*must do)

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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 to undertake actual installation and maintenance of traction network wiring systems.

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 Transmission, Distribution and Rail Traction Industry. 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 recommended concurrencies for this unit.

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Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the installation and maintenance of traction network wiring systems as it relates to the correct registration of the contact wire with respect to the current collectors

Types of conductor may include HD, CAD, tin bearing and magnesium copper, aluminium, steel, aluminium conductor steel reinforced (ACSR), insulated screened and unscreened cable and pilot and control cables.

Materials and equipment may include porcelain, glass, ceramic, fibre glass and composite insulators, steel, brass, stainless steel, neoprene, copper, cast and galvanized fittings, drums, pulleys, hooks, yoke plate, line grips, tensioning devices, ropes, slings, hydraulic/manual crimping and cutting tools, specialized tools and dynamometers; Conductors and support wires include droppers wire, catenary wire, contact/trolley wire, earth wire, feeder wire, drape/potential jumper wire, stay wire, cross-span, networks and head span wire.

Associated equipment to conductors may include registration arms, midpoint anchors, section insulators, neutral sections, supports, cantilevers, portals, drop verticals, surge diverters and tensioning devices.

Maintenance may include the removal, repair and replacement of cables, conductors and associated hardware.

Conductors and support wires include droppers wire, catenary wire, contact/trolley wire, earth wire, feeder wire, drape/potential jumper wire, stay wire, cross-span, networks and head span wire.

Associated equipment to conductors may include registration arms, midpoint anchors, section insulators, neutral sections, supports, cantilevers, portals, drop verticals, surge diverters and tensioning devices.

Plant may include ladders, elevating work platform, winches and capstans, specialist tensioning stringing equipment, cable trailers and drum stands, rail and road rail mounted overhead wiring vehicles.

Installing tension regulators encompasses fitting, positioning and securing weight chains and pulley systems.

Permits may include access permits, permits to work and or other relevant permits and documents by recognized bodies.

Profiling encompasses sag, tension, encumbrances, offsets, cants and registration which involves horizontal and vertical calibration of the contact wire or trolley wire to a design height and stagger in reference to the running rail.

Current collectors may include pantographs and tram trolley poles.

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RANGE STATEMENT

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
- 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

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Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Rail Traction Units

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UETTDRRT15B Install and maintain traction network equipment and components

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation and maintenance of the overhead traction electrical equipment and components as well as associated hardware including ancillary equipment. It includes the repair or replacement of "like for like" electrical components/equipment and associated hardware and the undertaking of safe working practices on or about the running line/track. It also encompasses the isolation of systems and circuits for safe working according to work plans and the correct positioning of road signs, barriers and or warning devices and the procedure of issuing/accepting electrical permits. It also includes the visual inspection and necessary checks to confirm that equipment, components and associated hardware have been correctly installed according to design and are in a safe condition to test prior to putting to service, the undertaking of pre-commissioning tests as required to ensure the integrity of the traction system prior to putting back into service and the updating of installation data and relevant quality assurance documentation.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit requires 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) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence. Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRRT14B	Install and maintain traction network wiring systems

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare for the installation and maintenance of traction network equipment/components	1.1	Works 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 the installation and maintenance of overhead traction equipment/components 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

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ELEMENT		PERFORMANCE CRITERIA	
			control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.
		1.6	Relevant work permits are obtained to access and 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 CPR, First Aid, and other rescue 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 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	Rail/road signs, barriers and warning devices are positioned in accordance with requirements.
		1.13	Environmental constraints applicable to work are identified and control measures applied.
2	Carry out the installation and maintenance of traction network equipment/components	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 aloft, and use of power tools/equipment, techniques and

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ELEMENT	PERFORMANCE CRITERIA	
		practices are safely followed and, currency according to requirements confirmed.
	2.3	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures.
	2.4	Essential knowledge and associated skills are applied in the safe installation of overhead traction equipment/components to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.5	Electrical components/equipment and associated hardware are positioned, secured and terminated/connected in accordance with requirements and established procedures.
	2.6	Electrical component/equipment and associated hardware is ascertained as operating within normal operating parameters and in accordance with requirements and established procedures.
	2.7	Maintenance, including repair and/or replacement of overhead traction equipment/components is carried out, in accordance with the work schedule and requirements/established procedures.
	2.8	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.
	2.9	Unplanned events during the installation of overhead traction equipment/components are undertaken within the scope of established procedures.
	2.10	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.11	On going checks of quality of the work are

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ELEMENT	PERFORMANCE CRITERIA	
		undertaken in accordance with instructions and established procedures
3 Complete the installation and maintenance of traction network equipment/components	3.1	Work undertaken is checked against design drawings and works schedule for conformance with requirements and anomalies reported in accordance with established procedures.
	3.2	Work site is rehabilitated, cleaned up and made 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 with established procedures.
	3.4	Relevant work permit(s) are signed off after final inspections and the system is energised, tested and returned to service in accordance with requirements.
	3.5	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing overhead traction equipment 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.6.1	Electrical traction principles
T2.6.2	Electrical traction protection requirements

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REQUIRED SKILLS AND KNOWLEDGE

T2.6.7	Overhead traction equipment and components

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)

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

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gathered will 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 - UET09". 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

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EVIDENCE GUIDE

Group No	**The minimum number of items on which skill is to be demonstrated**	**Item List**
A	Install and maintain traction network equipment and components and incorporate at least two of the following:	Fuse switches Dropout fuses Section insulators Switches/isolators Links Fuses Surge diverters Transformers
B	With regards to "A" incorporate at least five of the following:	Cantilever hardware Head span Neutral sections Pull offs Registration fittings Steady span Tension regulators Cross spans Tramway support network Pendulum
C	With regards to "A" incorporate at least two of the following:	Preformed fittings Compression fittings Wedge fittings Bolted splices
D	With regards to "A" incorporate at least three of the following:	Feeders Dissimilar conductors Lugs Bolted clamp Drapes/potential jumper

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		Droppers
E	With regards to the above incorporate at least two of the following:	Voltage detectors Micrometer/gauge Tension wrench Dynamometer Specialised tools
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 installation and maintenance of traction network equipment and components.

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 Transmission, Distribution and Rail Traction Industry. 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

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	demonstrate the essential knowledge and associated skills described in this unit
Concurrent assessment and relationship with other units	**9.5)** There are no recommended concurrencies for this unit.

Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the installation, visual inspection and pre-commissioning tests of the overhead traction electrical equipment and components as well as associated hardware including ancillary equipment.

Installation includes but is not limited to fitting, setting up and putting in place conductors, equipment, systems and conducting tests for operational soundness.

Types of traction wire support structures may consist of portals, pull-off, drop-pieces, head spans, cross spans and tramway support networks.

Types of traction components may include droppers, bay components, cantilever hardware, portal hardware, steady spans hardware, steady spans, insulators, pull-off, tension regulators, section insulators, neutral sections, tramway frogs, pendulums, crossing pans and ears/hangers, booster and auxiliary transformers, air break switches, in-span feeders, isolation switches knuckles (insulated and non-insulated), cross arms.

Traction system components may consist of metalwork, wires, hardware, fittings and insulators.

Types of conductor may include HD, CAD and tin bearing copper, aluminium, steel, aluminium conductor steel reinforced, copper cover steel.

Types of wiring arrangements include single wire/tram systems, simple and compound catenary systems.

Plant may include ladders, elevating work platforms, winches, specialist tension string equipment, cable trailers, work trains, rail mounted overhead wiring equipment/vehicles and road rail mounted overhead wiring equipment/vehicles.

Ancillary equipment may include, transformers, switches, and surge diverters.

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RANGE STATEMENT

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
- 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

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Rail Traction Units

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UETTDRSB01B Diagnose and rectify faults in power system substation environment

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the identification and analysis of fault conditions including the isolation, repair and restoration of substation control circuits. It encompasses the application of the full range of knowledge and skills from previous competencies associated with the installation and maintenance of substations.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit requires 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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT **PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan for fault finding and rectification in power system substation environment	1.1 Work schedules including drawings, plans, requirements procedures and material lists are acquired, analysed and the extent of work determined.
	1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4 Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to agreed quality standards and in accordance with established policies and procedures.
	1.5 Risk control measures are identified, prioritised, implemented and evaluated against the work schedule.
	1.6 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, acquired and confirmed in safe/technical working order.
	1.7 Liaison issues with other personnel and/or authorities are resolved and activities coordinated to facilitate the work.
	1.8 Personnel participating in the work including plant operators and contractors are fully briefed, their respective responsibilities explained and coordinated and appropriate authorisation checked in accordance with established procedures.
	1.9 Work site is prepared according to the work schedule and to minimise OHS risk and damage to property and personnel in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
2 Carry out fault finding within the substation environment	2.1	OHS and sustainable energy principles and practices to reduce the incidence of accidents and minimise waste are implemented and monitored in accordance with requirements and/or established procedures.
	2.2	CPR, Rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.
	2.3	Safe working documentation is acquired and requirements completed in accordance with established procedures.
	2.4	Lifting, climbing and working aloft, use of power tools/equipment techniques and practices are safly exercised in accordance with established procedures.
	2.5	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are reported to the immediate authorised persons for directions/preventative action taken according to established procedures.
	2.6	Essential knowledge and associated skills are applied for the safe diagnose and rectification of faults in power system substation to ensure completion inan agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.7	Faults are located, identified and affected circuits isolated in accordance with the work schedule and requirements and/or established procedures.
	2.8	Faults in power system substation control circuits are rectified in an agreed timeframe and to established quality standards with a minimum of waste.
	2.9	Faults are diagnosed, analysed and recommendations made to prevent a reoccurrence.
	2.10	Solutions to non-routine problems are identified and actioned using acquired essential knowledge

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ELEMENT	PERFORMANCE CRITERIA	
		and associated skills according to requirements.
	2.11	Circuit functions are restored in accordance with work schedule requirements and/or established procedures.
	2.12	On going checks of quality of the work are undertaken in accordance with requirements and established procedures to ensure a quality outcome is achieved for the client/customer and to a community/industry standard.
3 Complete fault finding within the substation environment	3.1	Work undertaken is checked against work schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.
	3.2	Safe working documentation is surrendered and equipment made ready for service.
	3.3	Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.4	Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.
	3.5	Required works completion records, reports and/or documentation and information are completed, processed and appropriate personnel notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 diagnosing and rectifying

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REQUIRED SKILLS AND KNOWLEDGE

faults in secondary systems substation environment.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.2.13	Low voltage energised work practices for substations
T2.8.1	Enterprise specific - policy and procedures and Instructions
T2.8.2	Enterprise specific - OHS instructions
T2.8.3	Enterprise specific - technical drawing and documents
T2.8.4	Enterprise specific - switching diagrams
T2.8.6	Enterprise specific - specialised tools
T2.8.7	Enterprise specific - equipment installation procedures
T2.8.8	Enterprise specific - data management processes
T2.10.7	Substation tools and equipment
T2.10.8	Typical fault conditions and symptoms - substations
T2.10.9	Analyse and interpret results and measurements - substations
T2.10.10	Equipment components and materials - substations
T2.10.11	Substation safety practices
T2.10.12	Substation LV supply design principles
T2.10.13	Substation control systems design principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.10.20 Low voltage substation switching 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 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 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

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EVIDENCE GUIDE

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 - UET09". 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

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Group No	The minimum number of items on which skill is to be demonstrated	Item List
A	At least two of the following:	HV circuit breaker control system fault Transformer control system fault DC supply systems fault DC switchgear and equipment fault
B	At least three of the following:	Multimeters Tong testers Insulation resistance/continuity tester Ductor tester Overload injection tester Specialist test equipment
C	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 diagnosis and rectification of faults in power system substation environments.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show

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EVIDENCE GUIDE

	demonstrated competency of: Working at realistic heights above ground, i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction Industry. 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

8) 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/may be demonstrated in relation to low voltage AC/DC control and supervisory systems associated with substation plant and equipment. Control systems may include those associated with HV transformers, tap changers, switchgear and associated control panels, alarms, alternators, mimic panels, cooling systems, automatic voltage regulators, batteries and battery chargers.

Test and measurement instruments may include multimeters, tong testers, insulation resistance/continuity tester, ductor tester, overload injection 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

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RANGE STATEMENT

may include indication lamps, LEDs, alarms and flag relays.

Initial fault location may be performed with the affected circuits energised.

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
- 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
- Identifying hazards
- Inspect
- Legislation
- MSDS
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Quality assurance systems
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

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Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Substation Units

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UETTDRSB02B Carry out substation inspection

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the security, electrical and environmental inspections of substations. It includes inspection, recording of information and reporting of defective/non-compliant conditions in accordance with established enterprise standards and procedures.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit requires 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.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to carry out substation inspections	1.1 Work schedules including drawings, plans, requirements procedures and material lists are acquired, analysed and the extent of work determined.

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ELEMENT	PERFORMANCE CRITERIA	
	1.2	Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4	Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to agreed quality standards and in accordance with established policies and procedures.
	1.5	Risk control measures are identified, prioritised, implemented and evaluated against the work schedule.
	1.6	Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, acquired and confirmed in safe/technical working order.
	1.7	Liaison issues with other personnel and/or authorities are resolved and activities coordinated to facilitate the work.
	1.8	Personnel participating in the work including plant operators and contractors are fully briefed, their respective responsibilities explained and coordinated and appropriate authorisation checked in accordance with established procedures.
	1.9	Work site is prepared according to the work schedule and to minimise risk and damage to property and personnel in accordance with established procedures.
2 Carry out substation inspections	2.1	OHS and sustainable energy principles and practices to reduce the incidence of accidents and minimise waste are implemented and monitored in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.2	CPR, Rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.
	2.3	Safe working documentation is acquired if appropriate and requirements completed in accordance with established procedures.
	2.4	Lifting, climbing and working aloft, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.
	2.5	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.
	2.6	Substation equipment, environmental protection systems and security systems are inspected, checked to requirements and as per established procedures.
	2.7	Critical defects are assessed for level of safety/system impact and communicated to appropriate personnel for further action.
	2.8	Minor defects and/or non conformances are rectified in-situ.
	2.9	Essential knowledge and associated skills are applied for the safe carrying out of sub station inspections to ensure completion in an agreed timeframe and to quality standards according to requirements.
	2.10	Unplanned events or conditions are responded to in accordance with established procedures.
3 Record the outcomes of substation inspections	3.1	Work undertaken is checked against work schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.
	3.2	Safe working documentation is surrendered if appropriate.

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ELEMENT	PERFORMANCE CRITERIA
	3.3 Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.4 Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.
	3.5 Required works completion records, reports and/or documentation and information are completed, processed and appropriate personnel notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 carrying out substation inspection.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.8.1	Enterprise specific - policy and procedures instructions
T2.8.2	Enterprise specific - OHS instructions
T2.8.8	Enterprise specific - data management processes
T2.10.7	Substation tools and equipment

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REQUIRED SKILLS AND KNOWLEDGE

T2.10.8	Typical fault conditions and symptoms - substations
T2.10.9	Analyse and interpret results and measurements - substations
T2.10.10	Equipment components and materials - substations
T2.10.11	Substation safety 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 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 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

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being assessed.

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 - UET09". 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

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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	At least one of the following:	Transmission substation Distribution substation Traction substation Zone substation Terminal switching stations
B	All of the following:	Substation plant and equipment Substation environmental systems Substation security systems
C	At least ten of the following:	Circuit breakers Transformers Control systems Operating mechanism cabinets Voltage transformers Current transformers Surge arrestors Capacitor banks Static VAR compensator Synchronous condenser Harmonic filters Rectifier transformers

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EVIDENCE GUIDE

		Rectifiers Invertors Negative reactors Energy dissipation resistors Disconnectors/isolators Earth switches Fault throwing switches Sectionalisers Ac and dc supply systems Control room environs Batteries Chargers Proving de-energised equipment Fire systems equipment Oil spill equipment
D	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 inspection of plant, equipment and auxiliaries contained in and around substations.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working:

At realistic heights above ground i.e. above 3 metres, in limited spaces, with different structural/construction types and method

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	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 Transmission, Distribution and Rail Traction Industry. 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

8) 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/may be demonstrated in relation to the inspection of plant, equipment and auxiliaries contained in and around substations including the associated environmental protection and substation security and safety systems.

Checks and measurements include, where appropriate, operation counters, oil in water levels, consumable material consumption, oil containment levels, gas quantities, equipment inspection and condition assessment, lighting and supply conditions.

Security systems include un-authorised access systems (including perimeter wall or fencing and access gates) and alarms systems.

Safety systems include general substation house keeping and fire systems.

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:

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RANGE STATEMENT

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform
- Assessing risk
- 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

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Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Substation Units

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UETTDRSB03B Install and maintain substation DC systems

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation and maintenance of substation DC systems such as main batteries, communication batteries, audio frequency control equipment, DC lighting systems, battery chargers, uninterrupted power supply (UPS) systems and associated control circuit in accordance with enterprise requirements. It includes the diagnosis of faults, the replacement of faulty equipment, the conducting of pre-commissioning/re-commissioning tests and the interpretation of test results against agreed specification.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit requires 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

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1.2) License to practice

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) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to install and/or maintain substation DC systems	1.1 Work schedules including drawings, plans, requirements procedures and material lists are acquired, analysed and the extent of work determined.
	1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4 Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to agreed quality standards and in accordance with established policies and procedures.
	1.5 Risk control measures are identified, prioritised, implemented and evaluated against the work schedule.
	1.6 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, acquired and confirmed in safe/technical working order.
	1.7 Liaison issues with other personnel and/or authorities are resolved and activities coordinated to facilitate the work.
	1.8 Personnel participating in the work including plant operators and contractors are fully briefed, their respective responsibilities explained and coordinated and appropriate authorisation checked in accordance with established procedures.
	1.9 Work site is prepared according to the work schedule and to minimise risk and damage to property and personnel in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
2 Carry out the installation and maintenance of substation DC systems.	2.1	OHS and sustainable energy principles and practices to reduce the incidence of accidents and minimise waste are implemented and monitored in accordance with established procedures.
	2.2	CPR, Rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.
	2.3	Safe working documentation is acquired and requirements completed in accordance with established procedures.
	2.4	Lifting, climbing and working aloft, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied for the safe installation and maintenance of substation DC systems to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.7	Installation of substation DC systems is carried out in accordance with the work schedule and requirements and/or established procedures.
	2.8	Maintenance of substation DC systems is carried out in accordance with the work schedule and requirements and/or established procedures.
	2.9	Installation and/or maintenance of substation DC systems are completed in an agreed timeframe and to acceptable quality standards with a minimum of waste according to requirements.
	2.10	Unplanned events or conditions are responded to in accordance with established procedures.
	2.11	Performance tests of the substation DC systems are carried out in accordance with established

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ELEMENT	PERFORMANCE CRITERIA	
		procedures and specifications.
	2.12	On going checks of quality of the work are undertaken in accordance with requirements and established procedures to ensure a quality outcome is achieved for the client/customer and to a community/industry standard.
3 Complete the installation and maintenance of substation DC systems	3.1	Work undertaken is checked against work schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.
	3.2	Safe working documentation is surrendered and equipment made ready for service.
	3.3	Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.4	Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.
	3.5	Required works completion records, reports and/or documentation and information are completed, processed and appropriate personnel notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing and maintaining substation DC 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.2.13	Low Voltage - energised work practices for substations
T2.8.1	Enterprise specific - policy and procedures and Instructions
T2.8.2	Enterprise specific - OHS instructions
T2.8.3	Enterprise specific - technical drawing and documents
T2.8.4	Enterprise specific - switching diagrams
T2.8.6	Enterprise specific - specialised tools
T2.8.7	Enterprise specific - equipment installation procedures
T2.8.8	Enterprise specific - data management processes
T2.10.7	Substation tools and equipment
T2.10.8	Typical fault conditions and symptoms - substations
T2.10.10	Equipment components and materials - Substations
T2.10.11	Substation safety practices
T2.10.12	Substation LV supply design principles
T2.10.13	Substation control systems design principles
T2.10.19	Substation switching practices

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 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 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

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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 - UET09". 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 enowledge 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	At least one of the following:	Nickel cadmium batteries Lead acid batteries Gel cell batteries

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B	At least one of the following:	Main batteries Communication batteries
C	All of the following:	Battery chargers DC control circuits
D	At least two of the following:	Cell voltage test Hydrometer/specific gravity test Battery discharge and capacity tests Impedance testing
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 to undertake actual installation and maintenance of substation DC systems.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working

At realistic heights above ground, i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction

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	Industry. 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

8) 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/may be demonstrated in relation to the installation and maintenance of DC systems contained in and around substations including the associated control systems.

DC systems may include audio frequency control equipment, lighting systems, battery chargers, substation batteries, communication systems batteries, isolated pilot batteries and uninterrupted power supply (UPS) systems.

Checks and measurements include but are not limited to cell voltage test, hydrometer/specific gravity test, battery discharge and capacity tests, impedance tests.

Battery cell types include but not limited to nickel cadmium batteries, lead acid batteries, sealed and unsealed batteries.

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
- Assessment
- Authorisation
- Confined space

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

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Competency Field

Competency Field 5)

Substation Units

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UETTDRSB04B Maintain HV power system breakers

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1)**

1.1) Descriptor

This Competency Standard Unit covers the maintenance of high voltage power system circuit breakers including the diagnosis of faults and the repair and replacement of high voltage power system circuit breakers components in accordance with enterprise requirements. It includes the diagnostic checks, pre-commissioning tests and function checks involving the circuit breakers and their associated control circuits and interpretation of these tests against agreed specifications.

Application of the Unit

Application of the Unit **4)**

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

1.2) License to practice

The skills and knowledge described in this unit requires 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

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1.2) License to practice

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) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare/plan to maintain High Voltage power system circuit breakers	1.1	Work schedules including drawings, plans, requirements procedures and material lists are acquired, analysed and the extent of work determined.
	1.2	Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4	Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to agreed quality standards and in accordance with established policies and procedures.
	1.5	Risk control measures are identified, prioritised, implemented and evaluated against the work schedule.
	1.6	Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, acquired and confirmed in safe/technical working order.
	1.7	Liaison issues with other personnel and/or authorities are resolved and activities coordinated to facilitate the work.
	1.8	Personnel participating in the work including plant operators and contractors are fully briefed, their respective responsibilities explained and coordinated and appropriate authorisation checked in accordance with established procedures.
	1.9	Work site is prepared according to the work

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ELEMENT	PERFORMANCE CRITERIA	
		schedule and to minimise risk and damage to property and personnel in accordance with established procedures.
2 Carry out maintenance on high voltage power system circuit breakers	2.1	OHS and sustainable energy principles and practices to reduce the incidence of accidents and minimise waste are implemented and monitored in accordance with established procedures.
	2.2	CPR, Rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.
	2.3	Safe working documentation is acquired and requirements completed in accordance with established procedures.
	2.4	Lifting, climbing and working aloft, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied for the safe maintenance of HV power system circuit breaker to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.7	Maintenance of HV power system circuit breakers is carried out in accordance with the work schedule and requirements and/or established procedures
	2.8	Maintenance of HV power system circuit breakers is completed in an agreed timeframe and to quality standards with a minimum of waste according to requirements.

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ELEMENT	PERFORMANCE CRITERIA	
	2.9	Unplanned events or conditions are responded to in accordance with established procedures.
3 Complete the maintenance of high voltage power system circuit breakers	3.1	Work undertaken is checked against work schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.
	3.2	Safe working documentation is surrendered and High Voltage power system circuit breakers are made ready for service.
	3.3	Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.4	Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.
	3.5	Required works completion records, reports and/or documentation and information are completed, processed and appropriate personnel notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining HV power system breakers.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.1	Occupational Health and Safety principles
E2.18.2	Safe working practice
T2.2.13	Low voltage - energised work practices for substations
T2.4.2	Low voltage switching principles
T2.8.1	Enterprise specific - policy and procedures instructions
T2.8.2	Enterprise specific - OHS instructions
T2.8.3	Enterprise specific - technical drawing and documents
T2.8.4	Enterprise specific - switching diagrams
T2.8.6	Enterprise specific - specialised tools
T2.8.7	Enterprise specific - equipment installation procedures
T2.8.8	Enterprise specific - data management processes
T2.10.7	Substation tools and equipment
T2.10.8	Typical fault conditions and symptoms - substations
T2.10.9	Analyse and interpret results and measurements - substations
T2.10.10	Equipment components and materials - substations
T2.10.11	Substation safety practices
T2.10.12	Substation LV supply design principles
T2.10.13	Substation control systems design principles
T2.10.14	Hydraulic and pneumatic operating mechanism principles - Substations
T2.10.19	Substation switching practices

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REQUIRED SKILLS AND KNOWLEDGE

T2.10.20	Low voltage substation switching principles
T2.10.21	Circuit breaker construction principles - substations
T2.10.22	Circuit breaker operating principles - substations

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)

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 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 - UET09". 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:

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EVIDENCE GUIDE

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	At least two of the following:	Bulk oil circuit breakers Small oil volume circuit breaker Air blast circuit breaker Vacuum circuit breaker GIS circuit breakers Gas circuit breakers
B	At least two of the following:	Spring operated mechanism Solenoid operated mechanism Hydraulic operated mechanism Pneumatic operated mechanism
C	At least three of the following:	Insulation resistance tests Contact resistance tests Minimum close and open tests (reduced voltage tests) Sequence timing tests Contact travel/timing test Vibration test Gas pressure tests
D	At least two of the following:	Gas measuring devices Pressure measuring devices SF6 gas sampling Oil sampling SF6 moisture content (dew

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		point)
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 to undertake actual maintenance of HV and EHV circuit breakers in power system substations.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working:

At realistic heights above ground, i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction Industry. 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.

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Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the maintenance of HV and EHV circuit breakers in power system substations, and switching stations.

Circuit breaker types may include: Bulk oil, small oil volume, air blast, vacuum, air insulated and gas insulated SF6.

Associated control circuits include operating mechanisms, solenoids, spring, hydraulic and pneumatic drives, contactors, AC heaters, tripping and closing circuits and control wiring.

Diagnostic checks may include insulation resistance, contact resistance (dynamic and static), timing (in-service and out of service), gas pressure, air pressure, gas density, oil pressure, minimum operate checks.

Specialised tools may include insulation resistance test sets, contact resistance tester, trip and close coil testers, manufacturer's specific tools, sequence timing equipment.

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
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5)**

Substation Units

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UETTDRSB05B Maintain HV power system - transformers and instrument transformers

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance of high voltage power system transformers and instrument transformers including routine diagnostic tests within agreed specifications. It includes maintenance of the associated cooling systems, control and alarm systems and tertiary cabling and/or busbar systems in accordance with enterprise procedures.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit requires 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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT **PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA	
1 Prepare/plan to maintain HV power system transformers and instrument transformers	1.1	Work schedules including drawings, plans, requirements procedures and material lists are acquired, analysed and the extent of work determined.
	1.2	Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4	Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to agreed quality standards and in accordance with established policies and procedures.
	1.5	Risk control measures are identified, prioritised, implemented and evaluated against the work schedule.
	1.6	Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, acquired and confirmed in safe/technical working order.
	1.7	Liaison issues with other personnel and/or authorities are resolved and activities coordinated to facilitate the work.
	1.8	Personnel participating in the work including plant operators and contractors are fully briefed, their respective responsibilities explained and coordinated and appropriate authorisation checked in accordance with established procedures.
	1.9	Work site is prepared according to the work schedule and to minimise risk and damage to property and personnel in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
2 Carry out the maintenance of transformers and instrument transformers	2.1	OHS and sustainable energy principles and practices to reduce the incidence of accidents and minimise waste are implemented and monitored in accordance with established procedures.
	2.2	CPR, Rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.
	2.3	Safe working documentation is acquired and requirements completed in accordance with established procedures.
	2.4	Lifting, climbing and working aloft, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.
	2.5	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are monitored and preventive action taken and/or appropriate authorities consulted where necessary in accordance with established procedures.
	2.6	Essential knowledge and associated skills are applied for the safe maintenance of HV power system transformers and instrument transformers to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.7	Transformer/instrument transformer is isolated and maintained in accordance with manufacturers and enterprise procedures and recommendations.
	2.8	Diagnostic measurements are carried out and results interpreted, analysed and recorded as per established procedures.
	2.9	Transformer/instrument transformer is restored in accordance with established policies and procedures.
	2.10	Unplanned events or conditions are responded to in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA
3 Complete the maintenance of transformers and instrument transformers	3.1 Work undertaken is checked against work schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.
	3.2 Safe working documentation is surrendered and transformer/instrument transformer made ready for service.
	3.3 Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.4 Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.
	3.5 Required works completion records, reports and/or documentation and information are completed, processed and appropriate personnel notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining HV power system transformers and instrument transformers.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

E2.18.2 Electrical safe working practice

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REQUIRED SKILLS AND KNOWLEDGE

T2.2.13	Low voltage - energised work practices for substations
T2.4.2	Low voltage switching principles
T2.8.1	Enterprise specific policy and procedures and instructions
T2.8.2	Enterprise specific - OHS instruction
T2.8.3	Enterprise specific - technical drawing and documents
T2.8.4	Enterprise specific - switching diagrams
T2.8.6	Enterprise specific - specialised tools
T2.8.7	Enterprise Specific - equipment installation procedures
T2.8.8	Enterprise Specific - data management processes
T2.10.7	Substation tools and equipment
T2.10.8	Typical fault conditions and symptoms - substations
T2.10.9	Analyse and interpret results and measurements - substations
T2.10.10	Equipment components and materials - substations
T2.10.11	Substation safety practices
T2.10.12	Substation LV supply design principles
T2.10.13	Substation control systems design principles
T2.10.15	High voltage insulation system principles - substations
T2.10.16	Power transformers and reactor principles - substations
T2.10.19	Substation switching practices

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REQUIRED SKILLS AND KNOWLEDGE

T2.10.20 Low voltage substation switching 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 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 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

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EVIDENCE GUIDE

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 - UET09". 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

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EVIDENCE GUIDE

Group No	The minimum number of items on which skill is to be demonstrated	Item List
A	At least one of the following:	Power transformer High voltage reactor
B	At least two of the following:	Auxiliary transformer Current transformer Voltage transformer
C	At least two of the following:	Insulation resistance tests Dielectric dissipation factor tests Low voltage excitation checks Frequency response analysis Recovery voltage measurements Ratio checks Winding resistance tests Oil sampling
D	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 maintenance of transformers and instrument transformers

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EVIDENCE GUIDE

	In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working: At realistic heights above ground, i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction Industry. 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

8) 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/may be demonstrated in relation to substation transformers and instrument transformers, including potential transformers, current transformers, power transformers and auxiliary transformers.

Diagnostic checks and measurements may include insulation resistance, winding resistance, dielectric dissipation factor, winding ratio, vector group, low voltage excitation, frequency response analysis and recovery voltage measurements.

The following constants and variables included in the element/Performance Criteria in

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RANGE STATEMENT

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
- 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

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Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Substation Units

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UETTDRSB06B Install high current DC switchgear and equipment

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation of DC switchgear and other equipment which may include rectifier transformers, rectifiers, invertors, isolators and links, harmonic filters, negative reactors and EDR's to ensure correct installation to prescribed procedures and standards. It also encompasses the isolation of systems and/or circuits for safe working according to work plans and the visual inspection and necessary checks to ensure that equipment and components have been correctly installed according to design and are in a safe condition for pre-commissioning tests prior to energisation, as well as updating of installation data and relevant quality assurance documentation.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit requires a licence/registration to practice

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1.2) License 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) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to Install high current DC switchgear and equipment	1.1 Work schedules including drawings, plans, requirements procedures and material lists are acquired, analysed and the extent of work determined.
	1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4 Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to agreed quality standards and in accordance with established policies and procedures.
	1.5 Risk control measures are identified, prioritised, implemented and evaluated against the work schedule.
	1.6 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, acquired and confirmed in safe/technical working order.
	1.7 Liaison issues with other personnel and/or authorities are resolved and activities coordinated to facilitate the work.
	1.8 Personnel participating in the work including plant operators and contractors are fully briefed, their respective responsibilities explained and coordinated and appropriate authorisation checked in accordance with established procedures
	1.9 Work site is prepared according to the work schedule and to minimise risk and damage to property and

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ELEMENT	PERFORMANCE CRITERIA	
		personnel in accordance with established procedures.
2 Carry out installation of high current DC switchgear and equipment	2.1	OHS and sustainable energy principles and practices to reduce the incidence of accidents and minimise waste are implemented and monitored in accordance with established procedures.
	2.2	CPR, Rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.
	2.3	Safe working documentation is acquired and requirements completed in accordance with established procedures.
	2.4	Lifting, climbing and working aloft, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.
	2.5	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.
	2.6	Installation of high current DC switchgear and equipment is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied for the safe installation of high current DC switchgear and equipment to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Unplanned events or conditions are responded to in accordance with established procedures.
3 Complete installation of high current DC switchgear and equipment	3.1	Work undertaken is checked against work schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.
	3.2	Safe working documentation is surrendered and equipment made ready for service.

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ELEMENT	PERFORMANCE CRITERIA
	3.3 Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.4 Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.
	3.5 Required works completion records, reports and/or documentation and information are completed, processed and appropriate personnel notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing high current DC switchgear 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

E2.18.2 Electrical safe working practice

T2.2.13 Low voltage - energised work practices for substations

T2.8.1 Enterprise specific - policy and procedures and Instructions

T2.8.2 Enterprise specific - OHS instruction

T2.8.3 Enterprise specific - technical drawing and documents

T2.8.4 Enterprise specific - switching diagrams

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REQUIRED SKILLS AND KNOWLEDGE

T2.8.6	Enterprise specific - specialised tools
T2.8.7	Enterprise specific - equipment installation procedures
T2.10.4	Substation DC circuit breaker principles
T2.10.6	Substation DC circuit breaker installation
T2.10.7	Substation tools and equipment
T2.10.20	Low voltage substation switching 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 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 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 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 - UET09". 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

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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:	Multimeters Ductor Megger tester Ammeter Voltmeter 1500 V drop out tester Wiring diagrams Schematic drawings Operating and substation arrangement diagrams Building layouts Cable block and schedule diagrams
B	At least six of the following:	Direct current circuit breakers Rectifier transformers Rectifiers Isolators and links Harmonic filters Negative reactors Energy dissipation resistors
C	At least ten of	DC feeders

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	the following:	Surge arresters Isolating links Busbar Cables Cable supports Pits and enclosures Protection/alarm systems Control wiring Metering Supervisory interface Cabinets REC
D	At least three of the following:	Buchholz Frame leakage Overcurrent Earth leakage Reverse current Delta i Diode protection
E	All of the following:	Cable terminations Busbar termination/joint Alignment of electrical contacts of withdrawable equipment
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

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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 installation of high current DC switchgear and equipment.

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 Transmission, Distribution and Rail Traction Industry. 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

8) 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/may be demonstrated in relation to the installation of high current DC switchgear and equipment

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RANGE STATEMENT

DC switchgear and other equipment include but are not limited to direct current circuit breakers, rectifier transformers, rectifiers, invertors, isolators and links, harmonic filters, negative reactors, energy dissipating resistors (EDR's) and rail earth contactor.

Associated equipment may include DC feeders, surge arresters, isolating links, busbar, cables, cable supports, pits and enclosures, control wiring of protection/alarm systems, metering, supervisory interface and cabinets.

Test and measurement equipments may include multimeters, ductor, megger tester, ammeter, voltmeter, 1500 V dropout test sets.

Drawings can refer to wiring, schematic, operating and substation arrangement diagrams, cable block and schedule diagrams and building layouts.

Confined Spaces may apply to pits, cable tunnels, false floors, and cable basements.

Protection systems may include Buchholz, frame leakage, overcurrent, earth leakage, reverse current, Delta I and diode protection.

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
- 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

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RANGE STATEMENT

- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Substation Units

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UETTDRSB07B Maintain high current DC switchgear and equipment

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance of DC switchgear and other equipment which may include rectifier transformers, rectifiers, invertors, isolators and links, harmonic filters, negative reactors and EDRs. It encompasses the maintenance, including the diagnosing of faults and replacement and repair to ensure correct maintenance to prescribed procedures and standards. It also encompasses the isolation of systems and/or circuits for safe working according to work plans and the visual inspection and necessary checks to ensure safe energisation, as well as updating of maintenance data and relevant quality assurance documentation.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit requires a licence/registration to practice

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1.2) License 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) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare/plan to maintain high current DC switchgear and equipment	1.1	Work schedules including drawings, plans, requirements procedures and material lists are acquired, analysed and the extent of work determined.
	1.2	Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4	Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to agreed quality standards and in accordance with established policies and procedures.
	1.5	Risk control measures are identified, prioritised, implemented and evaluated against the work schedule.
	1.6	Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, acquired and confirmed in safe/technical working order.
	1.7	Liaison issues with other personnel and/or authorities are resolved and activities coordinated to facilitate the work.
	1.8	Personnel participating in the work including plant operators and contractors are fully briefed, their respective responsibilities explained and coordinated and appropriate authorisation checked in accordance with established

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ELEMENT	PERFORMANCE CRITERIA	
		procedures.
	1.9	Work site is prepared according to the work schedule and to minimise risk and damage to property and personnel in accordance with established procedures.
2 Carry out the maintenance of high current DC switchgear and equipment	2.1	OHS and sustainable energy principles and practices to reduce the incidence of accidents and minimise waste are implemented and monitored in accordance with established procedures.
	2.2	CPR, Rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.
	2.3	Safe working documentation is acquired and requirements completed in accordance with established procedures.
	2.4	Lifting, climbing and working aloft, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.
	2.5	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.
	2.6	Maintenance and repair of high current DC switchgear and equipment is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied for the safe maintenance of high current DC switchgear and equipment to ensure completion in an agreed timeframe and to quality standards with a minimum of waste according to requirements.
	2.8	Unplanned events or conditions are responded to in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
3 Complete the maintenance of high current DC switchgear and equipment	3.1	Work undertaken is checked against work schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.
	3.2	Safe working documentation is surrendered and equipment made ready for service.
	3.3	Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.4	Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.
	3.5	Required works completion records, reports and/or documentation and information are completed, processed and appropriate personnel notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining high current DC switchgear 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice

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REQUIRED SKILLS AND KNOWLEDGE

T2.2.13	Low Voltage - energised work practices for substations
T2.8.1	Enterprise specific - policy and procedures and instructions
T2.8.2	Enterprise specific - OHS instruction
T2.8.3	Enterprise specific - technical drawing and documents
T2.8.4	Enterprise specific - switching diagrams
T2.8.6	Enterprise specific - specialised tools
T2.8.7	Enterprise specific - equipment installation procedures
T2.8.8	Enterprise specific data management processes
T2.10.4	Substation DC circuit breaker principles
T2.10.5	Substation DC circuit breaker maintenance
T2.10.6	Substation DC circuit breaker installation
T2.10.7	Substation tools and 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 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

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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 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 - UET09". 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:

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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; 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:	Multimeters Ductor Megger tester Ammeter Voltmeter 1500 V drop out tester Wiring diagrams Schematic drawings Operating and substation arrangement diagrams

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		Building layouts Cable block and schedule diagrams
B	At least six of the following:	Direct current circuit breakers Rectifier transformers Rectifiers Isolators and links Harmonic filters Negative reactors Energy dissipation resistors
C	At least ten of the following:	DC feeders Surge arresters Isolating links Busbar Cables Cable supports Pits and enclosures Protection/alarm systems Control wiring Metering Supervisory interface Cabinets REC
D	All of the following:	Cable terminations Busbar termination/joint Alignment of electrical contacts of withdrawable equipment
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

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		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 maintenance of high current DC switchgear and equipment.

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 Transmission, Distribution and Rail Traction Industry. 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

8) 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.

This Competency Standard Unit shall/may be demonstrated in relation to the maintenance of high current DC switchgear and equipment.

DC switchgear and other equipment includes but is not limited to Direct Current Circuit Breakers, rectifier transformers, rectifiers, invertors, isolators and links, harmonic filters, negative reactors and energy dissipating resistors (EDR's) and rail earth contactor.

Associated equipment may include DC feeders, surge arresters, isolating links, busbar, cables, cable supports, pits and enclosures, protection/alarm systems, control wiring, metering, supervisory interface, cabinets,

Associated components may include main and auxiliary contacts, holding coils, contractors, busbar fingers, diodes, heatsinks, capacitors, fuses, metering, shunts, resistors banks, resistor bank housing.

Test and measurement equipments may include multimeters, ductor, megger tester, ammeter, voltmeter, 1500V drop out test set, feeler gauge.

Drawings can refer to wiring, schematic, operating and substation arrangement diagrams, cable block and schedule diagrams and building layouts.

Confined Spaces may apply to pits, cable tunnels, false floors, and cable basements.

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
- 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

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5)**

Substation Units

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UETTDRSB09B Maintain voltage regulating equipment - capacitor banks

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance and repair of substation voltage regulating equipment and is restricted to high voltage capacitor banks and their associated switching reactors and the inspection, recording of information, testing and measurement of the associated control circuits. It also includes the range of acceptance tests and discharge requirements for complete units within a substation in accordance with established enterprise standards and procedures. It also encompasses fault diagnosis and pre-commissioning tests and interpretation of test results against agreed specifications.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit requires a licence/registration to practice in the work place subject to regulations for undertaking of electrical work. Practice in

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1.2) License to practice

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) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare/plan to maintain voltage regulating equipment (capacitor banks)	1.1	Work schedules including drawings, plans, requirements procedures and material lists are acquired, analysed and the extent of work determined.
	1.2	Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4	Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to agreed quality standards and in accordance with established policies and procedures.
	1.5	Risk control measures are identified, prioritised, implemented and evaluated against the work schedule.
	1.6	Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, acquired and confirmed in safe/technical working order.
	1.7	Liaison issues with other personnel and/or authorities are resolved and activities coordinated to facilitate the work.
	1.8	Personnel participating in the work including plant operators and contractors are fully briefed, their respective responsibilities explained and coordinated and appropriate authorisation checked in accordance with established procedures.
	1.9	Work site is prepared according to the work schedule and to minimise risk and damage to

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ELEMENT	PERFORMANCE CRITERIA	
		property and personnel in accordance with established procedures.
2 Carry out the maintenance of voltage regulating equipment (capacitor banks)	2.1	OHS and sustainable energy principles and practices to reduce the incidence of accidents and minimise waste are implemented and monitored in accordance with established procedures.
	2.2	CPR, rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.
	2.3	Safe working documentation is acquired and requirements completed in accordance with established procedures.
	2.4	Lifting, climbing and working aloft, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.
	2.5	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.
	2.6	Capacitor bank is isolated, discharged and maintained in accordance with requirements.
	2.7	Defective capacitor elements are identified, located and replaced in accordance with manufacturers and enterprise procedures and recommendations.
	2.8	Capacitor network is balanced and pre-service tests and measurements completed in accordance with enterprise procedures.
	2.9	Essential knowledge and associated skills are applied for the safe maintenance of voltage regulating equipment (capacitor banks) to ensure completion in an agreed timeframe and to quality standards with a minimum of waste according to requirements.

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ELEMENT	PERFORMANCE CRITERIA	
	2.10	Unplanned events or conditions are responded to in accordance with established procedures.
3 Complete the maintenance of voltage regulating equipment (capacitor banks)	3.1	Work undertaken is checked against work schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.
	3.2	Safe working documentation is surrendered and the capacitor bank is made ready for service.
	3.3	Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.4	Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.
	3.5	Required works completion records, reports and/or documentation and information are completed, processed and appropriate personnel notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining voltage regulating equipment - capacitor banks.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.2.13	Low voltage - energised work practices for substations
T2.8.1	Enterprise specific - policy and procedures instructions
T2.8.2	Enterprise specific - OHS instructions
T2.8.3	Enterprise specific - technical drawing and documents
T2.8.4	Enterprise specific - switching diagrams
T2.8.6	Enterprise specific - specialised tools
T2.8.7	Enterprise specific - equipment installation procedures
T2.8.8	Enterprise specific - data management processes
T2.10.7	Substation tools and equipment
T2.10.8	Typical fault conditions and symptoms - substations
T2.10.9	Analyse and interpret results and measurements - substations
T2.10.10	Equipment components and materials - substations
T2.10.11	Substation safety practices
T2.10.17	Static reactive plant principles - substations
T2.10.19	Substation switching 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 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 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

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 - UET09". 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	At least one of the following:	Double star neutral current unbalance type Voltage unbalance type, single

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EVIDENCE GUIDE

		star
B	At least two of the following:	Internal discharge resistor cans External resistor type Switching reactors Neutral unbalance current transformer
C	At least three of the following:	Insulation resistance tests Capacitance tests Unbalance current/voltage tests Primary injection tests High voltage dc withstand tests
D	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 maintenance of high voltage regulating equipment capacitor banks and their associated reactors and control circuits installed in substations.

In addition to the resources listed above, in context of and specific resources for assessment, evidence should show demonstrated competency working:

At realistic heights above ground, i.e. above 3 metres, in limited spaces, with different structural/construction types and method and in a variety of environments.

Method of

9.4)

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assessment	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 Transmission, Distribution and Rail Traction Industry. 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

8) 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/may be demonstrated in relation to high voltage capacitor banks and their associated reactors and control circuits installed in substations.

Checks and measurements may include inspection and cleaning, identification and replacement of defective/unserviceable elements/cans, unbalance current/voltage tests, functional tests and control/alarm system checks.

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
- Assessment
- Authorisation
- Confined space

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

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Competency Field

Competency Field **5)**

Substation Units

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UETTDRSB10B Maintain HV power system static VAR compensators

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance and repair of high voltage power system static VAR compensators including the diagnosis of faults and the replacement and repairing of high voltage power system static VAR compensator components in accordance with enterprise requirements. It includes diagnostic and pre-commissioning tests and the interpretation of tests results against agreed specifications.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit requires 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

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1.2) License to practice

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) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to maintain high voltage power system static VAR compensators	1.1 Work schedules including drawings, plans, requirements procedures and material lists are acquired, analysed and the extent of work determined.
	1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4 Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to agreed quality standards and in accordance with established policies and procedures.
	1.5 Risk control measures are identified, prioritised, implemented and evaluated against the work schedule.
	1.6 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, acquired and confirmed in safe/technical working order.
	1.7 Liaison issues with other personnel and/or authorities are resolved and activities coordinated to facilitate the work.
	1.8 Personnel participating in the work including plant operators and contractors are fully briefed, their respective responsibilities explained and coordinated and appropriate authorisation checked in accordance with established procedures.
	1.9 Work site is prepared according to the work schedule and to minimise risk and damage to property and personnel in accordance with

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ELEMENT	PERFORMANCE CRITERIA	
		established procedures.
2 Carry out maintenance on high voltage power system static VAR compensators	2.1	OHS and sustainable energy principles and practices to reduce the incidence of accidents and minimise waste are implemented and monitored in accordance with established procedures.
	2.2	CPR, rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.
	2.3	Safe working documentation is acquired and requirements completed in accordance with established procedures.
	2.4	Lifting, climbing and working aloft, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.
	2.5	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.
	2.6	Maintenance and repair of high voltage power system static VAR compensators is carried outand in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied for the safe maintenance and repair of high voltage power system static VAR compensators to ensurecompletion in an agreed timeframe and to quality standards with a minimum of waste according to requirements.
	2.8	Pre-service tests and measurements are conducted in accordance with enterprise procedures.
	2.9	Unplanned events or conditions are responded to in accordance with established procedures.
3 Complete the maintenance of high voltage power	3.1	Work undertaken is checked against work schedule for conformance with requirements, anomalies reported and solutions identified in accordance with

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ELEMENT	PERFORMANCE CRITERIA	
system static VAR compensators		established procedures.
	3.2	Safe working documentation is surrendered and high voltage static VAR compensator is made ready for service.
	3.3	Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.4	Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.
	3.5	Required works completion records, reports and/or documentation and information are completed processed and appropriate personnel notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining HV power system static VAR compensators.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.2.13	Low voltage - energised work practices for substations
T2.4.2	Low voltage switching principles
T2.8.1	Enterprise specific - policy and procedures instructions

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REQUIRED SKILLS AND KNOWLEDGE

T2.8.2	Enterprise specific - OHS instructions
T2.8.3	Enterprise specific - technical drawing and documents
T2.8.4	Enterprise specific - switching diagrams
T2.8.6	Enterprise specific - specialised tools
T2.8.7	Enterprise specific - equipment installation procedures
T2.8.8	Enterprise specific - data management processes
T2.10.7	Substation tools and equipment
T2.10.8	Typical fault conditions and symptoms - substations
T2.10.9	Analyse and interpret results and measurements - substations
T2.10.10	Equipment components and materials - substations
T2.10.11	Substation safety practices
T2.10.13	Substation control systems design principles
T2.10.15	High voltage insulation systems principles - substations
T2.10.16	Power transformers and reactor principles - substations
T2.10.17	Static reactive plant principles - substations
T2.10.19	Substation switching practices

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 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 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

9.2)

Before the critical aspects of evidence are considered all

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EVIDENCE GUIDE

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 - UET09". 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	At least two of the following:	SVC power transformer SVC auxiliary transformer Capacitors

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EVIDENCE GUIDE

		Reactors Cooling equipment
B	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 maintenance and repair of high voltage power system static VAR compensators including the diagnosis of faults and the replacement and repairing of high voltage power system static VAR compensator components.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working:

Heights above ground, i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction Industry. 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.

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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 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/may be demonstrated in relation to the maintenance and repair of high voltage power system static VAR compensators installed in substations.

Checks and measurements may include inspection and cleaning, identification of defective/unserviceable components, functional tests and control/alarm system checks.

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
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5)**

Substation Units

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UETTDRSB11B Maintain HV power system synchronous condensers

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance of high voltage power system synchronous condensers including the diagnosis of faults and the replacement and repairing of high voltage power system synchronous condenser components in accordance with enterprise requirements. It encompasses the diagnostic and pre-commissioning tests involving synchronous condensers and the interpretation of these tests against agreed specifications.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit requires 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

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1.2) License to practice

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) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to maintain high voltage power system synchronous condensers	1.1 Work schedules including drawings, plans, requirements procedures and material lists are acquired, analysed and the extent of work determined.
	1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4 Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to agreed quality standards and in accordance with established policies and procedures.
	1.5 Risk control measures are identified, prioritised, implemented and evaluated against the work schedule.
	1.6 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, acquired and confirmed in safe/technical working order.
	1.7 Liaison issues with other personnel and/or authorities are resolved and activities coordinated to facilitate the work.
	1.8 Personnel participating in the work including plant operators and contractors are fully briefed, their respective responsibilities explained and coordinated and appropriate authorisation checked in accordance with established procedures.
	1.9 Work site is prepared according to the work schedule and to minimise risk and damage to property and personnel in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
2 Carry out maintenance on high voltage power system synchronous condensers	2.1	OHS and sustainable energy principles and practices to reduce the incidence of accidents and minimise waste are implemented and monitored in accordance with established procedures.
	2.2	CPR, Rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.
	2.3	Safe working documentation is acquired and requirements completed in accordance with established procedures.
	2.4	Lifting, climbing and working aloft, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.
	2.5	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.
	2.6	Maintenance of high voltage power system synchronous condensers is carried out in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied for the safe maintenance of high voltage power system synchronous condensers to ensure completion in an agreed timeframe and to quality standards with a minimum of waste according to requirements.
	2.8	Pre-service tests and measurements are conducted in accordance with enterprise procedures.
	2.9	Unplanned events or conditions are responded to in accordance with established procedures.
3 Complete the maintenance of high voltage power system synchronous	3.1	Work undertaken is checked against work schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
condensers	3.2	Safe working documentation is surrendered and the power system synchronous condenser made ready for service.
	3.3	Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.4	Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.
	3.5	Required works completion records, reports and/or documentation and information are completed, processed and appropriate personnel notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining HV power system synchronous condensers.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.2.13	Low voltage - energised work practices for substations
T2.4.2	Low voltage switching principles
T2.8.1	Enterprise specific - policy and procedures instructions

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REQUIRED SKILLS AND KNOWLEDGE

T2.8.2	Enterprise specific - OHS instructions
T2.8.3	Enterprise specific - technical drawing and documents
T2.8.4	Enterprise specific - switching diagrams
T2.8.6	Enterprise specific - specialised tools
T2.8.7	Enterprise specific - equipment installation procedures
T2.8.8	Enterprise specific - data management processes
T2.10.7	Substation tools and equipment
T2.10.8	Typical fault conditions and symptoms - substations
T2.10.9	Analyse and interpret results and measurements - substations
T2.10.10	Equipment components and materials - substations
T2.10.11	Substation safety practices
T2.10.13	Substation control systems design principles
T2.10.19	Substation switching practices
T2.10.24	Rotating reactive plant principles - substations

Evidence Guide

EVIDENCE GUIDE

8) 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.

9)

Overview of 9.1)

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EVIDENCE GUIDE

8) 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.

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 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 - UET09". Evidence shall also comprise:

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EVIDENCE GUIDE

8) 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.

- 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	At least one of the following:	Stator winding Rotor winding
B	All of the following;	Hydrogen cooling system

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EVIDENCE GUIDE

8) 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.

C	At least one of the following;	Control system, Alarm system
D	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 maintenance of HV power system synchronous condensers found in substations.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working:

At realistic heights above ground i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction Industry. 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.

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EVIDENCE GUIDE

8) 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.

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 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/may be demonstrated in relation to the maintenance of HV power system synchronous condensers found in substations.

Checks and measurements include cooling water resistivity, gas pressure levels, residual gas content, winding resistance, insulation resistance and control circuit functionality.

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
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5)**

Substation Units

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UETTDRSB12B Maintain voltage regulating equipment - on load tapchangers

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance, repair and overhaul of substation voltage regulating equipment and is restricted to resistor and reactor type high speed on load tapchangers and does not include the main tank tap selector mechanism. It includes the inspection, recording of information, testing and measurement of associated control circuits. It also includes the range of acceptance tests required on installed complete units within the parent power transformer in accordance with established enterprise standards and procedures. It encompasses the diagnostic and pre-commissioning checks and tests involving the tapchangers and the interpretation of these results against agreed specifications.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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1.2) License to practice

The skills and knowledge described in this unit requires 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) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare/plan to maintain voltage regulating equipment (tapchangers)	1.1	Work schedules including drawings, plans, requirements procedures and material lists are acquired, analysed and the extent of work determined.
	1.2	Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4	Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to agreed quality standards and in accordance with established policies and procedures.
	1.5	Risk control measures are identified, prioritised, implemented and evaluated against the work schedule.
	1.6	Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, acquired and confirmed in safe/technical working order.
	1.7	Liaison issues with other personnel and/or authorities are resolved and activities coordinated to facilitate the work.
	1.8	Personnel participating in the work including plant operators and contractors are fully briefed, their respective responsibilities explained and coordinated and appropriate authorisation checked in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	1.9	Work site is prepared according to the work schedule and to minimise risk and damage to property and personnel in accordance with established procedures.
2 Carry out the maintenance of voltage regulating equipment (tapchangers)	2.1	OHS and sustainable energy principles and practices to reduce the incidence of accidents and minimise waste are implemented and monitored in accordance with established procedures.
	2.2	CPR, Rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.
	2.3	Safe working documentation is acquired and requirements completed in accordance with established procedures.
	2.4	Lifting, climbing and working aloft, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.
	2.5	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.
	2.6	Oil circuits are isolated and tap changer vessels drained in accordance with established and environmental protection procedures.
	2.7	Tap changer is withdrawn and maintained, applying essential knowledge and associated skills and in accordance with manufacturers and enterprise procedures and recommendations.
	2.8	Pre-service tests and measurements are conducted in accordance with enterprise procedures.
	2.9	Essential knowledge and associated skills are applied for the safe maintenance of voltage regulating equipment (tapchangers) to ensure completion in an agreed timeframe and to

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ELEMENT	PERFORMANCE CRITERIA	
		quality standards with a minimum of waste according to requirements.
	2.10	Unplanned events or conditions are responded to in accordance with established procedures.
3 Complete the maintenance of voltage regulating equipment (tapchangers)	3.1	Work undertaken is checked against work schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.
	3.2	Safe working documentation is surrendered and transformer made ready for service.
	3.3	Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.4	Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.
	3.5	Required works completion records, reports and/or documentation and information are completed, processed and appropriate personnel notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining voltage regulating equipment - on load tapchangers.

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 (EKAS) required is given in

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REQUIRED SKILLS AND KNOWLEDGE

Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.2.13	Low voltage - energised work practices for substations
T2.4.2	Low voltage switching principles
T2.8.1	Enterprise specific - policy and procedures instructions
T2.8.2	Enterprise specific - OHS instructions
T2.8.3	Enterprise specific - technical drawing and documents
T2.8.4	Enterprise specific - switching diagrams
T2.8.6	Enterprise specific - specialised tools
T2.8.7	Enterprise specific - equipment installation procedures
T2.8.8	Enterprise specific - data management processes
T2.10.7	Substation tools and equipment
T2.10.8	Typical fault conditions and symptoms - substations
T2.10.9	Analyse and interpret results and measurements - substations
T2.10.10	Equipment components and materials - substations
T2.10.11	Substation safety practices
T2.10.13	Substation control systems design principles
T2.10.16	Power transformers and reactor principles - substations
T2.10.18	On load tap changer principles - substations

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REQUIRED SKILLS AND KNOWLEDGE

T2.10.19 Substation switching 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 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 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

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EVIDENCE GUIDE

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 - UET09". 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	**The minimum**	**Item List**

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No	**number of items on which skill is to be demonstrated**	
A	At least one of the following:	High speed resistor type and drive mechanism, High speed reactor type and drive mechanism
B	At least two of the following:	Live tank diverter switch Dead tank diverter switch Tap selector
C	At least three of the following:	Insulation resistance tests Transition resistor tests Contact resistance tests Sequence timing tests Ratio checks Winding resistance tests Oil sampling
D	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 maintenance of voltage regulating equipment (tapchangers)

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working:

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EVIDENCE GUIDE

	At realistic heights above ground, i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction Industry. 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

8) 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/may be demonstrated in relation to high speed resistor and reactor type tapchangers installed in power transformers used in substations.

Checks and measurements may include mechanism alignment, contact erosion, component replacement, inspection and cleaning, disassembly and re-assembly, functional tests and operating mechanism checks. It includes the testing, filtering or replacement of diverter switch oil.

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)

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RANGE STATEMENT

- Appropriate authorities
- Appropriate work platform
- Assessing risk
- 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

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Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Substation Units

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UETTDRSB13B Install HV plant and equipment

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation of high voltage plant and equipment and includes the pre-commissioning tests within agreed specifications. It includes the installation of the earthing systems, tertiary cabling and/or busbar systems in accordance with enterprise procedures but does not include the necessary protection systems.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit requires 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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT **PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA	
1 Prepare/plan the installation of high voltage plant and equipment	1.1	Work schedules including drawings, plans, requirements procedures and material lists are acquired, analysed and the extent of work determined.
	1.2	Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4	Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to agreed quality standards and in accordance with established policies and procedures.
	1.5	Risk control measures are identified, prioritised, implemented and evaluated against the work schedule.
	1.6	Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, acquired and confirmed in safe/technical working order.
	1.7	Liaison issues with other personnel and/or authorities are resolved and activities coordinated to facilitate the work.
	1.8	Personnel participating in the work including plant operators and contractors are fully briefed, their respective responsibilities explained and coordinated and appropriate authorisation checked in accordance with established procedures.
	1.9	Work site is prepared according to the work schedule and to minimise risk and damage to property and personnel in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
2 Carry out the installation of high voltage plant and equipment	2.1	OHS and sustainable energy principles and practices to reduce the incidence of accidents and minimise waste are implemented and monitored in accordance with established procedures.
	2.2	CPR, rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.
	2.3	Safe working documentation is acquired and requirements completed in accordance with established procedures.
	2.4	Lifting, climbing and working aloft, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.
	2.5	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.
	2.6	Earthing requirements are identified and installed or confirmed installed in accordance with enterprise policies and procedures.
	2.7	Foundations and other appropriate civil works are constructed and/or confirmed ready for the erection of high voltage plant and equipment.
	2.8	High voltage plant and equipment is erected and associated HV connections, LV controls and supplies are installed in accordance with manufacturers and enterprise procedures and recommendations.
	2.9	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.10	Pre-commissioning checks are carried out and the high voltage plant and equipment made ready for service in accordance with established policies and procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.11	Work undertaken is checked against works schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.
	2.11	Essential knowledge and associated skills are applied for the safe installation of high voltage plant and equipment to ensure completion in an agreed timeframe and to quality standards with a minimum of waste according to requirements.
	2.13	Unplanned events or conditions are responded to in accordance with established procedures.
3 Complete the installation of high voltage plant and equipment	3.1	Work undertaken is checked against work schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.
	3.2	Safe working documentation is surrendered and installed power system high voltage plant and equipment made ready for service.
	3.3	Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.4	Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.
	3.5	Required works completion records, reports and/or documentation and information are completed, processed and appropriate personnel notified in accordance with established procedures.
	3.6	Associated drawings, schematics and diagrams are updated to reflect work as executed in accordance with enterprise procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing HV 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.2.13	Low voltage - energised work practices for substations
T2.4.2	Low voltage switching principles
T2.8.1	Enterprise specific - policy and procedures instructions
T2.8.2	Enterprise specific - OHS instruction
T2.8.3	Enterprise specific - technical drawing and documents
T2.8.4	Enterprise specific - switching diagrams
T2.8.6	Enterprise specific - specialised tools
T2.8.7	Enterprise specific - equipment installation procedures
T2.8.8	Enterprise specific - data management processes
T2.10.7	Substation tools and equipment
T2.10.8	Typical fault conditions and symptoms - substations
T2.10.9	Analyse and interpret results and measurements - substation

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REQUIRED SKILLS AND KNOWLEDGE

T2.10.10	Equipment components and materials - substations
T2.10.11	Substation safety practices
T2.10.12	Substation LV supply design principles
T2.10.13	Substation control systems design principles
T2.10.14	Hydraulic and pneumatic system principles - substations
T2.10.16	Power transformers and reactor principles - substations
T2.10.19	Substation switching practices
T2.10.21	Circuit breaker construction principles - substations
T2.10.22	Circuit breaker operating principles - substations

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)

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,

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EVIDENCE GUIDE

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 the "Assessment Guidelines - UET09". 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

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EVIDENCE GUIDE

- 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	At least two of the following:	Power transformer High voltage reactor (series or parallel) Auxiliary transformer Current transformer Voltage transformer Capacitor bank Circuit breaker High current dc switchgear and/or equipment
B	At least two of the following:	Disconnector Fault throwing switch Earth switch Earth grid connections Surge arrestor

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EVIDENCE GUIDE

		Neutral earthing transformer Resistor bank
C	At least three of the following:	Insulation resistance tests Dielectric dissipation factor tests Low voltage excitation checks Continuity checks Ratio checks Winding resistance tests Gas pressure checks Timing checks Contact resistance checks
D	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 installation of high voltage plant and equipment.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working:

At realistic heights above ground, i.e. above 3 metres, 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

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	given in Volume 1, Part 3 "Assessment Guidelines". Note: Competent performance with inherent safe working practices is expected in the Transmission, Distribution and Rail Traction Industry. 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

8) 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/may be demonstrated in relation to substation high voltage plant and equipment may include transformers and instrument transformers, auxiliary transformers, surge arrestors, wave traps, circuit breakers, capacitor banks, disconnectors, earth switches, ripples filters, static VAR compensators, gas insulated switchgear, fault throwers, resistor banks, neutral earthing transformers and reactors, high current DC switchgear and equipment.

Pre-commissioning checks and measurements may include insulation resistance, winding resistance, dielectric dissipation factor, winding ratio, vector group, low voltage excitation, continuity, trip and close checks, gas pressure checks, contact timing and other checks and measurements as required by the manufacturer.

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

Custom Content Section

2.2) Literacy and numeracy skills

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"

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2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Substation Units

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UETTDRSB14B Carry out Thermovision surveys

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This unit of competence covers the thermographic inspections of transmission/distribution systems and/or substation equipment. It includes surveying, inspecting, recording of information and reporting of defective/non compliant conditions in accordance with established enterprise standards and procedures.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit requires 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.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to carry out thermographic surveys	1.1 Work schedules including drawings, plans, requirements procedures and material lists are acquired, analysed and the extent of work

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ELEMENT	PERFORMANCE CRITERIA	
		determined.
	1.2	Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4	Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to agreed quality standards and in accordance with established policies and procedures.
	1.5	Risk control measures are identified, prioritised, implemented and evaluated against the work schedule.
	1.6	Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, acquired and confirmed in safe/technical working order.
	1.7	Liaison issues with other personnel and/or authorities are resolved and activities coordinated to facilitate the work.
	1.8	Personnel participating in the work including plant operators and contractors are fully briefed, their respective responsibilities explained and coordinated and appropriate authorisation checked in accordance with established procedures.
	1.9	Work site is prepared according to the work schedule and to minimise risk and damage to property and personnel in accordance with established procedures.
2 Carry out thermographic surveys	2.1	OHS and sustainable energy principles and practices to reduce the incidence of accidents and minimise waste are implemented and monitored

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ELEMENT	PERFORMANCE CRITERIA	
		in accordance with established procedures.
	2.2	CPR, Rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.
	2.3	Safe working documentation is acquired if appropriate and requirements completed in accordance with established procedures.
	2.4	Lifting, climbing and working aloft, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.
	2.5	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.
	2.6	Circuit load conditions are assessed, other personnel and/or organisations consulted and informed and appropriate circuit adjustments made prior to survey according to established procedures.
	2.7	Substation equipment and/or transmission/distribution systems are surveyed and all joints, connections and components surveyed and assessed in accordance with enterprise procedures.
	2.8	Non conformance defects are assessed for level of safety/system impact and communicated to appropriate personnel for further action as per established procedures.
	2.9	Circuits are restored to pre-survey conditions and appropriate personnel/organisations informed as per established procedures.
	2.10	Essential knowledge and associated skills are applied for the safe carrying out of thermographic surveys to ensure completion in an agreed timeframe and to quality standards with a minimum of waste according to requirements.

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ELEMENT	PERFORMANCE CRITERIA	
	2.11	Unplanned events or conditions are responded to in accordance with established procedures.
3 Record the outcomes of thermographic surveys	3.1	Work undertaken is checked against work schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.
	3.2	Safe working documentation is surrendered if appropriate.
	3.3	Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.4	Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.
	3.5	Required works completion records, reports and/or documentation and information are completed, processed and appropriate personnel notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 carrying out thermovision surveys.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.2	Electrical safe working practice
T2.8.1	Enterprise specific - policy and procedures instructions
T2.8.2	Enterprise specific - OHS instructions
T2.8.3	Enterprise specific - technical drawing and documents
T2.8.4	Enterprise specific - switching diagrams
T2.8.6	Enterprise specific - specialised tools
T2.8.7	Enterprise specific - equipment installation procedures
T2.8.8	Enterprise specific - data management processes
T2.10.7	Substation tools and equipment
T2.10.8	Typical fault conditions and symptoms - substations
T2.10.9	Analyse and interpret results and measurements - substations
T2.10.10	Equipment components and materials - substations
T2.10.11	Substation safety practices
T2.10.15	High voltage insulation systems principles - substations
T2.10.16	Power transformers and reactor principles - substations
T2.10.19	Substation switching practices
T2.10.21	Circuit breaker construction principles - substations
T2.10.22	Circuit breaker operating principles - substations
T2.10.23	Infrared imaging principles - substations

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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 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 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

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EVIDENCE GUIDE

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 - UET09". 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**	**Item List**

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	demonstrated	
A	At least one of the following:	Transmission substation Distribution substation Traction substation
B	At least one of the following:	Substation apparatus and equipment Transmission/distribution system conductors and components
C	At least three of the following:	Disconnectors Transmission/distribution system conductors Mid span joints Bolted palms and connections Terminations Jumpers Pot heads
D	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 carrying out of thermographic surveys

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working:

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	At realistic heights above ground, i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction Industry. 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

8) 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/may be demonstrated in relation to the thermographic surveying of distribution, transmission and rail lines and the apparatus and equipment found in and around substations.

It also includes modification of circuit configuration to maximise load on conductors to be surveyed.

Surveys can be carried out using hand held thermographic cameras at ground level or in a helicopter

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:

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RANGE STATEMENT

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform
- Assessing risk
- 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

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Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Substation Units

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UETTDRSB15B Maintain discrete protection and control systems

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the isolation, inspection, testing, adjustment, and repair, refurbishment and/or overhaul and functional checks of discrete protection and control devices. It includes the requirements to prove the functionality of discrete devices such as DC supplies,over-current, overload, earth fault, transformer temperature controls, alarms and indication circuits.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit requires 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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT **PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA	
1 Plan for the maintenance of discrete protection and control devices	1.1	Work schedules including drawings, plans, requirements procedures and material lists are acquired, analysed and the extent of work determined.
	1.2	Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4	Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to agreed quality standards and in accordance with established policies and procedures.
	1.5	Risk control measures are identified, prioritised, implemented and evaluated against the work schedule.
	1.6	Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, acquired and confirmed in safe/technical working order.
	1.7	Liaison issues with other personnel and/or authorities are resolved and activities coordinated to facilitate the work.
	1.8	Personnel participating in the work including plant operators and contractors are fully briefed, their respective responsibilities explained and coordinated and appropriate authorisation checked in accordance with established procedures.
	1.9	Work site is prepared according to the work schedule and to minimise risk and damage to property and personnel in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
2 Carry out the maintenance of discrete protection and control devices	2.1	OHS and sustainable energy principles and practices to reduce the incidence of accidents and minimise waste are implemented and monitored in accordance with established procedures.
	2.2	CPR, Rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.
	2.3	Safe working documentation is acquired and requirements completed in accordance with established procedures.
	2.4	Lifting, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.
	2.5	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.
	2.6	Maintenance of discrete protection and control devices is undertaken according to requirements and established procedures.
	2.7	Data is analysed and compared with compliance specifications to ensure completion of the maintenance work is within an agreed timeframe and according to requirements.
	2.8	Essential knowledge and associated skills are applied for the safe maintenance of discrete protection and control devices to ensure completion in an agreed timeframe and to quality standards with a minimum of waste according to requirements.
	2.9	Unplanned events or conditions are responded to in accordance with established procedures.
3 Complete the maintenance of discrete protection and control devices	3.1	Final inspections of discrete protection and control devices are undertaken and checked against the work schedule to ensure they comply with all requirements including all required documentation.

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ELEMENT	PERFORMANCE CRITERIA
	3.2 Anomalies between the work schedule requirements and measured performance are reported and solutions identified in accordance with established procedures.
	3.3 Safe working documentation is surrendered and transformer made ready for service.
	3.4 Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.5 Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.
	3.6 Required works completion records, reports and/or documentation and information are completed, processed and appropriate personnel notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining discrete protection and control 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

E2.18.2 Electrical safe working practice

T2.3.3 Statutory and safety considerations

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REQUIRED SKILLS AND KNOWLEDGE

T2.3.4	Electrical equipment - protection and control schemes
T2.3.5	Discrete protection schemes - isolation and tagging procedures
T2.3.6	Protection devices - maintenance and commissioning principles.
T2.3.7	Protection devices -manufacturers requirements
T2.7.6	Disposal procedures for insulating materials
T2.10.1	Visual inspection procedures -substations
T2.10.2	Surge relay operation and maintenance - substations
T2.10.9	Analyse and interpret results and measurements - substations
T2.10.26	Voltage regulation scheme principles - substations
T2.10.27	Use of test equipment on a discrete protection scheme - substations
T2.11.74	Discrete protection devices

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**) Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered

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EVIDENCE GUIDE

in a 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 the "Assessment Guidelines - UET09". 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:

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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; 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:	Isolate discrete protection Control and indications Overcurrent and Earth fault relays DC Supplies Trip and control circuits Alarms and indications Function test of discrete divices
B	At least three of the	Neutral displacement

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	following:	No-volt changeover Discrete auto reclose DC Frame leakage Oil surge (site maintenance) Voltage regulation Parallel operation Thermal overloads Transformer temperature control devices CEL fail
C	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 maintenance of discrete protection and control devices.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working:

At realistic heights above ground, i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction

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EVIDENCE GUIDE

	Industry. 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

8) 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/may be demonstrated in relation to the maintenance of discrete protection and control devices and may include the following:

Overcurrent, and Earth fault relays, Neutral displacement relays, No-volt changeover devices, Discrete auto reclose devices, DC Supplies, Oil surge devices (site maintenance), DC Frame leakage, Trip/control circuits, Alarms and indication, Voltage regulation relays, Parallel operation, Circuit isolation (discrete only) Function tests (discrete only) Thermal overload, Transformer temperature control devices CEL fail devices.

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
- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration
- Documenting detail work events, record keeping and or

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RANGE STATEMENT

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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

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Competency Field

Competency Field **5**)

Substation Units

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UETTDRSB16B Commission discrete protection and control systems

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the commissioning/testing of discrete protection and control systems and includes isolation, inspection, monitoring, testing, adjustment and functional checks on systems such as over-current, overloads, earth fault, alarms and controls.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit requires 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.

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Pre-Requisites

Prerequisite Unit(s) **2**)

2.1) **Competencies**

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Granting of competency in this unit shall also be made only after competency in the following unit(s) has/have been confirmed:.

UTETDRSB15B	Maintain discrete protection and control systems

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the commissioning/testing of discrete protection and control systems	1.1 Work schedules including drawings, plans, requirements procedures and material lists are acquired, analysed and the extent of work determined.
	1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4 Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to agreed quality standards and in accordance with established policies and procedures.
	1.5 Risk control measures are identified, prioritised, implemented and evaluated against the work schedule.
	1.6 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, acquired and confirmed in safe/technical working order.
	1.7 Liaison issues with other personnel and/or authorities are resolved and activities coordinated to facilitate the work.
	1.8 Personnel participating in the work including plant operators and contractors are fully briefed, their respective responsibilities explained and coordinated and appropriate authorisation checked in accordance with established procedures.
	1.9 Work site is prepared according to the work schedule and to minimise risk and damage to property and personnel in accordance with

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ELEMENT	PERFORMANCE CRITERIA	
		established procedures.
2 Carry out the commissioning/testing of discrete protection and control systems	2.1	OHS and sustainable energy principles and practices to reduce the incidence of accidents and minimise waste are implemented and monitored in accordance with established procedures.
	2.2	CPR, Rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.
	2.3	Safe working documentation is acquired and requirements completed in accordance with established procedures.
	2.4	Lifting, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.
	2.5	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.
	2.6	Commissioning/testing of discrete protection and control systems is undertaken according to requirements and established procedures.
	2.7	Data is analysed and compared with compliance specifications to ensure commissioning/testing of the discrete system is completed within an agreed timeframe and according to requirements.
	2.8	Essential knowledge and associated skills are applied for the safe commissioning/testing of discrete protection and control systems to ensure completion in an agreed timeframe and to quality standards with a minimum of waste according to requirements
	2.9	Unplanned events or conditions are responded to in accordance with established procedures.
3 Complete the commissioning/testing of discrete protection	3.1	Final inspections and functional testing of the discrete protection and control systems are completed and checked to ensure compliance with

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ELEMENT	PERFORMANCE CRITERIA	
and control systems		all requirements.
	3.2	Anomalies between requirements and measured performance are reported and solutions identified in accordance with established procedures.
	3.3	Safe working documentation is surrendered and discrete protection and control systems are made ready for service.
	3.4	Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.5	Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.
	3.6	Required works completion records, reports and/or documentation and information are completed, processed and appropriate personnel notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 commissioning/testing discrete protection and 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

E2.18.2 Electrical safe working practice

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REQUIRED SKILLS AND KNOWLEDGE

T2.3.3	Statutory and safety considerations
T2.3.4	Electrical equipment - protection and control schemes
T2.3.5	Discrete protection schemes - Isolation and tagging procedures
T2.3.6	Protection devices - maintenance and commission principles
T2.3.7	Protection devices - manufacturer requirements
T2.7.6	Disposal procedures for insulating materials
T2.10.1	Visual inspection procedures -substations
T2.10.2	Surge relay operation and maintenance - substations
T2.10.3	Commissioning of discrete protection devices - substations
T2.10.9	Analyse and interpret results and measurements - substations
T2.10.26	Voltage regulation scheme principles - substations
T2.10.27	Use of test equipment on a discrete protection scheme - substations
T2.11.74	Discrete protection devices

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

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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 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 - UET09". Evidence shall also comprise:

- A representative body of Performance Criteria 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; 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:	Isolate protection Control and alarms associated with discrete protection and control systems Isolate 'in service' current transformers Calibrate discrete protection and control relays Carry out function tests (trips, alarms etc.) on discrete protection and control systems

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		without assistance Write reports on the performance of discrete protection and control systems
B	At least three of the following:	Overcurrent, frame leakage Cooling controls Buccholz/surge protection Dc supplies control Neutral displacementCB reclose DC frame leakage CEL fail Earth fault
C	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 commissioning of discrete protection and control systems.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working:

At realistic heights above ground, i.e. above 3 metres, 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

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given in Volume 1, Part 3 "Assessment Guidelines".

Note:
Competent performance with inherent safe working practices is expected in the Transmission, Distribution and Rail Traction Industry. 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

8) 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/may be demonstrated in relation to the commissioning/testing of discrete protection and control systems and may include the following:

Overcurrent, frame leakage, cooling, buchholz, DC supplies, neutral displacement, sensitive earth fault, reclose, DC frame leakage, CEL fail, , earth fault

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
- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration
- Documenting detail work events, record keeping and or storage of information

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

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Competency Field

Competency Field **5**)

Substation Units

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UETTDRSB17B Maintain distribution field devices

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance of ACRs, gas switches, regulators and line capacitors, communication systems including mobile phones and TMR radio. It includes secondary injection, timing, and function tests and proving correct tripping, reclosing and remote operation.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit requires 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.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the maintenance of distribution field	1.1 Work schedules including drawings, plans, requirements procedures and material lists are acquired, analysed and the extent of work

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ELEMENT	PERFORMANCE CRITERIA	
devices		determined.
	1.2	Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4	Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to agreed quality standards and in accordance with established policies and procedures.
	1.5	Risk control measures are identified, prioritised, implemented and evaluated against the work schedule.
	1.6	Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, acquired and confirmed in safe/technical working order.
	1.7	Liaison issues with other personnel and/or authorities are resolved and activities coordinated to facilitate the work.
	1.8	Personnel participating in the work including plant operators and contractors are fully briefed, their respective responsibilities explained and coordinated and appropriate authorisation checked in accordance with established procedures.
	1.9	Work site is prepared according to the work schedule and to minimise risk and damage to property and personnel in accordance with established procedures.
2 Carry out the maintenance of distribution network	2.1	OHS and sustainable energy principles and practices to reduce the incidence of accidents and minimise waste are implemented and monitored

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ELEMENT	PERFORMANCE CRITERIA	
field devices		in accordance with established procedures.
	2.2	CPR, Rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.
	2.3	Safe working documentation is acquired and requirements completed in accordance with established procedures.
	2.4	Lifting, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied for the safe maintenance of distribution field devices to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.7	Maintenance, including testing of distribution field devices is undertaken according to requirements and established procedures.
	2.8	Unplanned events or conditions are responded to in accordance with established procedures.
3 Complete the maintenance of distribution network field devices	3.1	Functional checks of distribution field devices are completed and all work checked against the requirements to ensure compliance.
	3.2	Anomalies between the work schedule requirements and measured performance are reported and solutions identified in accordance with established procedures.
	3.3	Safe working documentation is surrendered and transformer made ready for service.
	3.4	Work site is rehabilitated, cleaned up and confirmed safe in accordance with established

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ELEMENT	PERFORMANCE CRITERIA	
		procedures.
	3.5	Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.
	3.6	Approved copies of the maintenance of distribution network field devices documents are issues and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining distribution field 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.3.3	Statutory and safety considerations
T2.3.4	Electrical equipment - protection and control schemes
T2.3.5	Discrete protection schemes - isolation and tagging procedures
T2.3.6	Protection devices - maintenance and commission principles
T2.3.7	Protection devices - manufacturer requirements

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REQUIRED SKILLS AND KNOWLEDGE

T2.7.6	Disposal procedures for insulating materials
T2.10.1	Visual inspection procedures - substations
T2.10.2	Surge relay operation and maintenance - substations
T2.10.9	Analyse and interpret results and measurements - substations
T2.10.26	Voltage regulation scheme principles - substations
T2.10.27	Use of test equipment on a discrete protection scheme - substations

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)

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

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EVIDENCE GUIDE

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

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 - UET09". 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

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EVIDENCE GUIDE

- 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:	Assembly Functional checks Applying device settings Secondary injections Timing Remote operations
B	At least three of the following:	ACRs Gas switches Regulators Line capacitors Mobile phone systems TMR radio systems
C	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 9.3)

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EVIDENCE GUIDE

specific 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 maintenance of distribution network field devices.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working:

At realistic heights above ground, i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction Industry. 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

8) 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

This Competency Standard Unit shall/may be demonstrated in relation to the maintenance of distribution field devices. These devices may include:

Automatic circuit reclosers (ACRs), gas switches, secondary injection tests, primary injection tests, TMR radio's, SCADA, remote control, overcurrent, earth fault, sensitive earth fault, inverse time curves, definite time curves, tripping, reclose, DC supplies, AC supplies, alarms.

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
- 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

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Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5)**

Substation Units

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UETTDRSB18B Commission distribution field devices

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the commissioning of ACRs, gas switches, regulators and line capacitors, communication systems including mobile phones and TMR radio. It also includes communication with the Operating Authority, testing, clearing after test and energising using techniques that are acceptable to the Operating Authority.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit requires 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.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the commissioning of distribution field	1.1 Work schedules including drawings, plans, requirements procedures and material lists are acquired, analysed and the extent of work

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ELEMENT	PERFORMANCE CRITERIA	
devices		determined.
	1.2	Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4	Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to agreed quality standards and in accordance with established policies and procedures.
	1.5	Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, acquired and confirmed in safe/technical working order.
	1.6	Liaison issues with other personnel and/or authorities are resolved and activities coordinated to facilitate the work.
	1.7	Personnel participating in the work including plant operators and contractors are fully briefed, their respective responsibilities explained and coordinated and appropriate authorisation checked in accordance with established procedures.
	1.8	Work site is prepared according to the work schedule and to minimise risk and damage to property and personnel in accordance with established procedures.
2 Carry out the commissioning of distribution network field devices	2.1	OHS and sustainable energy principles and practices to reduce the incidence of accidents and minimise waste are implemented and monitored in accordance with established procedures.
	2.2	CPR, Rescue from live electrical apparatus and other related safety procedures are in place

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ELEMENT	PERFORMANCE CRITERIA	
		according to requirements and established procedures.
	2.3	Safe working documentation is acquired and requirements completed in accordance with established procedures.
	2.4	Lifting, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.
	2.5	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are monitored and preventive action taken and/or appropriate authorities consulted where necessary in accordance with established procedures.
	2.6	Commissioning, including testing of distribution field devices is undertaken according to requirements and established procedures.
	2.7	Data is analysed and compared with compliance specifications to ensure completion of the maintenance work is within an agreed timeframe and according to requirements.
	2.8	Essential knowledge and associated skills are applied for the safe commissioning of distribution network field devices to ensure completion in an agreed timeframe and to quality standards with a minimum of waste according to requirements
	2.9	Unplanned events or conditions are responded to in accordance with established procedures.
3 Complete the commissioning of distribution network field devices	3.1	Functional checks of distribution field devices are completed and all work checked against the requirements to ensure compliance.
	3.2	Anomalies between the work schedule requirements and measured performance are reported and solutions identified in accordance with established procedures.
	3.3	Safe working documentation is surrendered and transformer made ready for service.

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ELEMENT	PERFORMANCE CRITERIA
	3.4 Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.5 Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.
	3.6 Documents and records related to the distribution field devices are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 commissioning distribution field 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

E2.18.2 Electrical safe working practice

T2.3.3 Statutory and safety considerations

T2.3.4 Electrical equipment - protection and control schemes

T2.3.5 Discrete protection schemes - isolation and tagging procedures

T2.3.6 Protection devices - maintenance and commission principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.3.7	Protection devices - manufacturer requirements
T2.7.6	Disposal procedures for insulating materials
T2.10.1	Visual inspection procedures -substations
T2.10.2	Surge relay operation and maintenance - substations
T2.10.9	Analyse and interpret results and measurements - substations
T2.10.25	Commissioning of distribution protection and control systems - substations
T2.10.26	Voltage regulation scheme principles - substations
T2.10.27	Use of test equipment on a discrete protection scheme - substations

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**)

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,

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EVIDENCE GUIDE

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 - UET09". 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

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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:	Assembly Functional checks Applying device settings Secondary injections Timing Remote operations Earthing checks Calibrations
B-	At least three of the following:	ACRs Gas switches Regulators Line capacitors Mobile phone systems TMR radio systems
C	At least one	Dealing with an unplanned event by drawing on essential

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	occasion	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 commissioning of distribution field devices

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working:

At realistic heights above ground i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction Industry. 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.

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Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the commissioning of distribution field devices. These devices may include:

Automatic circuit reclosers (ACRs), gas switches, secondary injection tests, primary injection tests, TMR radio's, SCADA, remote control, overcurrent, earth fault, sensitive earth fault, inverse time curves, definite time curves, tripping, reclose, DC supplies, AC supplies, alarms.

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
- 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

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RANGE STATEMENT

- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Substation Units

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UETTDRSO02B Manage network faults

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1)**

1.1) Descriptor

This Competency Standard Unit covers the management of single incident faults on electrical network plant to ensure prompt restoration of supply to affected customers. Electrical network plant includes feeders, transformers and busbars from transmission to distribution voltages. The unit includes single incident faults ranging from simple (involving a single item and no loss of supply) to complex (involving multiple substations with extensive loss of supply). The unit also encompasses liaison with operating authorities and dispatching and managing field crews, as well as the monitoring of safe access to the network.

Application of the Unit

Application of the Unit **4)**

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRSO20A	Respond to complex protection operations

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan for the management of a network fault	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the management of network faults, are reviewed and determined.
	1.2	Purpose of the management is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established procedures on policies and specifications for the management of network faults are obtained or established with the appropriate personnel.
	1.4	Identification and testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the occurrence of a network fault.
	1.5	Testing parameters are established from organisational established procedures on policies and specifications.
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.

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ELEMENT	PERFORMANCE CRITERIA	
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.12	Action plan is developed as per requirements and established procedures.
2 Carry out the management of a network fault	2.1	Action plan is initiated and continually monitored to ensure outcomes are being met.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the network fault solution in accordance with requirements and/or established procedures.
	2.3	Network fault management decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Stakeholders/customers are kept informed of current status regarding plan progress and recent developments.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of network fault management procedures is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged, coordinated and evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified

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ELEMENT	PERFORMANCE CRITERIA	
		and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the management of a network fault	3.1	Final inspection of the network is undertaken to ensure it complies with all requirements and report includes all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of network fault management documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 managing network 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.2	Electrical safe working practice
T2.8.13	Enterprise specific procedures and work practices relating to fault restorations
T2.11.56	Analysis protection targeting

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)

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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EVIDENCE GUIDE

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 - UET09". 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 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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EVIDENCE GUIDE

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	Manage a Network Fault including all of the following:	Identify a network fault by interpreting available alarms and event data. Develop a plan to enable management of a network fault. Implement plans in order that the network be restored after a fault has occurred. Effectively liaise with operating authorities and field crews to restore the network after a fault has occurred. Document/de-brief actions upon restoration of the network.
B	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 management of a network fault.

Note:

Access will be needed to: relevant modelling tools, drawings,

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EVIDENCE GUIDE

	computerised electrical plant control and monitoring facilities and enterprise operational policies, procedures and work practices. In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions
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 Transmission, Distribution and Rail Traction Industry. 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

8) 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/may be demonstrated in relation to the management of network fault operations such as simultaneous multiple network faults and shall/may be demonstrated using the following:

Equipment includes; sectionalisers, security, sensitive earth fault protection, communication bearers, local trip circuits, inter-trip circuits, remote control supervisory circuits, frequency injection units, under frequency circuits, voice frequency protection signalling, micro-controllers, RDC and MUX units, pilot cables, telephone lines, microwave bearers, cossonay earthwire carriers and optical fibre cables.

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RANGE STATEMENT

Equipment also includes; LV fuses, links and bridges, HV links, fuses, reclosers, ring main units, circuit breakers, isolators, earth switches, sectionalisers, air break switches, capacitor banks, transformer taps, metering and protection equipment, data communication systems. Primary and secondary voltage and current injection equipment; time delay measuring equipment; current transformers; voltage transformers; power transformers; tapchangers; circuit breakers; capacitor banks; ring main units; audio frequency load control; circuit breaker auxiliary systems; substation and metal structure earthing systems; SCADA interfaces and transducer inputs; local opto-isolated alarms; PLC programs; auto reclosers (ACRS); protection relays; metering; control circuits; statistical metering systems; frame leakage relays; distance relays; pilot wire relays; transformer differential relays; busbar differential relays; impedance bus zone relays; overcurrent and earth fault relays; transformer neutral check relays; circuit breaker fail relays; multi-trip relays; auto recloser relays; voltage transformer failure relays; surge protection relays; buchholz relays; winding temperature relays; sensitive earth fault relays; phase failure relays; frequency relays; load shedding relays; general protection LV devices; oil temperature protection devices; oil surge protection devices; power supplies. differential relays; power systems; multi-facetted schemes; interactive overload schemes, distance protection (incorporating relay selection, switched/non-switched schemes; mutual coupling and teed feeder systems); protection signalling (incorporating series, direct, permissive, distance acceleration, block interruption); telecommunication circuits and equipment ; alternators; generator differential protection; over/under speed protection; over/under flux protection; synchroscopes; excitation circuits; governors.

Communication equipment may include: Fixed radio; mobile radio; satellite; SACS controllers; computer hardware and software; programmable controllers; modems; digital line drivers (low and high speed); fibre optic line drivers (low and high speed); radio links including voice link and digital bearer; wave trap.

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
- 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

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

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Competency Field 5)

System Operation Units

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UETTDRSO03B Manage critical events

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the management of critical events such as simultaneous multiple network faults, and storm events of various magnitudes. It includes liaison procedures with multiple operating authorities and dispatching and managing multiple field crews. It also encompasses monitoring of safe access to the network and invoking crisis management procedures and mutual aid plans.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRSO02B Manage network faults

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan for the management of a critical event	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the management of critical events, are reviewed and determined.
	1.2	Purpose of the management is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established procedures on policies and specifications for the management of events are obtained or established with the appropriate personnel.
	1.4	Identification and testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the occurrence of a critical event.
	1.5	Testing parameters are established from organisational established procedures on policies and specifications.
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to

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ELEMENT	PERFORMANCE CRITERIA	
		requirements and/or established procedures.
	1.12	Action plan is developed.
2 Carry out the management of a critical event	2.1	Action plan is initiated and continually monitored to ensure outcomes are being met.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the network fault solution in accordance with requirements and/or established procedures.
	2.3	Network fault management decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Stakeholders/customers are kept informed of current status regarding plan progress and recent developments.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of critical event management procedures is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.

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ELEMENT	PERFORMANCE CRITERIA	
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the management of a critical event	3.1	Strategic plans are developed incorporating organisation initiatives as per established procedures.
	3.2	Final review of the management procedures of the critical event are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.3	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.4	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.5	Approved copies of critical event management documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 managing critical events.

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 (EKAS) required is given in

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REQUIRED SKILLS AND KNOWLEDGE

Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.8.14	Enterprise specific procedures and work practices relating to critical events

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)

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

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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 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 - UET09". 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 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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EVIDENCE GUIDE

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	Manage a Critical Event within including all of the following:	Identify a critical event. Develop a plan to enable management of a critical event. Implement plans in order that the network be restored after the critical event has occurred. Effectively liaise with operating authorities and field crews to restore the network after a critical event has occurred. Document/De-brief actions upon restoration of the network.
B	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 for management of a critical event.

Note:

Access will be needed to: relevant protection, control, metering, and alarm equipment, network drawings, computerised electrical

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	plant control and monitoring facilities, operational event data, enterprise operational policies, procedures and work practices and enterprise crisis management procedures. In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions
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 Transmission, Distribution and Rail Traction Industry. 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

8) 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/may be demonstrated in relation to the management of critical event operations such as simultaneous multiple network faults and storm events of various magnitudes and shall/may be demonstrated using the following:

Equipment includes; sectionalisers, security, sensitive earth fault protection, communication bearers, local trip circuits, inter-trip circuits, remote control supervisory circuits, frequency injection units, under frequency circuits, voice frequency protection

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RANGE STATEMENT

signalling, micro-controllers, RDC and MUX units, pilot cables, telephone lines, microwave bearers, cossonay earthwire carriers and optical fibre cables.

Equipment also includes; LV fuses, links and bridges, HV links, fuses, reclosers, ring main units, circuit breakers, isolators, earth switches, sectionalisers, air break switches, capacitor banks, transformer taps, metering and protection equipment, data communication systems. Primary and secondary voltage and current injection equipment; time delay measuring equipment; current transformers; voltage transformers; power transformers; tapchangers; circuit breakers; capacitor banks; ring main units; audio frequency load control; circuit breaker auxiliary systems; substation and metal structure earthing systems; SCADA interfaces and transducer inputs; local opto-isolated alarms: PLC programs; auto reclosers (ACRS); protection relays; metering; control circuits; statistical metering systems; frame leakage relays; distance relays; pilot wire relays; transformer differential relays; busbar differential relays; impedance bus zone relays; overcurrent and earth fault relays; transformer neutral check relays; circuit breaker fail relays; multi-trip relays; auto recloser relays; voltage transformer failure relays; surge protection relays; buchholz relays; winding temperature relays; sensitive earth fault relays; phase failure relays; frequency relays; load shedding relays; general protection LV devices; oil temperature protection devices; oil surge protection devices; power supplies. differential relays; power systems; multi-facetted schemes; interactive overload schemes, distance protection (incorporating relay selection, switched/non-switched schemes; mutual coupling and teed feeder systems); protection signalling (incorporating series, direct, permissive, distance acceleration, block interruption); telecommunication circuits and equipment; alternators; generator differential protection; over/under speed protection; over/under flux protection; synchroscopes; excitation circuits; governors.

Communication equipment may include: Fixed radio; mobile radio; satellite; sacs controllers; computer hardware and software; programmable controllers; modems; digital line drivers (low and high speed); fibre optic line drivers (low and high speed); radio links including voice link and digital bearer; wave trap.

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
- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

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Competency Field

Competency Field **5)**

System Operation Units

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UETTDRSO04B Control generating plant

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the control of the generation side of a generation plants. It includes the assessment, evaluation and achievement of the synchronization requirements to ensure machine and or system stability during synchronisation. It also includes the control of the generation of electrical energy, the coordination of the generation control and the monitoring of the system/plant. It also encompasses the analysis of the system/plant faults, the updating of the relevant documentation and the reporting of plant problems, movements, abnormalities and status in accordance with enterprise/site procedures.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRSO18A	Respond to discrete / interdependent protection operations
UETTDRSO19A	Coordinate system operations in a regulated energy market

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the control of a generation plant	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the control of the generating plant, are reviewed and determined.
	1.2 Purpose of the control is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the control of the generating plant are obtained or established with the appropriate personnel.
	1.4 Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5 Testing parameters are established from organisational established procedures on policies and specifications.
	1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7 Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8 Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and

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ELEMENT	PERFORMANCE CRITERIA	
		land owners are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the control of a generation plant	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Decisions for the control of the generating plant are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models of the control procedures are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of control procedures is undertaken according to requirements and established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the control of a generation plant	3.1	Final review of the control procedures of the generating plant are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 controlling generating plant.

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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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.8.15	Enterprise specific procedures and work practices relating to generating plant
T2.11.8	Voltage control devices on interconnected transmission systems
T2.11.10	Control of power flow in interconnected transmission systems
T2.11.13	AC generators
T2.11.57	Analysis control and protection information
T2.11.63	Prime mover 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 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

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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 the "Assessment Guidelines - UET09". 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

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specified in the Performance Criteria and range; and

- Demonstrate an understanding of the Essential knowledge and associated skills 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	Manage an Electricity Generating Plant including all of the following:	Operate generator and excitation systems. Control and coordinate generation of electrical energy. Analyse prime mover and alternator faults. Effectively liaise with operating and regulatory authorities. Record events using both written and computerised logging systems. Document/De-brief actions following an event resulting in loss of generation.
B	At least one occasion	Dealing with an unplanned event by drawing on essential knowledge and associated 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 control of a generation plant.

Note:

Access will be needed to: relevant protection, control, metering, and alarm equipment, network drawings, computerised electrical plant control and monitoring facilities, operational event data, enterprise operational policies, procedures and work practices and enterprise crisis management procedures.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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.

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Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to controlling the generation side of generation plants and shall/may be demonstrated using the following:

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; alternators; generator differential protection; over/under speed protection; over/under flux protection; synchroscopes; excitation circuits.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible)

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

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
- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

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Competency Field

Competency Field **5)**

System Operation Units

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UETTDRSO05B Manage HV distribution and subtransmission network demand

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the management of the switching of HV network components with due regard to the loadings and prevailing network constraints and may include scheduling of generators, VAR compensators, load shedding and non-essential loads in response to NEMMCO or network requirements. It also includes voltage control equipment.

Application of the Unit

Application of the Unit **4)**

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

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRSO18A	Respond to discrete / interdependent protection operations
UETTDRSO19A	Coordinate system operations in a regulated energy market

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency

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standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the management of HV Distribution and Sub transmission network demand	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the management of HV Distribution and Sub transmission network systems, are reviewed and determined.
	1.2 Purpose of the management is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the management of the network demand are obtained or established with the appropriate personnel.
	1.4 Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5 Testing parameters are established from organisational established procedures on policies and specifications.
	1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7 Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8 Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.

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ELEMENT	PERFORMANCE CRITERIA	
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the management of HV Distribution and Sub transmission network demand	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Management of HV Distribution and Sub transmission network demand decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical models of the HV Distribution and Sub transmission network demand are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of HV Distribution and Sub transmission network demand is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned

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ELEMENT	PERFORMANCE CRITERIA	
		goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the management of HV Distribution and Sub transmission network demand	3.1	Final inspections of the network demand are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the managed HV distribution and Sub transmission network demand documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 managing HV distribution and sub transmission network demand.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.8.16	Enterprise specific procedures and work practices relating to managing network demand
T2.8.17	Enterprise specific - effective management and communication
T2.8.18	Enterprise specific - write management 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 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 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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EVIDENCE GUIDE

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

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 - UET09". 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 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

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EVIDENCE GUIDE

- 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	Demonstrate at least three (3) system manipulations that encompass the following:	HV Sub transmission distribution network Transmission network manipulation to control loading on equipment Transformers with HV windings HV Busbars HV Isolators HV Switchgear (applicable to enterprise equipment)
B	Do all of the following:	Writing switching instructions Analysis and review switching instructions Manage multiple switching instructions Coordinate the status of all access permits/authorities on HV network equipment relevant to the scope Ensure network plant operates within design and regulatory requirements on a real time

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		basis Calculation of line loading Preparation and authorisation of HV distribution switching programs Demonstrate application and administration of SCADA or equivalent. Analysis, diagnosis and reporting of system failure Calculation and analysis of paralleling conditions on the interconnected HV system
C	Prepare, write and check switching sheets to undertake all of the following:	Manage load Manage Voltage Minimise loss Maximise system reliability Allow safe network access for maintenance activities Allow safe network access for construction activities Validating fault reports arising from system disturbances
D	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 management of HV Distribution and Sub transmission network demand

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EVIDENCE GUIDE

Note:

Access will be needed to: relevant protection, control, metering, and alarm equipment, network drawings, computerised electrical plant control and monitoring facilities, operational event data, enterprise operational policies, procedures and work practices and enterprise crisis management procedures.

In addition to the resources listed above in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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

8) 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/may be demonstrated in relation to the management of a HV components with due regard to the loadings and prevailing network and shall/may be demonstrated using the following:

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RANGE STATEMENT

HV Distribution feeders/distribution network; transformers or regulators with HV windings; HV busbars; HV isolators; HV Switchgear (applicable to enterprise equipment); switching instructions (applicable to enterprise equipment); computers (applicable to enterprise equipment); network diagrams (applicable to enterprise equipment)

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
- 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

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Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

System Operation Units

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UETTDRSO06B Develop LV distribution switching programs

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1)**

1.1) Descriptor

This Competency Standard Unit covers the preparation and/or checking of activities required to place the LV distribution network in a state in which work can safely be performed whilst minimising customer outages. The format is typically a written sequence of switching items in a pre-defined format. It includes planning outages and taking into account loading of network components. It also includes planning the management of multiple outages on the LV distribution network and the calculation of network loading conditions to ensure the network is operating within designed parameters.

Application of the Unit

Application of the Unit **4)**

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UEENEED004B	Use engineering application software
and	UEENEEE007B	Use drawings, diagrams, schedules and manuals
and	UEENEEE024B	Compile and produce electrotechnology report
and	UEENEEG049B	Solve problems in complex polyphase power circuits
and	UETTDRIS22B	Implement and monitor organisation's OHS policies, procedures and programs
and	UETTDRIS23B	Implement and monitor environmental and sustainable energy policies and procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the preparation of LV Distribution switching programs	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the preparation of LV Distribution switching systems, are reviewed and determined.
	1.2 Purpose of the switching program preparation is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the LV Distribution Switching systems are obtained or established with the appropriate personnel.
	1.4 Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5 Testing parameters are established from organisational established procedures on policies and specifications.

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ELEMENT		PERFORMANCE CRITERIA	
		1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
		1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
		1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
		1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
		1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
		1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2	Carry out the preparation of LV Distribution switching programs	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
		2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
		2.3	LV Distribution switching program decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
		2.4	Mathematical and/or engineering models of the LV Switching systems are used to analyse the effectiveness of the finished project as per requirements and established procedures.
		2.5	Technical advice is given regarding potential hazards, safety risks and control measures so that monitoring and preventative action can be

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ELEMENT	PERFORMANCE CRITERIA	
		undertaken and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of LV switching program is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the preparation of LV Distribution switching programs	3.1	Final review of the switching program is undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the preparation of LV Distribution Switching programs documents are

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ELEMENT	PERFORMANCE CRITERIA
	issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 developing LV distribution 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.2.1	Generation power systems
T2.2.2	Transmission, distribution and rail power systems
T2.2.3	Substations, power transformers and reactors
T2.2.27	Generator control systems LV
T2.2.31	Distribution overhead line component fundamentals
T2.2.37	Live line work up to 33KV with glove and barrier
T2.2.38	Working on live lines up to 33kV with glove and barrier/Hotstick Combined
T2.2.39	Plant, equipment and tools used for HV live line work
T2.2.48	Electrical Equipment HV and LV powerline

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REQUIRED SKILLS AND KNOWLEDGE

T2.2.49	Coordinating permit access authority procedures.
T2.3.1	Powerline safety practices
T2.3.3	Statutory and safety considerations
T3.3.5	Discrete protection schemes isolation and tagging procedures
T2.4.1	Switchgear installation
T2.4.2	Low voltage switching principles
T2.4.9	Systems switching operations and authorisation procedures LV
T2.4.12	Low voltage overhead and substation switching principles
T2.4.14	Low voltage switching instruction preparation
T2.5.1	Ecological principles for vegetation control
T2.5.2	Vegetation control techniques
T2.8.1	Enterprises specific policies and procedure instructions
T2.8.2	Enterprises specific OHS instructions
T2.8.3	Enterprises specific technical drawing and documents
T2.8.4	Enterprises specific - switching diagrams
T2.9.1	Interpretation of power distribution network drawings and documentation
T2.10.11	Substation safety practices
T2.11.14	Fault calculation techniques
T2.11.15	Visual inspection procedures
T2.11.16	Commissioning procedures
T2.11.18	Discrete protection systems

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REQUIRED SKILLS AND KNOWLEDGE

T2.11.19 Interdependent protection systems

T2.11.20 Complex protection systems

T2.11.40 Harmonics

T2.11.58 Distribution UG line component fundamentals

T2.11.64 LV System load calculation 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 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 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 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 - UET09". 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 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

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EVIDENCE GUIDE

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	Demonstrate at least three (3) switching programs that between them encompass at least 7 of the following:	A transformer with a LV winding and fixed tap LV busbars LV isolators LHV switchgear (applicable to enterprise equipment) Phasing and phase rotation Commissioning an item of LV plant A planned interruption to an LV customer/s Installation of a mobile generators
B	Prepare switching instructions to isolate, test and earth all of the following	All enterprise transformer types with LV windings All enterprise LV busbar types All enterprise LV feeder types All enterprise LV circuit breakers, isolators or switches
C	Prepare, write and check switching sheets to do all of the following:	Manage load Manage voltage Minimise losses Maximise network reliability

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EVIDENCE GUIDE

D	Do all of the following:	Check all above types of switching instructions Coordinate all above types of switching instructions Calculation of plant loading Application and administration of SCADA or enterprise specific system. Analysis and diagnosis of system failure
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 to undertake actual preparation of LV Distribution Switching programs.

Note:

Access will be needed to: relevant protection, control, metering, and alarm equipment, network drawings, computerised electrical plant control and monitoring facilities, operational event data, enterprise operational policies, procedures and work practices and enterprise crisis management procedures

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions

Method of assessment

9.4)

This Competency Standard Unit shall be assessed by methods given in Volume 1, Part 3 "Assessment Guidelines".

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EVIDENCE GUIDE

Note:
Competent performance with inherent safe working practices is expected in the Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with units:

UETTDRSO07B	Develop HV Distribution and sub transmission switching programs
UETTDRSO08B	Develop and evaluate Transmission switching programs

Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the preparation and/or checking of activities required to place the LV distribution network in a state in which work can safely be performed whilst minimising customer outages and shall/may be demonstrated using the following:

LV Distribution feeders/distribution network; Transformers with LV windings; LV busbars; LV isolators; LV switchgear (applicable to enterprise equipment); switching instructions (applicable to enterprise equipment); computers (applicable to enterprise equipment); network diagrams (applicable to enterprise equipment); access authorities; regulatory requirements.

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:

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RANGE STATEMENT

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform
- Assessing risk
- 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

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

System Operation Units

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UETTDRSO07B Develop HV distribution and subtransmission switching programs

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the preparation and/or checking of activities required to place the HV distribution and sub transmission network in a state in which work can safely be performed whilst minimising customer outages. The format is typically a written sequence of switching items in a pre-defined format. It includes planning outages and taking into account loading of network components. It also includes planning the management of multiple outages on the HV distribution and sub transmission network and the calculation of network loading conditions to ensure the network is operating within designed parameters.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit may require a licence/registration to

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UEENEED004B	Use engineering application software
UEENEEE007B	Use drawings, diagrams, schedules and manuals
UEENEEE024B	Compile and produce electrotechnology report
UEENEEG049B	Solve problems in complex polyphase power circuits
UETTDRIS22B	Implement and monitor organisation's OHS policies, procedures and programs
UETTDRIS23B	Implement and monitor environmental and sustainable energy policies and procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the preparation of HV Distribution and Sub transmission Switching programs	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the preparation of HV Distribution and Sub transmission Switching system programs, are reviewed and determined.
	1.2 Purpose for the preparation of HV Distribution and sub transmission switching programs is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the preparation of HV Distribution and sub transmission switching programs are obtained or established with the appropriate personnel.
	1.4 Testing/switching procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.

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ELEMENT	PERFORMANCE CRITERIA	
	1.5	Testing/switching parameters are established from organisational established procedures on policies and specifications.
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the preparation of HV Distribution and sub transmission switching programs	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Preparation of HV Distribution and sub transmission switching program decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models of the program is used to analyse the effectiveness of the finished project as per requirements and

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ELEMENT	PERFORMANCE CRITERIA	
		established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of the program is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the preparation of HV Distribution and sub transmission switching programs	3.1	Final review of the switching program is undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or

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ELEMENT	PERFORMANCE CRITERIA
	regulatory approval.
	3.4 Approved copies of prepared HV Distribution and sub transmission switching program documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 developing HV distribution and sub transmission 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.2.1	Generation power systems
T2.2.2	Transmission, distribution and rail power systems
T2.2.3	Substations, power transformers and reactors
T2.2.31	Distribution overhead line component fundamentals
T2.2.34	Generator control systems HV
T2.2.35	Live line working up to 132KV with Hotstick
T2.2.37	Live line working up to 33kV with glove and barrier
T2.2.38	Working on live lines up to 33kV with glove

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REQUIRED SKILLS AND KNOWLEDGE

	and barrier/Hotstick combined
T2.2.39	Plant, equipment and tools used for HV live line work
T2.2.48	Electrical equipment HV and LV powerline
T2.2.49	Coordinating permit access authority procedures
T2.3.1	Powerline safety practices
T2.3.3	Statutory and safety considerations
T3.3.5	Discrete protection schemes isolation and tagging procedures
T2.4.1	Switchgear installation
T2.4.3	High voltage switching principles
T2.4.4	High voltage fault switching principles
T2.4.5	High voltage distribution transformer principles
T2.4.6	High voltage SWER system
T2.4.7	Feeder automation system
T2.4.8	System switching operations and authorisation procedures HV
T2.4.11	High voltage overhead and substation switching principles
T2.4.13	High voltage switching instruction preparation
T2.5.1	Ecological principles for vegetation control
T2.5.2	Vegetation control techniques
T2.8.1	Enterprises specific policies and procedure instructions
T2.8.2	Enterprises specific OHS instructions
T2.8.3	Enterprises specific technical drawing and

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REQUIRED SKILLS AND KNOWLEDGE

	documents
T2.9.1	Interpretation of power distribution network drawings and documentation
T2.10.9	Analyse and interpret results and measurements substations
T2.10.11	Substation safety practices
T2.10.15	High voltage insulation system principles substations
T2.10.19	Substation switching practices
T2.11.11	Control of transient overvoltages
T2.11.14	Fault calculation techniques
T2.11.15	Visual inspection procedures
T2.11.16	Commissioning procedures
T2.11.18	Discrete protection systems
T2.11.19	Interdependent protection systems
T2.11.20	Complex protection systems
T2.11.31	Primary plant testing
T2.11.40	Harmonics
T2.11.58	Distribution UG line component fundamentals
T2.11.65	HV system load calculation 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.

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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 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 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

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shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines - UET09". 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 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	Demonstrate at least three (3) switching programs that between them encompass the following:	A transformer with a HV winding and fixed tap A transformer with a HV winding and on-load tap changer HV busbars

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		HV isolators HV switchgear (applicable to enterprise equipment) Phasing and phase rotation Commissioning an item of HV plant A planned interruption to a HV customer/s Installation of a mobile generators (if applicable to enterprise equipment) Placing distribution feeders in parallel where special considerations are required to cope with capacitors, phase shifts between different bulk supply systems, sensitive earth fault protection, single phase switching.
B	Prepare switching instructions to isolate, test and earth all of the following	All enterprise transformer types All enterprise busbar types All enterprise feeder types All enterprise circuit breakers, isolators or switches
C	Prepare, write and check switching sheets to do all of the following:	Manage load Manage voltage Minimise losses Maximise network reliability
D	Do all of the following:	Check all above types of switching instructions Coordinate all above types of switching instructions Calculation of plant loading
E	At least one	Dealing with an unplanned event by drawing on essential

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	occasion	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 the preparation of HV Distribution and Sub transmission Switching programs.

Note:

Access will be needed to: relevant protection, control, metering, and alarm equipment, network drawings, computerised electrical plant control and monitoring facilities, operational event data, enterprise operational policies, procedures and work practices and enterprise crisis management procedures.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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

9.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with units:

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other units

UETTDRSO06B	Develop LV distribution switching programs
UETTDRSO08B	Develop and evaluate Transmission switching programs

Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the preparation and/or checking of activities required to place the HV distribution and sub transmission network (may also be applied to include rail/tram networks) in a state in which work can safely be performed whilst minimising customer outages and shall/may be demonstrated using the following:

HV distribution feeders/distribution network -radial or loop; HV sub transmission feeders/network -radial or loop; transformers with HV windings and fixed tap; transformers with HV windings and on-load tap changers; HV busbars - indoor and/or outdoor as applicable to enterprise; HV isolators; HV switchgear (applicable to enterprise equipment); switching instructions (applicable to enterprise equipment); computers (applicable to enterprise equipment); network diagrams (applicable to enterprise equipment); access authorities; regulatory requirements

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
- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications
- Emergency

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

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Competency Field

Competency Field **5)**

System Operation Units

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UETTDRSO08B Develop and evaluate transmission switching programs

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the development and evaluation of activities required to place the transmission network in a state in which work can safely be performed whilst minimising customer outages. The format is typically a written sequence of switching items in a pre-defined format. It includes planning for the management of the network and multiple outages. It encompasses the calculation of network loading conditions to ensure the network will operate within design parameters and in compliance with national electricity code.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UEENEED004B	Use engineering application software
UEENEEE007B	Use drawings, diagrams, schedules and manuals
UEENEEE024B	Compile and produce electrotechnology report
UEENEEG049B	Solve problems in complex polyphase power circuits
UETTDRIS22B	Implement and monitor organisation's OHS policies, procedures and programs
UETTDRIS23B	Implement and monitor environmental and sustainable energy policies and procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and coordinate for the preparation of HV Transmission switching programs	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the preparation of the switching program, are reviewed and determined.
	1.2 Purpose of the switching program is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Established policies, procedures and specifications for the switching program are obtained or established with the appropriate personnel.
	1.4 Switching procedures are discussed with and/or directed to the appropriate personnel in order to ascertain the project brief.
	1.5 Switching parameters are ascertained from established policies, procedures and specifications.

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ELEMENT	PERFORMANCE CRITERIA	
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities and clients are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out and coordinate the preparation of HV Transmission switching programs	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Decisions concerning the preparation of the HV Transmission Switching program are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	The effectiveness of the finished project is analysed as per requirements and established procedures.
	2.5	Technical advice is given regarding potential hazards, safety risks and control measures so

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ELEMENT	PERFORMANCE CRITERIA	
		that monitoring and preventative action can be undertaken and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of the program is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete and coordinate the preparation of HV Transmission switching programs	3.1	Final review of the switching program is undertaken to ensure it complies with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of switching program documents are issued and records are updated in accordance with established procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 developing and evaluating transmission 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.2.1	Generation power systems
T2.2.2	Transmission, distribution and rail power systems
T2.2.3	Substations, power transformers and reactors
T2.2.35	Live line working up to 132kV with Hotstick
T2.2.36	Live line work for voltages greater than 132kV and up to 500kV with Hotstick
T2.2.39	Plant, equipment and tools used for HV live line work
T2.2.48	Electrical Equipment HV and LV Powerline
T2.2.49	Coordinating permit process authority procedures
T2.3.1	Powerline safety practices
T2.3.3	Statutory and safety considerations
T3.3.5	Discrete protection schemes isolation and tagging procedures
T2.4.1	Switchgear installation

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REQUIRED SKILLS AND KNOWLEDGE

T2.4.3	High voltage switching principles
T2.4.8	System switching operations and authorisation procedures HV
T2.4.11	High voltage overhead and substation switching principles
T2.4.13	High voltage switching instruction preparation
T2.5.1	Ecological principles for vegetation control
T2.5.2	Vegetation control techniques
T2.8.1	Enterprises specific policies and procedure instructions
T2.8.2	Enterprises specific OHS instructions
T2.8.3	Enterprises specific technical drawing and documents
T2.9.1	Interpretation of power distribution network documentation
T2.10.9	Analyse and interpret results and measurements substations
T2.10.11	Substation safety practices
T2.10.15	High voltage insulation system principles substations
T2.10.19	Substation switching principles
T2.11.11	Control of transient overvoltages
T2.11.14	Fault calculation techniques
T2.11.15	Visual inspection procedures
T2.11.16	Commissioning procedures
T2.11.18	Discrete protection systems
T2.11.19	Interdependent protection systems

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REQUIRED SKILLS AND KNOWLEDGE

T2.11.20 Complex protection systems

T2.11.31 Primary plant testing

T2.11.40 Harmonics

T2.11.59 Generator control systems EHV

T2.11.60 Transmission line component fundamentals

T2.11.66 EHV transmission system load calculation 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 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 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

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that may be required and the critical nature of the competencies being assessed.

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 - UET09". 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 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

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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	Develop and evaluate, at least four (4) switching programs that between them integrates all of the following:	A transformer with an EHV winding EHV Busbars; EHV Isolators EHV Switchgear (applicable to enterprise equipment) Phasing and phase rotation Commissioning a project that includes more than one item of EHV plant that includes a transformer A planned liaison with a HV customer/s Activities that address the correction of errors in the process
B	Prepare switching instructions, test and earth the following:	Transformer types Busbar types Transmission line types Circuit breakers, isolators or switches
C	All of the	Check switching

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	following:	instructions; Calculate plant loading; Manage the development of multiple switching programs
D	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 preparation of HV Transmission Switching programs

Note:

Access will be needed to: relevant modelling tools, drawings, computerised electrical plant control and monitoring facilities and enterprise operational policies, procedures and work practices.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and

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	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 may be assessed concurrently with units: UETTDRSO06B Develop LV distribution switching programs UETTDRSO07B Develop HV distribution and sub transmission switching programs

Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the development and evaluation of activities required to place the transmission network in a state in which work can safely be performed whilst minimising customer outages and may include the following:

EHV transmission network; EHV transmission lines; Transformers with EHV windings ; EHV busbars - indoor and/or outdoor as applicable to enterprise; EHV isolators ; EHV switchgear (applicable to enterprise equipment); switching instructions (applicable to enterprise equipment); computers (applicable to enterprise equipment); network diagrams (applicable to enterprise equipment); access authorities; regulatory requirements.

Conditions and facilities for the calculation of network loading, planning for the management of the network and multiple outages.

Regulatory and enterprise procedures for the compliance with national electricity code.

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:

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RANGE STATEMENT

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform
- Assessing risk
- 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

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

System Operation Units

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UETTDRSO09B Coordinate LV distribution networks

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the monitoring of LV distribution networks in real time. This includes voltage control and monitoring the status of access authorities and ensuring that the network is operated within design parameters at all times. It also includes dispatching and management of field repair crews to respond to and rectify abnormalities.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRSO06B	Develop LV distribution switching programs

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the management of an LV distribution network	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the management of LV distribution network systems, are reviewed and determined.
	1.2 Purpose for the management of an LV distribution network is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the management of an LV distribution network are obtained or established with the appropriate personnel.
	1.4 Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5 Testing parameters are established from organisational established procedures on policies and specifications.
	1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7 Work roles and tasks are allocated according to requirements and individuals' competencies
	1.8 Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11 Relevant work permits are secured to coordinate the performance of work according to

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ELEMENT	PERFORMANCE CRITERIA	
		requirements and/or established procedures.
2 Carry out the management of an LV distribution network	2.1	Circuit/systems modelling are used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Management decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models of the LV distribution network are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of the LV distribution network is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.

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ELEMENT	PERFORMANCE CRITERIA	
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the management of an LV distribution network	3.1	Final review of the management procedures of the LV distribution network are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the managed LV distribution network documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 coordinating LV distribution 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.2.49	Coordinating permit access authority procedures
T2.4.9	Systems switching operations and authorisation procedures LV
T2.4.10	Co-ordinating and directing switching instructions
T2.4.12	Low voltage overhead and substation switching principles
T2.4.14	Low voltage switching instruction preparation

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)

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

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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 - UET09". 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 described in this unit to such an extent that the learner's performance outcome is

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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	Demonstrate on at least three (3) occasions the coordinate system manipulations that encompass the following:	LV distribution network LV network manipulation to control loading on equipment Transformers with LV windings (if applicable to enterprise equipment) LV busbars LV isolators LV switchgear (applicable to enterprise equipment)
B	All of the following:	Write switching instructions Check switching instructions Coordinate switching instructions Calculate plant loading Prepare and authorise LV distribution switching programs Monitor switching progress

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		Monitor the status of access permits/authorities on LV network equipment Ensure network plant operates within design and regulatory requirements on a real time basis Dispatch and communicate with field crews to respond/rectify system abnormalities Application and administration of SCADA (if applicable to enterprise equipment) Analyse and diagnose system failures Calculate and analyse paralleling conditions on the interconnected LV system
C	Monitor and manage switching to:	Manage load Manage voltage Minimise loss Maximise system reliability Allow safe network access for maintenance activities Allow safe network access for construction activities Validating fault reports arising from system disturbances
D	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 **9.3)**

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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 management of an LV distribution network.

Note:

Access will be needed to: relevant protection, control, metering and alarm equipment, network drawings, computerised electrical plant control and monitoring facilities, operational event data, enterprise operational policies, procedures and work practices and crisis management procedures.

In addition to the resources listed above in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions

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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with units:

UETTDRSO10B	Coordinate HV distribution and sub transmission networks
UETTDRSO11B	Manage Transmission networks

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Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the monitoring of LV distribution networks in real time ensuring that the network is operated within design parameters at all times and shall/may be demonstrated using the following:

LV Distribution feeders/distribution network; Transformers with LV windings; LV busbars; LV isolators ; LV switchgear (applicable to enterprise equipment); Switching instructions (applicable to enterprise equipment); computers (applicable to enterprise equipment); network diagrams (applicable to enterprise equipment); access authorities; regulatory requirements.

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
- 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

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RANGE STATEMENT

- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

System Operation Units

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UETTDRSO10B Coordinate HV distribution and subtransmission networks

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the monitoring of HV distribution and sub transmission networks in real time. This includes voltage control and monitoring the status of access authorities and ensuring that the network is operated within design parameters at all times. It also includes dispatching and coordination of field repair crews to respond to and rectify abnormalities and liaison with other electrical authorities.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRSO07B	Develop HV distribution and sub transmission switching programs

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency

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standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan for the coordination of HV distribution and sub Transmission network	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the coordination of HV distribution and sub transmission Network, are reviewed and determined.
	1.2	Purpose of the coordination of the network is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established procedures on policies and specifications for the coordination of the network are obtained or established with the appropriate personnel.
	1.4	Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5	Testing parameters are established from organisational established procedures on policies and specifications.
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.

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ELEMENT	PERFORMANCE CRITERIA	
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the coordination of HV distribution and sub Transmission network	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Coordination decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models of the coordination process are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of coordination process is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the coordination of HV distribution and sub Transmission network	3.1	Final review of the coordination processes is undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of coordination documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 coordinating HV distribution and sub transmission networks.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.2.49	Coordinating permit access authority procedures
T2.4.8	Systems switching operations and authorisation procedures HV
T2.4.10	Coordinating and directing switching instructions
T2.4.11	High voltage overhead and substation switching principles
T2.4.13	High voltage switching instruction preparation

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)

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,

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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 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 - UET09". 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

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knowledge and associated skills 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	Demonstrate on at least three (3) occasions the coordination of system manipulations that encompass:	HV sub transmission and distribution network HV sub transmission and distribution network manipulation to control loading on equipment Transformers with HV windings (if applicable to enterprise equipment HV busbars HV isolators HV switchgear (applicable to enterprise equipment).
B	All of the following:	Write switching instructions Check switching instructions Coordinate switching instructions Calculate plant loading

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		Prepare and authorise HV sub transmission and distribution switching program Monitor switching progress Monitor the status of access permits/authorities on HV network equipment Ensure network plant operates within design and regulatory requirements on a real time basis Dispatch and communicate with field crews to respond/rectify system abnormalities Application and administration of SCADA (if applicable to enterprise equipment) Analyse and diagnose system failures Calculate and analyse paralleling conditions on the interconnected HV system
C	Monitor and mange switching to:	Manage load Manage voltage Minimise loss Maximise system reliability Allow safe network access for maintenance activities Allow safe network access for construction activities Validating fault reports arising from system disturbances
D	At least one occasion	Dealing with an unplanned event by drawing on essential knowledge and associated skills to provide appropriate

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		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 coordination of HV distribution and sub transmission Network.

Note:

Access will be needed to: relevant protection, control, metering and alarm equipment, network drawings, computerised electrical plant control and monitoring facilities, operational event data, enterprise operational policies, procedures and work practices and crisis management procedures.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with units:

UETTDRSO09B Coordinate LV distribution networks

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UETTDRSO11B Manage transmission networks

Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the monitoring of HV distribution and sub transmission networks (may also be applied to include rail/tram networks), ensuring that the network is operated within design parameters at all times and shall/may be demonstrated using the following:

HV Sub transmission feeders/sub transmission network; HV Distribution feeders/distribution network; transformers with HV windings; HV busbars; HV isolators; HV switchgear (applicable to enterprise equipment); Switching instructions (applicable to enterprise equipment); computers (applicable to enterprise equipment); network diagrams (applicable to enterprise equipment); access authorities; regulatory requirements.

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
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

System Operation Units

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UETTDRSO11B Manage transmission networks

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the monitoring of EHV transmission networks in real time. This includes voltage control and monitoring the status of access authorities and ensuring that the network is operated within design parameters at all times. It also includes dispatching and management of field repair crews to respond to and rectify abnormalities and liaison with other electrical authorities.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRSO18A	Respond to discrete / interdependent protection operations
UETTDRSO19A	Coordinate system operations in a regulated energy market

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements
describe the essential

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outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the management of Transmission networks	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the management of transmission network systems, are reviewed and determined.
	1.2 Purpose of the management of the transmission networks is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the management of transmission networks are obtained or established with the appropriate personnel.
	1.4 Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5 Testing parameters are established from organisational established procedures on policies and specifications.
	1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7 Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8 Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.

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ELEMENT	PERFORMANCE CRITERIA	
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the management of Transmission networks	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Management decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models of the Transmission Network are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of management processes is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the management of Transmission networks	3.1	Final review of management processes are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of management procedure documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 managing transmission networks.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.2.49	Coordinating permit access authority procedures.
T2.4.8	Systems switching operations and authorisation procedures HV
T2.4.10	Co-ordinating and directing switching instructions
T2.4.11	High voltage overhead and substation switching principles
T2.4.13	High voltage switching instruction preparation

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)

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,

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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 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 - UET09". 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 described in this unit to such an

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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	Demonstrate on at least three (3) occasions the management of system manipulations that encompass:	EHV transmission network EHV network manipulation to control loading on equipment Transformers with EHV windings (if applicable to enterprise equipment) EHV busbars EHV isolators EHV switchgear (applicable to enterprise equipment).
B	All of the following:	Write switching instructions Check switching instructions Coordinate switching instructions Calculate plant loading Prepare and authorise EHV switching programs Monitor switching progress

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		Monitor the status of access permits/authorities on EHV network equipment Ensure network plant operates within design and regulatory requirements on a real time basis Dispatch and communicate with field crews to respond/rectify system abnormalities Application and administration of SCADA (if applicable to enterprise equipment) Analyse and diagnose system failures Calculate and analyse network conditions on the interconnected EHV system.
C	Monitor and mange switching to:	Manage load Manage voltage Minimise loss Maximise system reliability Allow safe network access for maintenance activities Allow safe network access for construction activities Validating fault reports arising from system disturbances
D	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.

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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 management of transmission networks

Note:

Access will be needed to: relevant protection, control, metering and alarm equipment, network drawings, computerised electrical plant control and monitoring facilities, operational event data, enterprise operational policies, procedures and work practices and crisis management procedures.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with units:

UETTDRSO09B	Coordinate LV distribution networks
UETTDRSO10B	Coordinate HV distribution and sub transmission networks

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Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the management of a transmission network ensuring that the network is operated within design parameters at all times and shall/may be demonstrated using the following:

EHV transmission network; transformers with EHV windings; EHV busbars; EHV isolators EHV Switchgear (applicable to enterprise equipment); switching instructions (applicable to enterprise equipment); computers (applicable to enterprise equipment); network diagrams (applicable to enterprise equipment); access authorities; regulatory requirements

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
- 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

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

System Operation Units

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UETTDRSO12B Manage transmission network demand

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the management of the switching of transmission network components with due regard to the loadings and prevailing network constraints and may include scheduling of generators, VAR compensators, load shedding and non-essential loads in response to NEMMCO or network requirements. It also includes voltage and frequency controls.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRSO11B	Manage transmission networks

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan for the management of transmission network demand	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the management of transmission network demand systems, are reviewed and determined.
	1.2	Purpose of the management of transmission network demand is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established procedures on policies and specifications for the management of transmission network demand are obtained or established with the appropriate personnel.
	1.4	Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5	Testing parameters are established from organisational established procedures on policies and specifications.
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to

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ELEMENT	PERFORMANCE CRITERIA	
		requirements and/or established procedures.
2 Carry out the management of transmission network demand	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Management decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models of the transmission network demand are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of management process is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.

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ELEMENT	PERFORMANCE CRITERIA	
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the management of transmission network demand	3.1	Final review of management process is undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the managed transmission network demand documents are issues and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 managing transmission network demand.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.2	Electrical safe working practice
T2.8.16	Enterprise specific procedures and work practices relating to managing network demand
T2.8.17	Enterprise specific effective management and communication
T2.8.18	Enterprise specific write management 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 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 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

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being assessed.

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 - UET09". 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 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

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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	Demonstrate at least three (3) system manipulations that encompass the following:	EHV transmission network Transmission network manipulation to control loading on equipment Transformers with EHV windings EHV busbars EHV isolators EHV switchgear (applicable to enterprise equipment) Dispatch of Static/Synchronous VAR compensation (if applicable to enterprise) Dispatch of generation (if applicable to enterprise).
B	All of the following:	Writing switching instructions Analysis and review switching instructions Manage multiple switching instructions Calculating line loading Preparing and authorising EHV transmission switching programs

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		Demonstrate application and administration of SCADA or equivalent. Analysis and diagnosis of system failure Calculate and analyse transmission line conditions on the interconnected EHV system.
C	Prepare, write and check switching sheets to:	Manage load Manage voltage Minimise loss Maximise system reliability Allow safe network access for maintenance activities Allow safe network access for construction activities Validating fault reports arising from system disturbances Dispatch static/synchronous VAR compensation (if applicable to enterprise) Dispatch generation (if applicable to enterprise)
D	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

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materials to undertake actual management of transmission network demand.

Note:

Access will be needed to: relevant network modelling tools, drawings, computerised electrical plant control and monitoring facilities, operational event data and enterprise operational policies, procedures and work practices

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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

8) 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/may be demonstrated in relation to the management of the switching of transmission network components with due regard to the loadings and prevailing network constraints and shall/may be demonstrated using

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RANGE STATEMENT

the following equipment:

EHV distribution feeders/distribution network; transformers or regulators with EHV windings; EHV busbars; EHV isolators; EHV switchgear (applicable to enterprise equipment); generators, VAR compensators, load shedding and non-essential loads; switching instructions (applicable to enterprise equipment); computers (applicable to enterprise equipment); network diagrams (applicable to enterprise equipment).

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
- 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

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Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

System Operation Units

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UETTDRSO13B Coordinate LV distribution network demand

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the coordination of the switching of LV distribution network components with due regard to the loadings and prevailing network constraints and may include scheduling of generators, VAR compensators, load shedding and non-essential loads in response to NEMMCO or network requirements. It also includes voltage control equipment.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRSO09B	Coordinate LV distribution networks

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan for the coordination of LV distribution network demand	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the coordination of LV Distribution network demand systems, are reviewed and determined.
	1.2	Purpose of the coordination of the network demand is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established procedures on policies and specifications for the coordination of the network demand are obtained or established with the appropriate personnel.
	1.4	Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5	Testing parameters are established from organisational established procedures on policies and specifications.
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to

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ELEMENT	PERFORMANCE CRITERIA	
		requirements and/or established procedures.
2 Carry out the coordination of LV distribution network demand	2.1	Circuit/systems modelling are used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Coordination decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models of the coordination process are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of the coordination process is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.

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ELEMENT	PERFORMANCE CRITERIA	
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the coordination of LV distribution network demand	3.1	Final review of the coordination process is undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of managed LV Distribution network demand documents are issues and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 coordinating LV distribution network demand.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.2	Electrical safe working practice
T2.8.16	Enterprise specific procedures and work practices relating to managing network demand
T2.8.17	Enterprise specific effective management and communication
T2.8.18	Enterprise specific write management 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 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 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

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being assessed.

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 - UET09". 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 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

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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	Demonstrate at least three (3) coordinate of multiple simultaneous system manipulations that encompass the following:	LV distribution network LV network manipulation to control loading on equipment Transformers with LV windings (if applicable to enterprise equipment) LV busbars LV isolators LV switchgear (applicable to enterprise equipment).
B	All of the following:	Writing switching instructions Checking and review switching instructions Coordinating multiple simultaneous switching instructions Confirm line loading Preparing and authorising LV distribution switching programs Coordinate multiple switching processes Coordinate the status of all access permits/authorities on LV network equipment

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		relevant to the scope Ensure network plant operates within design and regulatory requirements on a real time basis Application and administration of SCADA or equivalent. Analysis, diagnosis and reporting of system failure Calculate and analyse paralleling conditions on the interconnected LV system.
C	Prepare, write and check switching sheets to:	Manage load Manage voltage Minimise loss Maximise system reliability Allow safe network access for maintenance activities Allow safe network access for construction activities Validating fault reports arising from system disturbances.
D	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 the coordination of LV

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distribution network demand.

Note:

Access will be needed to: relevant modelling tools, drawings, computerised electrical plant control and monitoring facilities and enterprise operational policies, procedures and work practices.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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

8) 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/may be demonstrated in relation to the coordination of a switching of LV distribution network components with due regard to the loadings and prevailing network constraints and shall/may be demonstrated using

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RANGE STATEMENT

the following:

LV distribution feeders/distribution network; transformers or regulators with LV windings; LV busbars; LV isolators ; LV switchgear (applicable to enterprise equipment); generation that interconnects with the LV network; VAR compensation devices that interconnect with the LV network; switching instructions (applicable to enterprise equipment); computers (applicable to enterprise equipment); network diagrams (applicable to enterprise equipment).

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
- 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

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RANGE STATEMENT

- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

System Operation Units

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UETTDRSO14B Develop crisis management plans

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the preparation of crisis management plans, which can be implemented following the loss of one or more items of plant. This unit involves the activities associated with the assessment of risk, the probability of failure, the consequences of failure and the plant and/or network loads that will result as per established enterprise procedures.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRSO03B Manage critical events

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the development of crisis management plans	1.1 OHS practices/procedures and environmental and sustainable energy procedures which may influence the development of crisis management plans systems are reviewed and determined.
	1.2 Purpose of the development of crisis management plans is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the development of crisis management plans are obtained or established with the appropriate personnel.
	1.4 Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5 Testing parameters are established from organisational established procedures on policies and specifications.
	1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7 Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8 Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11 Relevant work permits are secured to coordinate the performance of work according to

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ELEMENT	PERFORMANCE CRITERIA	
		requirements and/or established procedures.
2 Carry out the development of crisis management plans	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Development of crisis management plans decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models of the development are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of crisis development plans is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to

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ELEMENT	PERFORMANCE CRITERIA	
		requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the development of crisis management plans	3.1	Final review of the crisis management plans are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the developed crisis management plan documents are issues and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 developing crisis management 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.8.14	Enterprise specific procedures and work practices relating to critical events
T2.11.61	Analysis network event records
T2.11.62	Preparing policies 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 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)

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

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being assessed.

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 - UET09". 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 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

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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	Do all of the following:	Identify a crisis event Develop a plan to manage a crisis Formulate plans in order that the network be restored during and after the crisis Effectively liaise with operating authorities and field crews develop and formulate achievable crisis management plans Document/de-brief actions that are required following an end of crisis situation
B	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

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materials to undertake actual development of crisis management plans

Note:

Access will be needed to: relevant protection, control, metering, and alarm equipment, network drawings, computerised electrical plant control and monitoring facilities, operational event data, enterprise operational policies, procedures and work practices and crisis management procedures.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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

8) 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/may be demonstrated in relation to the management of critical event operations such as simultaneous multiple network faults

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RANGE STATEMENT

and storm events of various magnitudes and shall/may be demonstrated using the following:

Equipment includes; sectionalisers, security, sensitive earth fault protection, communication bearers, local trip circuits, inter-trip circuits, remote control supervisory circuits, frequency injection units, under frequency circuits, voice frequency protection signalling, micro-controllers, RDC and MUX units, pilot cables, telephone lines, microwave bearers, cossonay earthwire carriers and optical fibre cables.

Equipment also includes; LV fuses, links and bridges, HV links, fuses, reclosers, ring main units, circuit breakers, isolators, earth switches, sectionalisers, air break switches, capacitor banks, transformer taps, metering and protection equipment, data communication systems. Primary and secondary voltage and current injection equipment; time delay measuring equipment; current transformers; voltage transformers; power transformers; tapchangers; circuit breakers; capacitor banks; ring main units; audio frequency load control; circuit breaker auxiliary systems; substation and metal structure earthing systems; SCADA interfaces and transducer inputs; local opto-isolated alarms: PLC programs; auto reclosers (ACRs); protection relays; metering; control circuits; Statistical metering systems; frame leakage relays; distance relays; pilot wire relays; transformer differential relays; busbar differential relays; impedance bus zone relays; overcurrent and earth fault relays; transformer neutral check relays; circuit breaker fail relays; multi-trip relays; auto recloser relays; voltage transformer failure relays; surge protection relays; buchholz relays; winding temperature relays; sensitive earth fault relays; phase failure relays; frequency relays; load shedding relays; general protection LV devices; oil temperature protection devices; oil surge protection devices; power supplies. differential relays; power systems; multi-facetted schemes; interactive overload schemes, distance protection (incorporating relay selection, switched/non-switched schemes; mutual coupling and teed feeder systems); protection signalling (incorporating series, direct, permissive, distance acceleration, block interruption); telecommunication circuits and equipment; alternators; generator differential protection; over/under speed protection; over/under flux protection; synchroscopes; excitation circuits; governors.

Communication equipment may include: Fixed radio; mobile radio; satellite; SACS controllers; computer hardware and software; programmable controllers; modems; digital line drivers (low and high speed); fibre optic line drivers (low and high speed); radio links including voice link and digital bearer; wave trap.

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
- Assessment

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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"

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2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

System Operation Units

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UETTDRSO15A Operate and monitor system equipment (SCADA)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This Competency Standard Unit covers the skills and knowledge to operate, monitor and control HV apparatus on the network via SCADA control

Application of the Unit

Application of the Unit **4**)

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

1.2) **License to practice**

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.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDREL05B	Respond to Technical Enquiries and requests

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT **PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare for the operation, monitoring and control of system equipment	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the preparation of the switching program, are reviewed and determined.
	1.2	System requirements are established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	System and associated equipment operational prerequisites are identified and established in accordance with manufacturers and/or enterprise/site procedures
	1.4	System monitoring and control procedures are discussed with and/or directed to the appropriate personnel in order to ascertain the project brief.
	1.5	Operational parameters are ascertained from established policies, procedures and specifications.
	1.6	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.7	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.8	Liaison and communication issues with other/authorised personnel, authorities and clients are resolved and activities coordinated to carry out work.
	1.9	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.10	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out and coordinate the operation, monitoring	2.1	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are

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ELEMENT	PERFORMANCE CRITERIA	
and control of system equipment		incorporated into the project in accordance with requirements and/or established procedures.
	2.2	Decisions concerning the operation, monitoring and control of system equipment are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.3	The effectiveness of the finished project is analysed as per requirements and established procedures.
	2.4	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.
	2.5	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.6	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.7	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete the operation, monitoring and control of system equipment	3.1	Final review of the operation, monitoring and control of system equipment is undertaken to ensure it complies with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of

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ELEMENT	PERFORMANCE CRITERIA	
		completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 developing and evaluating transmission 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
E2.3.13	Using supervisory control and data acquisition systems
E2.4.14	Personal computer operating systems, basics
E2.4.16	Personal computers, engineering applications software basic
T2.2.1	Generation power systems
T2.2.2	Transmission, distribution and rail power systems
T2.2.3	Substations, power transformers and reactors
T2.8.1	Enterprises specific policies and procedure instructions

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REQUIRED SKILLS AND KNOWLEDGE

T2.8.2	Enterprises specific OHS instructions
T2.8.3	Enterprises specific technical drawing and documents
T2.9.1	Interpretation of power distribution network drawings and documentation
T2.10.9	Analyse and interpret results and measurements substations
T2.11.18	Discrete protection systems
T2.11.19	Interdependent protection 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 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 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,

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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 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 - UET09". 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 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

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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	Perform on at least three (3) occasions the following:	Evidence of switching programs involving the operation and monitoring of system equipment via SCADA
B	Perform on at least two (2) occasions the following:	Evidence of unplanned switching events involving the operation and monitoring of system equipment via SCADA
C	Demonstrate the following:	Extract data used in the analysis of network loading trends
D	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

9.3)

This unit should be assessed as it relates to normal work

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for assessment

practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual preparation of the monitoring, control and operation of system equipment

Note:

Access will be needed to: relevant modelling tools, drawings, computerised electrical plant control and monitoring facilities and enterprise operational policies, procedures and work practices.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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

8) 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.

This Competency Standard Unit shall be demonstrated in relation to the operation, monitoring and control of system equipment include the following:

Equipment shall include network primary and secondary plant types applicable to the enterprise. This 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/ parameters out of specification, 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 bank selection.

Operational prerequisites may include switching programmes, pre-operational checks

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RANGE STATEMENT

and plant status.

Regulatory and enterprise procedures for the compliance with national electricity code.

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
- Assessing risk
- Assessment
- Authorisation
- 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
- 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

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Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

System Operation Units

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UETTDRSO16A Monitor and control the activities of field staff

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1)**

1.1) Descriptor

This Competency Standard Unit covers the monitoring of permit to work requests, dispatching personnel, responding to alarms, travel and activity monitoring of field personnel, monitoring work activities of field personnel against work schedule, contingency skills, response to third party enquiries, out of hour, response to man down alarm, tracking of field personnel (remote area), monitoring activities on system equipment, monitoring availability of assets (maintain a log), monitor equipment status, coordinating field activities, controlling and authorising field works, preparing incident reports.

Application of the Unit

Application of the Unit **4)**

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

1.2) License to practice

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

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1.2) License to practice

New Apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

To minimise incidents related to safe systems of work, entry into this unit requires at a minimum that an individual has demonstrated or possesses relevant technical engineering discipline competencies of at least AQF level 3. It is intended that an individual will be expected to perform with a large degree of autonomy in decision-making, whilst in an individual environment.

This may include immediate response to protect human life, adverse effect on safety, security of supply or the integrity of the assets.

NOTE: Typically the following disciplines provide direct entry; electrical or instrumentation, fitting and turning or mechanical trade.

Where an individual does not possess or demonstrate the requisite entry requirement, an equivalent bridging program shall be used to ensure equivalence of entry.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the monitoring and controlling of field activities	1.1 Work schedules, plans, requirements, established procedures detailed and analysed and if necessary the extent of the preparation of the work determined for planning and coordination
	1.2 Shift hand-over detail is received, understood and confirmed according to established procedures
	1.3 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
	1.4 Risk control measures for identified hazards are prioritised, implemented and evaluated against the work schedule
	1.5 Salient system constraints are communicated to relevant persons and identified for work sites as per established procedures
	1.6 Operational and commercial requirements are communicated to stakeholders as per established procedures
	1.7 OHS, environmental and sustainable energy policies and procedures related to the work are identified to ensure safe systems of work are followed
	1.8 Relevant work permits are secured to coordinate the performance of work according to requirements and established procedures

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ELEMENT		PERFORMANCE CRITERIA	
		1.9	Liaison and communication with authorised persons, authorities, clients and land-owners is performed/actioned and activities are coordinated to carry out work
2	Undertake monitoring and controlling of field activities	2.1	OHS policies and procedures and safe work practices are followed to eliminate or minimise incidents and hazards
		2.2	Work is performed and coordinated in accordance with a work schedule and established procedures
		2.3	OHS risks are monitored and action taken according to established procedures
		2.4	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and established procedures
		2.5	Essential knowledge and associated skills are applied in an agreed timeframe and to quality standards efficiently according to requirements and established procedures
		2.6	Solutions to non-routine problems are identified and actioned using essential knowledge and associated skills according to requirements
		2.7	Ongoing checks of quality of the work are undertaken in accordance with requirements and established procedures to ensure a quality outcome is achieved for the client/customer to community and industry standards
3	Complete procedures monitoring and controlling field activities	3.1	Work undertaken is checked against works schedule for conformance with requirements and anomalies are reported and solutions identified in accordance with established procedures
		3.2	Relevant work permit(s) and field activities are signed off and the status of plant, equipment and personnel movements recorded and handover procedures are conducted as per established procedures

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ELEMENT	PERFORMANCE CRITERIA	
	3.3	Shift handover detail is relayed and confirmed according to established procedures
	3.4	Work completion records, reports, documentation and information is confirmed, processed and the appropriate persons notified

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 monitoring and controlling field 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
E2.4.14	Personal computer operator operating systems, basic
T2.2.2	Transmission, distribution and rail power systems
T2.2.3	Substations, power transformers and reactors
T2.2.48	Electrical Equipment - HV and LV Powerline
T2.2.49	Coordinating permit access authority procedures
T2.3.2	Powerline safety implementation and monitoring
T2.3.3	Statutory and safety considerations

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REQUIRED SKILLS AND KNOWLEDGE

T2.4.8	System switching operations and authorisation procedures HV
T2.4.9	System switching operations and authorisation procedures LV
T2.4.10	Co-ordinating and directing switching instructions
T2.4.11	High voltage overhead and substation switching principles
T2.4.12	Low voltage overhead and substation switching principles
T2.8.1	Enterprise specific - policies and procedure instructions
T2.8.2	Enterprise specific - OHS instruction
T2.8.17	Enterprise specific - effective management and communication
T2.11.16	Commissioning procedures

Evidence Guide

EVIDENCE GUIDE

9)

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

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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 the 'Assessment Guidelines UET09'. 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

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specified in the performance criteria and range

- 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
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant anti discrimination legislation, regulations, policies and workplace procedures
- Demonstrate 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	Evaluate, respond and report threats to systems operation/security Working knowledge of network functions including identification of abnormal conditions of the network and reporting Use relevant field permit to work systems Respond correctly to alarms Working knowledge of monitoring field work Communicate effectively in the workplace Operating communications equipment Interpret technical drawings and symbols

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		Emergency Response procedures Work utilising relevant OHS legislation, regulations, codes of practice, policies and procedures Apply planning skills
B	At least one occasion	Deal 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 work as prescribed by this Competency Standard Unit.
- Appropriate environmental regulation and work practices.
- Appropriate organisational requirements.
- Appropriate work environment, equipment and tools.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency in monitoring and controlling field activities.

Assessment of this competency must also be undertaken in either an actual workplace or under a simulated work environment. Assessment must also integrate the Employability Skills.

Method of assessment

9.4)

This Competency Standard Unit shall be assessed by methods given in Volume 1, Part 3 '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 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

8) 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 covers the monitoring of permit to work requests, dispatching personnel, responding to alarms, travel and activity monitoring of field personnel, monitoring work activities of field personnel against work schedule, contingency skills, response to third party enquiries, out of hour, response to man down alarm, tracking of field personnel (remote area), monitoring activities on system equipment, monitoring availability of assets (maintain a log), monitor equipment status, coordinating field activities, controlling and authorising field works, preparing incident reports.

The following constants and variables included in the element/performance criteria in this unit are fully described in the Definitions Section of this volume and form an integral part of the Range Statement of this unit:

Areas to be monitored

Areas to control

Electricity supply infrastructure

Organisational requirements

Records/reports

Information systems

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RANGE STATEMENT

Maps and drawings

Established procedures

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

Control centre.

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UETTDRSO17A Coordinate HV transmission network

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the monitoring of HV transmission networks in real time. This includes power quality, alarm interpretation, facilitating and monitoring the status of access authorities and ensuring that the network is operated within design parameters at all times. It also includes dispatching and coordination of field repair crews to respond to and rectify abnormalities and liaise with other electrical authorities.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRSO08B	Develop and evaluate transmission switching programs

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan for the coordination of HV Transmission networks	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the coordination of HV Transmission networks, are reviewed and determined.
	1.2	Purpose of the coordination of the network is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established procedures on policies and specifications for the coordination of the network are obtained or established with the appropriate personnel.
	1.4	Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5	Testing parameters are established from organisational established procedures on policies and specifications.
	1.6	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.7	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.8	Liaison and communication issues with other authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.9	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.10	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
2 Carry out the coordination of HV Transmission networks	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Coordination decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models of the coordination process are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	Technical advice is given regarding potential hazards, safety risks and control measures so that monitoring and preventative actions can be undertaken and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of coordination process is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal

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ELEMENT	PERFORMANCE CRITERIA	
		performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the coordination of HV Transmission networks	3.1	Final review of the coordination processes is undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of coordination documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 coordinating HV Transmission 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

E2.18.2 Electrical safe working practice

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REQUIRED SKILLS AND KNOWLEDGE

T2.2.29	Transmission powerline inspection principles
T2.2.30	Powerline transmission installation safety
T2.2.53	HV principles
T2.4.4	High voltage fault switching principles
T2.4.10	Co-ordinating and directing switching instructions
T2.11.1	Power system layouts
T2.11.4	AC transmission system components
T2.11.5	AC transmission line electrical parameters
T2.11.6	AC transmission lines equivalent circuit calculations
T2.11.7	Basic design characteristics of transmission structures and associated equipment
T2.11.10	Control of power flow in interconnected transmission 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 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

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preferred model for 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 the "Assessment Guidelines - UET09". 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

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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 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	Demonstrate on at least three (3) occasions the coordination of system manipulations that encompass:	HV sub transmission and distribution network HV sub transmission and distribution network manipulation to control loading on equipment Transformers with HV windings (if applicable to enterprise equipment HV busbars HV isolators HV switchgear (applicable to enterprise equipment).
B	All of the	Write switching instructions

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	following:	Check switching instructions Coordinate switching instructions Calculate plant loading Prepare and authorise HV sub transmission and distribution switching program Monitor switching progress Monitor the status of access permits/authorities on HV network equipment Ensure network plant operates within design and regulatory requirements on a real time basis Dispatch and communicate with field crews to respond/rectify system abnormalities Application and administration of SCADA (if applicable to enterprise equipment) Analyse and diagnose system failures Calculate and analyse paralleling conditions on the interconnected HV system
C	Monitor and manage switching to:	Manage load Manage voltage Minimise loss Maximise system reliability Allow safe network access for maintenance activities Allow safe network access for construction activities Validating fault reports arising from system

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		disturbances
D	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 coordination of HV Transmission networks.

Note:

Access will be needed to: relevant protection, control, metering and alarm equipment, network drawings, computerised electrical plant control and monitoring facilities, operational event data, enterprise operational policies, procedures and work practices and crisis management procedures.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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

9.5)

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assessment and relationship with other units	For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with units:

UETTDRSO08B	Develop and evaluate transmission switching programs
UETTDRSO11B	Manage transmission networks

Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the monitoring of HV Transmission networks, ensuring that the Transmission network is operated within design parameters at all times and shall/may be demonstrated using the following:

HV Transmission feeders/Transmission network; Transmission transformers with HV windings; HV busbars; HV isolators; HV switchgear (applicable to Transmission enterprise equipment); Switching instructions (applicable to Transmission enterprise equipment); computers (applicable to Transmission enterprise equipment); network diagrams (applicable to Transmission enterprise equipment); access authorities; regulatory requirements.

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
- Assessing risk
- Assessment
- Authorisation
- Diagnostic, testing and restoration
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications
- Emergency
- Environmental and sustainable energy procedures

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RANGE STATEMENT

- Environmental legislation
- Environmental management documentation
- Established procedures
- Hazards
- Identifying hazards
- Inspect
- Legislation
- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

System Operation Units

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UETTDRSO18A Respond to discrete/ interdependent protection operations

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the coordination of response to discrete and interdependent protection operations due to system faults.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRSO10B	Coordinate HV distribution and sub transmission networks
or	UETTDRSO17A	Coordinate HV transmission networks

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan response to discrete/interdependantprotection operations	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the preparation of the switching program, are reviewed and determined.
	1.2	Purpose of the response established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Established policies, procedures and specifications for the response are obtained or established with the appropriate personnel.
	1.4	Response to discrete/interdependent protection operations are discussed with and/or directed to the appropriate personnel in order to ascertain the scope of the work/testing required.
	1.5	Testing parameters are ascertained from established policies, procedures and specifications.
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities and clients are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Need for relevant work permits is identified to coordinate the performance of work according

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ELEMENT	PERFORMANCE CRITERIA	
		to requirements and/or established procedures.
	1.12	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	1.13	Strategic plans are developed incorporating organisational initiatives as per established procedures
2 Carry out response to discrete/interdependa ntprotection operations	2.1	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.2	Decisions concerning the response to protection operations are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.3	Stakeholders/customers are kept informed of current status regarding plan progress and recent developments
	2.4	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.
	2.5	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the work within an agreed timeframe according to requirements.
	2.6	Testing of the decision to be implemented is undertaken according to requirements and established procedures.
	2.7	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.

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ELEMENT		PERFORMANCE CRITERIA	
		2.8	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
		2.9	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3	Complete the response to discrete/interdependa ntprotection operations	3.1	Final review of the switching program is undertaken to ensure it complies with all requirements and include all specifications and documentations needed to complete the work.
		3.2	Appropriate personnel are notified of completion and reports and/or completion documents (electronic/paper) are finalised/commissioned.
		3.3	Reports and/or completion documents (electronic/paper) are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
		3.4	Approved copies of switching program documents (electronic/paper) are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 developing and evaluating transmission 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 (EKAS) required is given

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REQUIRED SKILLS AND KNOWLEDGE

in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.2.2	Transmission, distribution and rail power systems
T2.2.3	Substations, power transformers and reactors
T2.4.4	High voltage fault switching principles
T2.11.18	Discrete protection systems
T2.11.19	Interdependent protection 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 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 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

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EVIDENCE GUIDE

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

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 - UET09". 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 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,

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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	Develop and evaluate, on at least three (3) occasions all of the following:	Identify discrete/interdependent relay operations by interpreting available alarms and event data. Analyse and diagnose system failures Evaluate response to discrete/interdependent relay operations
B	All of the following:	Describe control and alarms associated with discrete/interdependent protection systems
C	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

9.3)

This unit should be assessed as it relates to normal work

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EVIDENCE GUIDE

for assessment	practice using procedures, information and resources typical of a workplace. This should include: OHS policy and work procedures and instructions. Suitable work environment, facilities, equipment and materials to undertake actual preparation of HV Transmission Switching programs Note: Access will be needed to: relevant modelling tools, drawings, computerised electrical plant control and monitoring facilities and enterprise operational policies, procedures and work practices. In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.
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 Transmission, Distribution and Rail Traction Industry. 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

8) 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.

This Competency Standard Unit shall/may be demonstrated in relation to the activities required when responding to discrete/interdependent protection operations activities required to secure the network in the event of a fault condition and restoration plans which allow work to be safely performed whilst minimising customer outages and may include the following:

Overcurrent and Earth fault relays, Neutral displacement relays, No-volt changeover devices, Discrete auto reclose devices, DC Supplies, Oil surge devices (site maintenance), DC Frame leakage, Trip / control circuits, Alarms and indication, Voltage regulation relays, Parallel operation, Circuit isolation (discrete only) Function Tests (discrete only) Thermal overload , Transformer temperature control devices and CEL fail devices.

Conditions and facilities for the calculation of network loading, planning for the management of the network and multiple outages.

Regulatory and enterprise procedures for the compliance with national electricity code.

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

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

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RANGE STATEMENT

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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field 5)

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Competency Field **5)**

System Operation Units

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UETTDRSO19A Coordinate system operations in a regulated energy market

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**).

1.1) Descriptor

This Competency Standard Unit covers the coordination of system operations in a regulated energy market. It includes the relevant application of knowledge of the National Electricity Market (NEM), the practices and rules used in facilitating the coordination of operations in a regulated energy market.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRSO10B	Coordinate HV distribution and subtransmission networks
or	UETTDRSO17A	Coordinate HV transmission network

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential

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outcomes of a competency standard unit

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan to coordinate System Operations in a regulated energy market	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the coordination of the electricity market are reviewed and determined.
	1.2 Energy market requirements are established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Energy market and associated equipment operational prerequisites are identified and established in accordance with manufacturers and/or enterprise/site procedures
	1.4 Electricity market coordination and control procedures are discussed with and/or directed to the appropriate personnel in order to ascertain the project brief.
	1.5 Testing parameters are ascertained from established policies, procedures and specifications.
	1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7 Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8 Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9 Liaison and communication issues with other/authorised personnel, authorities and clients are resolved and activities coordinated to

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ELEMENT	PERFORMANCE CRITERIA	
		carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Need for relevant work permits is identified to coordinate the performance of work according to requirements and/or established procedures.
	1.12	Circuit/systems modelling are used to evaluate alternative proposals as per established procedures.
2 Coordinate System Operations in a regulated energy market	2.1	Strategic plans are developed incorporating organisational initiatives as per established procedures
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Decisions concerning the coordination are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Stakeholders/customers are kept informed of current status regarding plan progress and recent developments
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the work within an agreed timeframe according to requirements.
	2.7	Testing of the decision to be implemented is undertaken according to requirements and

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ELEMENT	PERFORMANCE CRITERIA	
		established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete the coordination of System Operations in a regulated energy market	3.1	Final review of the coordination is undertaken to ensure it complies with all requirements and include all specifications and documentations needed to complete the work.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents (electronic/paper) are finalised/commissioned.
	3.3	Reports and/or completion documents (electronic/paper) are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of coordination documents (electronic/paper) are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **Essential Knowledge and Associated Skills** (**EKAS**): 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 developing and evaluating transmission 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.1	Generation power systems
T2.8.1	Enterprises specific policies and procedure instructions
T2.8.16	Enterprise specific procedures and work practices relating to managing network demand
T2.9.1	Interpretation of power distribution network drawings and documentation

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)

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,

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EVIDENCE GUIDE

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 - UET09". 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

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EVIDENCE GUIDE

- Demonstrate an understanding of the essential knowledge and associated skills 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	Perform on at least three (3) occasions the following:	Dispatch energy to the electricity market Respond to electricity market fluctuations/demands Manipulate the system to ensure reliable operation in response to electricity market requirements
B	All of the following:	Principals and objectives of the electricity market The role of ancillary services in the operation of the electricity market Service provider obligations in the electricity market Connection and access requirements to the

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EVIDENCE GUIDE

		electricity market Analysis of pricing concepts Contractual obligations Scheduling of generation assets
C	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 the operation of the power system within the NEM

Note:

Access will be needed to: relevant modelling tools, drawings, computerised electrical plant control and monitoring facilities and enterprise operational policies, procedures and work practices.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. This requires that the specified essential knowledge and associated skills are assessed 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 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

8) 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 unit shall/may be demonstrated in relation to the knowledge of the structure, operation of the National Electricity Market and the impact of the National Electricity Rules on the operation of the power system.

It includes but it is not limited to a knowledge of dispatch of energy and ancillary services in the NEM, electrical market auto loading procedures; the ensuing flows and operation of the network, transmission plant loadings, stable system operation, planned and unplanned network outages, restoration of the system following system events, black system restart

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
- Assessing risk
- Assessment
- Authorisation
- Emergency
- Established procedures
- Legislation
- Notification

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RANGE STATEMENT

- OHS practices
- OHS issues
- Quality assurance systems
- Requirements
- Market participant
- Network service providers,
- Non market participants,
- Australian Energy Market Commission
- Australian Energy Regulator
- National Electricity Market Management Company

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

System Operation Units

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UETTDRSO20A Respond to complex protection operations

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the coordination of response to complex protection operations due to system faults.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

	UETTDRSO04B	Control generating plant
or	UETTDRSO05B	Manage HV distribution and sub transmission network demand
or	UETTDRSO12B	Manage transmission network demand

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan response to complex protection operations	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the preparation of response to complex protection operations, are reviewed and determined.
	1.2	Purpose of the response is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Established policies, procedures and specifications for the response are obtained or established with the appropriate personnel.
	1.4	Response to complex protection operations are discussed with and/or directed to the appropriate personnel in order to ascertain the scope of the work/testing required.
	1.5	Testing parameters are ascertained from established policies, procedures and specifications.
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities and clients are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Need for relevant work permits is identified to coordinate the performance of work according to

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ELEMENT	PERFORMANCE CRITERIA	
		requirements and/or established procedures.
	1.12	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
2 Carry out response to complex protection operations	2.1	Strategic plans are developed incorporating organisational initiatives as per established procedures
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Decisions concerning the response to complex protection operations are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Stakeholders/customers are kept informed of current status regarding plan progress and recent developments
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the work within an agreed timeframe according to requirements.
	2.7	Testing of the decision to be implemented is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete the response to complex protection operations	3.1	Final review of the response to complex protection operation is undertaken to ensure it complies with all requirements and include all specifications and documentations needed to complete the work.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents (electronic/paper) are finalised/commissioned.
	3.3	Reports and/or completion documents (electronic/paper)are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the response to complex protection operation documents (electronic/paper) are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 developing and evaluating transmission 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 (EKAS) required is given

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REQUIRED SKILLS AND KNOWLEDGE

in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

E2.18.2 Electrical safe working practice

T2.11.17 Protection scheme requirements

T2.11.56 Analysis protection targeting

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)

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 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 - UET09". 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 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:

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	Develop and evaluate, on at least three (3) occasions all of the following:	Identify complex relay operations by interpreting available alarms and event data. Analyse and diagnose system failures Evaluate response to complex relay operations
B	All of the following:	Describe control and alarms associated with complex protection systems
C	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 preparation of HV Transmission Switching programs
  - Note:
  - Access will be needed to: relevant modelling tools,

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drawings, computerised electrical plant control and monitoring facilities and enterprise operational policies, procedures and work practices.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with units:

Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the activities required when responding to complex protection operations as the result of a fault condition. These activities are required to secure the network and develop restoration plans that allow work to be safely be performed whilst minimising customer outages and may include the following:

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RANGE STATEMENT

Complex: distance, differential, transformer differential, bus zone, bus overcurrent, revenue metering, current transformer accuracy, SCADA, communications, harmonic control, point on wave, HV plant testing.

Conditions and facilities for the calculation of network loading, planning for the management of the network and multiple outages.

Regulatory and enterprise procedures for the compliance with national electricity code.

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
- 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

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RANGE STATEMENT

- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

System Operation Units

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UETTDRSO21A Manage network power flows

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1)**

1.1) Descriptor

This Competency Standard Unit covers the management of electrical network active and reactive power flows ensuring the network is operated within design parameters at all times. The electrical network includes feeders from distribution to transmission voltages; substation and generation assets that can influence power flows.

Application of the Unit

Application of the Unit **4)**

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

1.2) License to practice

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

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1.2) License to practice

equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRSO02B Manage Network Faults

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a competency standard unit

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan to manage network power flows	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence preparation of any network power flow management decisions are reviewed and determined.
	1.2	Purpose of the management is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established policies, procedures and specifications for the management of network power flows are obtained or established with the appropriate personnel.
	1.4	Network power flow management decisions are discussed with and/or directed to the appropriate personnel in order to ascertain the system conditions.
	1.5	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.6	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.7	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.8	Liaison and communication issues with other/authorised personnel, authorities and clients are resolved and activities coordinated to carry out work.
	1.9	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.10	Need for relevant operating procedures are identified to manage the performance of the network according to requirements and/or

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ELEMENT	PERFORMANCE CRITERIA	
		established procedures.
	1.11	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
2 Carry out and management network power flow	2.1	Strategic plans are developed incorporating organisational initiatives as per established procedures
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Management decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Stakeholders/customers are kept informed of current status regarding plan progress and recent developments
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the work within an agreed timeframe according to requirements.
	2.7	Testing of management decisions is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential

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ELEMENT	PERFORMANCE CRITERIA	
		knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete the management of network power flow	3.1	Final review of management decisions are undertaken to ensure it complies with all requirements and include all specifications and documentations needed to complete the work.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents (electronic/paper) are finalised/commissioned.
	3.3	Reports and/or completion documents (electronic/paper) are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Where applicable, approved copies of power flow management documents (electronic/paper) are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 developing and evaluating transmission 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.2	Electrical safe working practice
T2.8.16	Enterprise specific procedures and work practices relating to managing network demand
T2.11.8	Voltage control devices on interconnected transmission systems
T2.11.10	Control of power flow in interconnected transmission systems
T2.11.13	AC generators
T2.11.59	Generator control systems - EHV

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)

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

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

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 - UET09". 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 described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach;

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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	Develop and evaluate, on at least three (3) occasions network manipulations that encompass the following:	Maximise system reliability Manage voltage Minimise loss Control load Dispatch of Static/Synchronous VAR compensation (if applicable to enterprise) Dispatch of generation (if applicable to enterprise)
B	Demonstrate calculations and analyse the following:	Transmission line conditions on the interconnected EHV system. Distribution and Subtransmission line conditions on an interconnected system
C	At least one occasion	Dealing with an unplanned event by drawing on essential knowledge and associated skills to provide

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		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 preparation of HV Transmission Switching programs
  - Note:
  - Access will be needed to: relevant modelling tools, drawings, computerised electrical plant control and monitoring facilities and enterprise operational policies, procedures and work practices.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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.

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Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the management of network power flows. These activities are required to secure the network, ensure the network operates at maximum efficiency and develop plans allowing work to be performed safely and shall/may be demonstrated using the following:

EHV transmission network; HV distribution and sub transmission network; transformers with EHV windings; transformers with HV windings; EHV and HV busbars; EHV and HV isolators; EHV and HV Switchgear (applicable to enterprise equipment); switching of reactors or capacitors into circuit; electricity market auto loading procedures; generator excitation systems; prime mover governing system; fuel delivery systems; switching instructions (applicable to enterprise equipment); computers (applicable to enterprise equipment); network diagrams (applicable to enterprise equipment); access authorities; regulatory requirements

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
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

System Operation Units

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UETTDRTP02B Establish and reinstate a transmission tower work site

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the operation/maintenance of support plant and equipment and tools used for excavation work associated with foundations and footings for the construction of transmission towers. It also covers the preparation of the work site and the reinstatement of the ground surface. Scope of maintenance includes and is limited to visual inspection; lubrication; gland nipping; draining of water taps; degreasing; replacing gaskets. Use of relevant personal protective equipment is required.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UEENEEE001B	Apply OHS practices in the workplace
UETTDREL03B	Comply with environmental and incident response procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements

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describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to establish and or restore a transmission tower work site schedule of work	1.1 Work instructions are identified, received and confirmed.
	1.2 Relevant requirements, specifications and priorities are set as per procedures to establish and confirm the work schedule.
	1.3 OHS policies and procedures to be followed for the work to be performed are received and confirmed.
	1.4 Suggestions to assist with the establishing/restoration of the work site are made to others involved in the work.
	1.5 Hazards are identified, OHS risks assessed and emergency exits kept clear according to given instructions and established procedures.
	1.6 Scope of responsibility under the relevant work permit, where appropriate, are received and confirmed according to requirements and established procedures with relevant persons.
	1.7 Resources including equipment, tools, drawings, notices and personal protective equipment required for the job are identified and checked for working order according to established procedures.
	1.8 Relevant responsibilities associated with first aid and other related work safety procedures at the work site are checked and confirmed in accordance with requirements and established procedures to ensure safety measures are followed in the instance of an incident.
	1.9 Client issues are referred to appropriate persons in accordance with industry/acceptable /community

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ELEMENT	PERFORMANCE CRITERIA	
		standards.
	1.10	Site preparation is confirmed according to given instructions, as is the site safety plan and the work schedule for a quality outcome and to minimise risk and damage to property, commerce and individuals in accordance with established procedures.
	1.11	Road signs, barriers and warning devices are confirmed as positioned in accordance with given instructions and requirements.
2 Establish and/or restore the work site schedule of work	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste associated with establishing/restoring the work site and/or using of plant and equipment, are followed, in accordance with given instructions, requirements and/or established procedures.
	2.2	Site hazards such as lifting, climbing, working in confined spaces and/or aloft, and use of power tools/equipment, techniques and practices are safely followed in accordance with given instructions and according to requirements confirmed to eliminate the prospects of incidents.
	2.3	Operational knowledge for establishing/restoration of the work site and for operating support plant and equipment is confirmed to ensure completion in an agreed timeframe and to quality standards with a minimum of waste according to requirements and established procedures.
	2.4	Establishing/restoring the work site and operating support plant and equipment is used safely and carried out in accordance with given instructions and established procedures to ensure all process aspects of the work are confirmed.
	2.5	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.

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ELEMENT	PERFORMANCE CRITERIA	
	2.6	Non-routine events are referred to the immediate authorised persons for directions according to established procedures.
	2.7	Problems associated with establishing/restoring the work site and the operation of support plant and equipment are dealt with using acquired known solutions and skills related to routine procedures to ensure work instructions and established procedures are met.
	2.8	On going checks of quality of the work are undertaken and work is completed within an allocated timeframe in accordance with given instructions and established procedures.
3 Review and document establishment and/or restoration of work site schedule of work	3.1	Work undertaken is checked against work schedule and anomalies reported to authorised persons in accordance with established procedures.
	3.2	Accidents and/or incidents are actioned and reported to authorised persons in accordance with established procedures.
	3.3	Work site is rehabilitated, cleaned up and made safe in accordance with given instructions and 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	Appropriate persons are notified of work completion according to established procedures.
	3.6	Work completion records, report forms/data sheets are completed accurately in accordance with given instructions and established procedures.
	3.7	Performance feedback is sought to confirm outcomes are in agreement with work requirements and specifications.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 establishing and reinstating a transmission tower work site.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.11.1	Hand tools
E2.11.2.1	Power tools
T2.1.3	Engineering applications of material properties
T2.1.7	Enterprise vehicles
T2.1.8	Chain saw principles
T2.7.1	Environmental fundamentals
T2.7.2	Material handling and the environment
T2.8.1	Enterprise specific - policies and procedure instructions
T2.8.2	Enterprise specific - OHS instructions
T2.8.3	Enterprise specific - technical drawings and documents

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be

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EVIDENCE GUIDE

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 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

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 - UET09". 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	Using plans, drawings, maps/work schedule define work to be completed,

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EVIDENCE GUIDE

		indicating OHS and environmental issues/hazards. Verify qualifications to operate machinery and perform machinery daily log checks. Submit Dial Before You dig application form. Verify understanding of material safety data sheets (MSDS) and work permits. Undertake appropriate traffic control management Verify an understanding of working safely with hazardous materials and equipment, safe manual handling techniques and correct use of personal protective equipment.
B	Operate at least 5 of the following	Small generator sets Welding units Air Compressors and hoses Pneumatic and/or electric hammers Rollers and compactors Concrete and ceramic cutters Pumps Post hole diggers Drills
C	Operate at least one of the following	Back hoes Earth drilling rigs Trench excavators Heavy vehicles
D	At least one occasion	Dealing with an unplanned event by drawing on essential knowledge and associated skills to provide appropriate

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EVIDENCE GUIDE

		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 installation and maintenance on de-energised low voltage underground polymeric cables.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with the following units:

UETTDRTP03B Erect transmission towers

UETTDRTP04B Erect transmission tower hardware

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Range Statement

RANGE STATEMENT

8) 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 establishing and/or restoring the work site using support plant, equipment and tools to perform work in a utilities industry work environment.

Support plant may include back hoes, earth drilling rigs, trench excavators, heavy vehicles, wood-chippers, concrete cutters, air compressors, portable generators, welders, crimper-cutters, pumps, chain-saws, post hole diggers, sand-blasters, pneumatic and/or electric hammers, rollers and compactor, concrete and ceramic cutters, boring equipment, trenching equipment and drills.

Equipment may include hand operated ratchet and friction grip winches, chain pullers and block and tackle.

The following constants and variables included in the element/Performance Criteria in this unit are fully described in the Definitions Section 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
- Authorisation
- Confined space
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications
- Emergency
- Environmental and sustainable energy procedures
- Environmental legislation
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Legislation
- MSDS
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work

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RANGE STATEMENT

- Personnel
- Quality assurance systems
- Requirements
- Work clearance systems.

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Transmission Units

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UETTDRTP03B Erect transmission towers

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the erection of towers in sections or in parts, in accordance with construction plans and specifications. It includes the correct positioning of road signs, barriers and or warning devices, the inspection and confirmation that excavation/foundation construction is in accordance with the works order and the identification of potential hazards and safety risks with recommendations for preventative action being referred to appropriate authorities.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UEENEEE001B	Apply OHS practices in the workplace
UETTDREL03B	Comply with environmental and incident response procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements
describe the essential

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outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to erect transmission towers	1.1	Work instructions are received and confirmed.
	1.2	Relevant requirements and established procedures to be followed for the work to be preformed are discussed with all personnel to establish and confirm the work schedule.
	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 erection of towers outcomes are made to others involved in the work.
	1.5	Hazards are identified, OHS risks assessed and emergency exits kept clear according to given instructions and established procedures.
	1.6	Scope of responsibility under the relevant work permit are received and confirmed according to requirements and established procedures with relevant personnel.
	1.7	Resources including, equipment, tools and personnel protective equipment required for the job are obtained and, in working order according to established procedures.
	1.8	Relevant responsibility associated with First Aid, Tower/Pole Top Rescue and/or other related work safety procedures at the work site are confirmed in accordance with requirements and established procedures to ensure safety measures are followed in the instance of an incident.
	1.9	Client issues are referred to appropriate personnel in accordance with industry/acceptable /community standards.

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ELEMENT	PERFORMANCE CRITERIA	
	1.10	Site is prepared according to given instructions and the work schedule for a quality outcome and to minimise risk and damage to property, commerce, and individuals in accordance and established procedures.
	1.11	Road signs, barriers and warning devices are positioned in accordance with given instructions and requirements.
2 Carry out the erection of transmission towers.	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are followed in accordance with given instructions, requirements and/or established procedures.
	2.2	Lifting, climbing, working aloft, and use of power tools/equipment, techniques and practices are safely followed in accordance with given instructions and, according to requirements confirmed to eliminate the prospects of incidents.
	2.3	Operational knowledge for the operation of support plant and equipment used for the erection of towers to be applied to the work is confirmed to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements and established procedures.
	2.4	Operation of support plant and equipment used for the erection of towers is carried out in accordance with given instructions and established routines/procedures.
	2.5	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.
	2.6	Non-routine events are referred to the immediate authorised personnel for directions according to established procedures.
	2.7	Problems associated with operation of support plant and equipment used for the erection of towers are dealt with using acquired known

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ELEMENT	PERFORMANCE CRITERIA	
		solutions and skills related to routine procedures to ensure work instructions and established procedures are met.
	2.8	On going checks of quality of the work are undertaken in accordance with given instructions and established procedures.
3 Complete the erection of transmission towers	3.1	Work undertaken is checked against work schedule and anomalies reported to Authorised personnel in accordance with established procedures.
	3.2	Accidents and/or incidents are actioned and reported to authorised personnel in accordance with established procedures.
	3.3	Work site is rehabilitated, cleaned up and made safe in accordance with given instructions and 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	Appropriate personnel are notified of work completion according to established procedures.
	3.6	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

7) **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 erecting transmission towers.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
E2.11.1	Hand tools
E2.11.2.1	Power tools
T2.1.3.	Engineering applications of material properties
T2.2.10	Transmission structures and hardware
T2.8.3	Enterprise specific - technical drawings and documents

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 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

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EVIDENCE GUIDE

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 - UET09". 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

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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	At least one of the following:	Pyramid Delta Pi Enterprise specific types
B	At least one of the following:	Mass concrete Caisson or pile-based Screw-anchor Bored
C	At least one of the following:	Crane Gin pole
D	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 9.3)

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EVIDENCE GUIDE

specific 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 installation and maintenance on de-energised low voltage underground polymeric cables.

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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with the following units:

UETTDRTP02B	Establish and reinstate a transmission tower work site
UETTDRTP04B	Erect transmission tower hardware

Range Statement

RANGE STATEMENT

8) This relates to the unit of competency as a whole providing the range of contexts and

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RANGE STATEMENT

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 erection of transmission towers.

Tower types may include pyramid, delta and pi and other enterprise specific types.

Methods of erection may include crane and/or gin pole.

Foundations may include mass concrete, caisson or pile-based and screw-anchor or bored types

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
- Authorisation
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications
- Emergency
- Environmental and sustainable energy procedures
- Environmental legislation
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Legislation
- MSDS
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Work clearance systems

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Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Transmission Units

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UETTDRTP04B Erect transmission tower hardware

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the erection of hardware and/or associated equipment used on transmission towers. It includes the correct positioning of hardware on the towers in accordance with construction plans and specifications. It also encompasses the inspection and confirmation that the hardware and associated equipment are in accordance with the works order and the identification of potential hazards and safety risks with recommendations for preventative action being referred to appropriate authorities.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRTP03B Erect transmission towers

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of competency

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to erect transmission tower hardware	1.1	Work instructions are received and confirmed.
	1.2	Relevant requirements and established procedures to be followed for the work to be preformed are discussed with all personnel to establish and confirm the work schedule.
	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 erection of transmission tower hardware outcomes are made to others involved in the work.
	1.5	Hazards are identified, OHS risks assessed and emergency exits kept clear according to given instructions and established procedures.
	1.6	Scope of responsibility under the relevant work permit are received and confirmed according to requirements and established procedures with relevant personnel.
	1.7	Resources including, equipment, tools and personnel protective equipment required for the job are obtained and, in working order according to established procedures.
	1.8	Relevant responsibility associated with First Aid, Tower/Pole Top Rescue and/or other related work safety procedures at the work site are confirmed in accordance with requirements and established procedures to ensure safety measures are followed in the instance of an incident.
	1.9	Client issues are referred to appropriate personnel in accordance with industry/acceptable /community standards.
	1.10	Site is prepared according to given instructions and the work schedule for a quality outcome and to minimise risk and damage to property, commerce, and individuals in accordance and

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ELEMENT	PERFORMANCE CRITERIA	
		established procedures.
	1.11	Road signs, barriers and warning devices are positioned in accordance with given instructions and requirements.
2 Carry out the erection of transmission tower hardware	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are followed in accordance with given instructions, requirements and/or established procedures.
	2.2	Lifting, climbing, working in confined spaces and/or aloft, and use of power tools/equipment, techniques and practices are safely followed in accordance with given instructions and, according to requirements confirmed to eliminate the prospects of incidents
	2.3	Operational knowledge for the erection of transmission tower hardware to be applied to the work is confirmed to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements and established procedures.
	2.4	The erection of transmission tower hardware is carried out in accordance with given instructions and established routines/procedures.
	2.5	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.
	2.6	Non-routine events are referred to the immediate authorised personnel for directions according to established procedures.
	2.7	Problems associated with the erection of transmission tower hardware are dealt with using acquired known solutions and skills related to routine procedures to ensure work instructions and established procedures are met.
	2.8	On going checks of quality of the work are undertaken in accordance with given instructions

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ELEMENT	PERFORMANCE CRITERIA	
		and established procedures.
3 Complete the erection of transmission tower hardware	3.1	Work undertaken is checked against work schedule and anomalies reported to Authorised personnel in accordance with established procedures.
	3.2	Accidents and/or incidents are actioned and reported to authorised personnel in accordance with established procedures.
	3.3	Work site is rehabilitated, cleaned up and made safe in accordance with given instructions and 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	Appropriate personnel are notified of work completion according to established procedures.
	3.6	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

7) **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 erecting transmission tower hardware.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.2	Electrical safe working practice
E2.11.1	Hand tools
E2.11.2.1	Power tools
T2.1.7	Enterprise vehicles
T2.2.1	Generation power systems
T2.2.2	Transmission, distribution and rail power systems
T2.3.1	Powerline safety practices
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions

Evidence Guide

EVIDENCE GUIDE

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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.

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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 - UET09". 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

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EVIDENCE GUIDE

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	At least one of the following:	Pyramid Delta Pi Enterprise specific types
B	At least one of the following:	Insulators Bolts Clamps
C	At least one of the following:	Crane Gin pole
D	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 **9.3)**

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EVIDENCE GUIDE

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 installation and maintenance on de-energised low voltage underground polymeric cables.

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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with the following units:

UETTDRTP02B	Establish and reinstate a transmission tower work site

Range Statement

RANGE STATEMENT

8) 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

This Competency Standard Unit shall/may be demonstrated in relation to erection of transmission tower hardware.

Tower types may include pyramid, delta and pi and other enterprise specific types.

Associated hardware may include insulators and associated bolts and clamps.

Methods of erection may include crane and/or gin pole.

Foundations may include mass concrete, caisson or pile-based and screw-anchor or bored types.

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
- Authorisation
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications
- Emergency
- Environmental and sustainable energy procedures
- Environmental legislation
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Legislation
- MSDS
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Work clearance systems

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Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Transmission Units

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UETTDRTP05B Pre-tension stringing transmission overhead conductors and cables

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the stringing of overhead conductors and cables with no electrical connections being made. It includes the preparation of the site, the pre-positioning of conductors and fitting of conductor/cable stringing equipment where appropriate and the cleaning of insulators in accordance with works order.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRTP04B	Erect transmission tower hardware

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of competency

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to pre-tension string the transmission overhead conductors and cables	1.1 Work instructions are received and confirmed.
	1.2 Relevant requirements and established procedures to be followed for the work to be preformed are discussed with all personnel to establish and confirm the work schedule.
	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 pre-tension stringing of transmission overhead conductors and cables outcomes are made to others involved in the work.
	1.5 Hazards are identified, OHS risks assessed and emergency exits kept clear according to given instructions and established procedures.
	1.6 Scope of responsibility under the relevant work permit are received and confirmed according to requirements and established procedures with relevant personnel.
	1.7 Resources including, equipment, tools and personnel protective equipment required for the job are obtained and, in working order according to established procedures.
	1.8 Relevant responsibility associated with First Aid, Tower/Pole Top Rescue and/or other related work safety procedures at the work site are confirmed in accordance with requirements and established procedures to ensure safety measures are followed in the instance of an incident.
	1.9 Client issues are referred to appropriate personnel in accordance with industry/acceptable /community standards.
	1.10 Site is prepared according to given instructions and the work schedule for a quality outcome and to minimise risk and damage to property, commerce, and individuals in accordance and

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ELEMENT	PERFORMANCE CRITERIA	
		established procedures.
	1.11	Road signs, barriers and other warning devices are positioned in accordance with given instructions and requirements.
2 Carry out pre-tension stringing of transmission overhead conductors and cables	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are followed in accordance with given instructions, requirements and/or established procedures.
	2.2	Lifting, climbing, working aloft, and use of power tools/equipment, techniques and practices are safely followed in accordance with given instructions and, according to requirements confirmed to eliminate the prospects of incidents.
	2.3	Operational knowledge for the pre-tension stringing of transmission overhead conductors and cables to be applied to the work is confirmed to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements and established procedures.
	2.4	Pre-tension stringing of transmission overhead conductors and cables is carried out in accordance with given instructions and established routines/procedures.
	2.5	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.
	2.6	Non-routine events are referred to the immediate authorised personnel for directions according to established procedures.
	2.7	Problems associated with pre-tension stringing of transmission overhead conductors and cables are dealt with using acquired known solutions and skills related to routine procedures to ensure work instructions and established procedures are met.
	2.8	On going checks of quality of the work are

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ELEMENT	PERFORMANCE CRITERIA	
		undertaken in accordance with given instructions and established procedures.
3 Complete pre-tension stringing of transmission overhead conductors and cables	3.1	Work undertaken is checked against work schedule and anomalies reported to authorised personnel in accordance with established procedures.
	3.2	Accidents and/or incidents are actioned and reported to authorised personnel in accordance with established procedures.
	3.3	Work site is rehabilitated, cleaned up and made safe in accordance with given instructions and 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	Appropriate personnel are notified of work completion according to established procedures.
	3.6	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

7) **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 pre-tension stringing transmission overhead conductors and cables.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practice
T2.2.32	Stringing transmission overhead conductors and cables
T2.3.1	Powerline safety practices
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions

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 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 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 - UET09". 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

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EVIDENCE GUIDE

- 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	Any 2 of the following:	Copper Aluminium Steel Aluminium/steel reinforced HV ABC HV IUC
B	Any one of the following:	EWP Winches/capstans Tension equipment Stringing equipment Cable trailers Cable drum stands Ropes Rollers Sheaves Stockings Swivels
C	At least one occasion	Dealing with an unplanned event by drawing on essential knowledge and

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		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 pre-tension stringing transmission overhead conductors and cables.

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 Transmission, Distribution and Rail Traction Industry. 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.

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Range Statement

RANGE STATEMENT

8) 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 the pre-tension stringing of transmission overhead conductors and cables in accordance with relevant enterprise safe working practices/procedures and environmental requirements, manufacturers specifications, codes of practice, statutory requirements, Australian Standards and Occupational Health and Safety standards.

Types of conductors and cables may include copper, aluminium, steel, aluminium conductor steel reinforced.

Stringing may be required to be carried out for all the types of conductors and cables listed above.

Plant may include elevating work platform, winches and capstans, specialist tension stringing equipment, cable trailers and cable drum stands. Other stringing equipment may include ropes, rollers and sheaves, stockings and swivels.

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
- Authorisation
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications
- Emergency
- Environmental and sustainable energy procedures
- Environmental legislation
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Legislation
- MSDS
- Notification
- OHS practices
- OHS issues

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RANGE STATEMENT

- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Transmission Units

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UETTDRTP06B Erect transmission towers and associated hardware

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the erection of non-energised, pyramid, delta, Pi or enterprise specific transmission towers and associated hardware. It includes the erection of components in accordance with construction plans, specifications, work orders and standing enterprise requirements. Erection could also involve cleaning and welding. The updating of system data, records and or completion of relevant documentation in accordance with enterprise requirements also forms part of this competency.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDREL01B	Apply environment and sustainable energy procedures
and	UETTDREL02B	Operate plant and equipment near energised and exposed electrical conductors/apparatus
and	UETTDREL04B	Working safely near live electrical apparatus as a non-electrical worker
and	UEENEEE001B	Apply OHS practices
and	UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
and	UEENEEE004B	Solve problems in multiple path d.c. circuits
and	UEENEEE005B	Fix and secure equipment
and	UEENEEE007B	Use drawing, diagrams, schedules and service manuals
and	UEENEEG001B	Solve problems in electromagnetic circuits
and	UEENEEG002B	Solve problems in single and three phase low voltage

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Prerequisite Unit(s) **2)**

circuits

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to erect transmission towers and associated hardware	1.1 Works 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 the erect towers and associated hardware are obtained

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ELEMENT	PERFORMANCE CRITERIA	
		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 work permits are obtained to access and 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 work site are confirmed current in First Aid, Tower/Pole Top Rescue 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	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures.
	1.11	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.12	Traffic management plan is identified and implemented.
2 Carry out the erection of transmission towers	2.1	OHS, sustainable energy and environmental principles and practices to reduce the incidents of

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ELEMENT	PERFORMANCE CRITERIA	
and associated hardware		accidents and minimise waste are monitored and followed in accordance with requirements and/or established procedures.
	2.2	Lifting, climbing, working 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 in the safe erection of towers and associated hardware to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.4	Towers and associated hardware to be erected are stabilised according to requirements.
	2.5	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.
	2.6	Erection of towers and associated hardware is carried out, in accordance with the work schedule and requirements/established procedures.
	2.7	Unplanned events in the erection of towers and associated hardware are undertaken within the scope of established procedures.
	2.8	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.9	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the erection of transmission towers and associated hardware	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.

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ELEMENT	PERFORMANCE CRITERIA	
	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 or disposed of in accordance with established procedures.
	3.5	Relevant work permit(s) are signed off and, towers and associated hardware are returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 erecting transmission towers and associated hardware.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.1.4.	Basic rigging techniques
T2.1.9.	Stores procedures
T2.2.1	Generation power systems
T2.2.2	Transmission, distribution and rail power systems
T2.2.3	Substations, power transformers and reactors

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REQUIRED SKILLS AND KNOWLEDGE

T2.2.10 Transmission structures and hardware

T2.3.1 Powerline safety practices

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 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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EVIDENCE GUIDE

on the decision as to how much and how detailed the data gathered will 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 - UET09". 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/oth

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EVIDENCE GUIDE

er variables		
Group No	**The minimum number of items on which skill is to be demonstrated**	**Item List**
A	Any one of the following:	Pyramid Delta pi Enterprise specific type
B	At least two of the following:	Insulators Clamps Bolts Structural components
C	At least one of the following:	Welding Cleaning
D	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 erection of towers and associated equipment.

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.

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EVIDENCE GUIDE

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 Transmission, Distribution and Rail Traction Industry. 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

8) 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 the erection of non-energised, pyramid, delta, Pi or enterprise specific towers in accordance with construction plans and specifications

Tower types may include pyramid, delta and pi and other enterprise specific types.

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
- Assessment
- Authorisation

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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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Competency Field

Competency Field **5)**

Transmission Units

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UETTDRTP07B Maintain transmission towers and associated hardware

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1)**

1.1) Descriptor

This Competency Standard Unit covers the maintenance of non-energised, pyramid, delta, Pi or enterprise specific transmission towers and associated hardware. It includes the repair, and or replacement of components in accordance with construction plans, specifications, work orders and standing enterprise requirements. Maintenance could also involve cleaning and welding. The updating of system data, records and or completion of relevant documentation in accordance with enterprise requirements also forms part of this competency.

Application of the Unit

Application of the Unit **4)**

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRTP06B	Erect transmission towers and associated hardware

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of

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competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to maintain transmission towers and associated hardware	1.1	Works 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 the maintenance of towers and associated hardware 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	Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.
	1.7	Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.
	1.8	Relevant personnel at work site are confirmed current in First Aid, Pole Tower/Top Rescue and other related work procedures according to requirements.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and

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ELEMENT	PERFORMANCE CRITERIA	
		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 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	Traffic management plan is identified and implemented.
2 Carry out the maintenance of transmission towers and associated hardware	2.1	OHS, sustainable energy and environmental 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	Towers and associated hardware to be erected are stabilised according to requirements.
	2.3	Lifting, climbing, working aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
	2.4	Essential knowledge and associated skills are applied in the safe erection of towers and associated hardware to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.5	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.
	2.6	Maintenance, including repair and/or replacement of towers is carried out, in accordance with the work schedule and requirements/established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.7	Unplanned events in the erection of towers and associated hardware are undertaken within the scope of established procedures.
	2.8	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.9	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the maintenance of transmission towers and associated hardware	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 or disposed of in accordance with established procedures.
	3.5	Relevant work permit(s) are signed off and, towers and associated hardware are returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **Essential Knowledge and Associated Skills** (**EKAS**): This describes the essential

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REQUIRED SKILLS AND KNOWLEDGE

skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of maintaining transmission towers and associated hardware.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.8.2.2	Alternating current principles - power
E2.8.5	Magnetism
E2.8.6	Electromagnetic principles
T2.2.11	Routine maintenance on transmission structures
T2.3.1	Powerline safety practices

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 recognised that, in some circumstances, assessment in part or full can occur outside the workplace.

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EVIDENCE GUIDE

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 - UET09". 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

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EVIDENCE GUIDE

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	Any one of the following:	Pyramid Delta pi Enterprise specific type
B	At least two of the following	Insulators Clamps Bolts Structural components
C	At least one of the following:	Welding Cleaning
D	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 **9.3)**

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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 pre-tension stringing of transmission overhead conductors and cables.

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 Transmission, Distribution and Rail Traction Industry. 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

8) 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 the erection of non-energised, pyramid, delta, Pi or enterprise specific towers in accordance with

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RANGE STATEMENT

construction plans and specifications

Tower types may include pyramid, delta and pi and other enterprise specific types.

Maintenance may include the removal, repair and replacement of tower components, including welding where appropriate; and the replacement, repair and cleaning of associated hardware.

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
- Assessment
- Authorisation
- 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

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Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Transmission Units

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UETTDRTP08B Transmission tower stub setting

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the utilisation of geographical maps and site surveys to set out, excavate, prepare, align and install the foundation footings of a transmission tower and establish the tower stubs to ground level for the erection of a transmission towers. Survey processes and operation of survey equipment is associated with this unit.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

There are no prerequisite competencies to this unit.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the setting of a transmission	1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analysed and

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ELEMENT	PERFORMANCE CRITERIA	
tower stub		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 construction activities 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	Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.
	1.7	Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.
	1.8	Relevant personnel at work site are confirmed current in First Aid, Rescue 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 established procedures.
	1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where

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ELEMENT	PERFORMANCE CRITERIA	
		applicable in accordance with established procedures.
	1.12	Traffic management plan is identified and implemented where appropriate.
2 Carry out the setting of a transmission tower stub	2.1	OHS, sustainable energy and nvironmental 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	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.
	2.3	Lifting, climbing, working in excavations, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
	2.4	Essential knowledge and associated skills are applied in the survey and establishment of tower stubs to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.5	Unplanned events in the establishment of tower stubs are undertaken within the scope of established procedures.
	2.6	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.7	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the setting of a transmission tower stub	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

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ELEMENT	PERFORMANCE CRITERIA	
		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 or disposed of in accordance with established procedures.
	3.5	Relevant work permit(s) are signed off where appropriate and returned in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 setting and transmission tower stub.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.1.1	Engineering applications of mathematical principles
T2.1.2	Engineering applications of mechanical principles
T2.1.3	Engineering applications of material properties
T2.1.5	Elevator work platform operational principles

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REQUIRED SKILLS AND KNOWLEDGE

T2.1.6	Hydraulic and pneumatic portable equipment
T2.1.7	Enterprise vehicles
T2.1.8	Chain saw principles
T2.1.9	Stores procedures
T2.2.10	Transmission structures and hardware
T2.3.1	Powerline safety practices
T2.7.1	Environmental fundamentals
T2.7.2	Material handling and the environment
T2.11.43	Survey principles

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 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

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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 - UET09". 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

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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:	Survey techniques Set out and peg excavation markers Establish the tower stub to ground level
B	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 construction of lattice type tower stubs.

In addition to the resources listed above, in Context of and

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EVIDENCE GUIDE

	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 Transmission, Distribution and Rail Traction Industry. 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

8) 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 the construction of lattice type transmission towers.

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
- Assessment

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RANGE STATEMENT

- Authorisation
- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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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Competency Field

Competency Field **5**)

Transmission Units

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UETTDRTP09B Install and maintain overhead conductors and cables (towers)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation and maintenance of overhead conductors and cables used on towers which includes the stringing, tensioning and terminating of the conductor/cable while de energised, securing of the conductor to the insulators or supports and the undertaking of the electrical connections. It also covers maintenance work associated with the diagnosing of faults, the conducting of visual inspections, the confirmation of phasing and the completion of other enterprise tests. It also encompasses confirming isolation of systems and circuits, and/accepting/ issuing electrical permits and the updating of system data/maintenance records.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit may require a licence/registration to

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRTP07B	Maintain transmission towers and associated hardware

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential

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outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the installation and maintenance of overhead conductors and cables used on towers	1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists are received/ sourced, 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 the installation and maintenance of overhead conductors and cables used on towers 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 work permits are obtained to access and 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 work site are confirmed current in First Aid, Rescue and other related procedures according to requirements.

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ELEMENT	PERFORMANCE CRITERIA	
	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, environment and individuals in accordance with 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	Traffic management plan is identified and implemented.
2 Carry out installation and maintenance of overhead conductors and cables used on towers	2.1	OHS, sustainable energy and environmental 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 aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
	2.3	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements /permits and established procedures.
	2.4	Essential knowledge and associated skills are applied in the safe installation and maintenance of overhead conductors and cables used on towers to ensure completion in an agreed timeframe to quality standards with a minimum of waste according to requirements.
	2.5	Overhead conductor/cables are strung, tensioned and terminated as per requirements/established procedures.
	2.6	Conductors and anti-vibration devices, spaces/spreaders are secured as per established

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ELEMENT	PERFORMANCE CRITERIA	
		procedures.
	2.7	Electrical connections are made in accordance with the requirements/established procedures.
	2.8	Maintenance, including repair and/or replacement of overhead conductors and cables used on towers is carried out, in accordance with the work schedule and requirements/established procedures.
	2.9	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.
	2.10	Unplanned events in the installation and maintenance of overhead conductors and cables used on towers are undertaken within the scope of established procedures.
	2.11	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.12	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the installation and maintenance of overhead conductors and cables used on towers	3.1	Work undertaken is checked against works schedule for confirmation of phasing and 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 or disposed of in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA
	3.5 Relevant work permit(s) are signed off and, overhead conductors and cables used on towers are returned to service in accordance with requirements.
	3.6 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing and maintaining overhead conductors and cables (towers).

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.11 Routine maintenance on transmission structures

T2.2.21 Installation and maintenance on transmission lines and associated equipment

T2.2.30 Powerline transmission installation safety

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.

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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 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 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

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with the "Assessment Guidelines - UET09". 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	At least one of the following:	Copper Aluminium Steel Composite Aluminium/steel reinforced

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		Pilot
B	At least two of the following:	Elevated work platform Portable platform Gondola Hook ladder* Elevated work box (*must do)
C	At least five of the following:	Winches* Tension equipment* Stringing equipment Cable trailers Crimping equipment * Pre-formed splices Hardware Cable drum stands Ropes Rollers/ sheaves Comealongs Swivels (*must do)
D	At least two of the following:	Voltage/ de-energised indicating device Field intensity meter Operating rods (*must do)
E	At least one of the following:	Dynamometer Site board Abney level Sag chart* Theodolite (*must do)

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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 installation and maintenance of overhead conductors and cables on towers.

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 Transmission, Distribution and Rail Traction Industry. 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.

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Range Statement

RANGE STATEMENT

8) 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 the installation and maintenance of overhead conductor and or cables used on transmission towers

Installation and maintenance may include the stringing, tensioning, terminating, removal, repairing and replacement of the conductors/cables. Visual inspections and the diagnosing of faults is also included.

Structures include towers and columns.

Types of conductor include copper, aluminium, steel and composites. Conductor configurations may be single or bundled and include pilot cables.

Overhead conductors include earthing systems

Plant may include elevating work platform, winches and capstans, specialist tension stringing equipment, cable trailers, cable drum stands and equipotential equipment.

Testing and recording equipment includes, insulation resistance testers, recording meters and other approved devices and techniques applicable to the voltage. .

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
- Assessment
- Authorisation
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5**)

Transmission Units

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UETTDRTP10B Inspect overhead structures and electrical apparatus (towers)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the inspection as per requirements of overhead structures such as towers and electrical apparatus. Overhead structures include towers and overhead conductors and or cables include, underground and overhead transition points, electrical equipment, hardware and or earthing systems. It also includes the completion of inspection reports and other relevant documentation in accordance with requirements.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRTP07B	Maintain transmission towers and associated hardware

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of competency

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the inspection of overhead structures and electrical apparatus used on towers	1.1 Works 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 the inspection of overhead structures and electrical apparatus used on towers are obtained and understood for the purposes of the work to be performed.
	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 work permits are obtained to access and 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 identified, scheduled and obtained and, in working order.
	1.8 Relevant personnel at work site are confirmed current in First Aid, Tower/Pole Top Rescue 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.

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ELEMENT	PERFORMANCE CRITERIA	
	1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with 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	Traffic management plan is identified and implemented.
2 Carry out inspection of overhead structures and electrical apparatus used on towers	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 kills are applied in the safe inspection of overhead structures and electrical apparatus used on towers to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.4	Inspection of overhead structures and electrical apparatus used on towers is carried out, in accordance with the work schedule and requirements/established procedures.
	2.5	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.
	2.6	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.7	On going checks of quality of the work are

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ELEMENT	PERFORMANCE CRITERIA	
		undertaken in accordance with instructions and established procedures.
3 Complete the inspection of overhead structures and electrical apparatus used on towers	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.
	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 work permit(s) are signed off and, overhead structures and electrical apparatus used on towers are returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 inspecting overhead structures and electrical apparatus (towers).

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 (EKAS) required is given in

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REQUIRED SKILLS AND KNOWLEDGE

Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.10	Transmission structures and hardware
T2.2.28	Towers and structures inspection principles
T2.2.29	Transmission powerline inspection principles

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 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 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 - UET09". 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

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- 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	At least four of the following:	Towers Overhead conductors/cables Structural fittings Electrical Equipment Hardware. Earthing systems
B	At least two of the following:	Visual* Infra-red camera X-Ray Camera Binoculars/telescope (* must do)
C	All of the following:	Reporting procedures Reporting outcomes
D	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

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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 inspection of overhead structures and electrical apparatus on towers.

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 Transmission, Distribution and Rail Traction Industry. 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

8) 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 the inspection of overhead structures such as towers and electrical apparatus and equipment.

Inspection may be carried out on foot, and/or by conventional ground-based vehicle, or

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RANGE STATEMENT

from the air. Aircraft may be helicopters or fixed-wing types.

Inspection techniques include use of X-ray and infrared camera.

Items to be inspected may include towers but not overhead poles and or structures.

Types of electrical apparatus to be inspected include overhead conductors, cables, hardware and footings, underground cables and overhead transition points and, electrical equipment such as pole-mounted transformers and air-break switches, hardware and or earthing systems.

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
- Assessment
- Authorisation
- 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

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Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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

Competency Field

Competency Field **5)**

Transmission Units

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UETTDRTP11B Maintain energised lines (transmission) using live line stick technique

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This Competency Standard Unit covers the maintenance of energised high voltage transmission overhead electrical apparatus, i.e. live line work using line Stick techniques and includes the verification of the site conditions and the potential hazards, the conformation and calculation of physical loads and the selection of appropriate and authorised work method. It includes the preparation and cleaning of specialist material and tools in accordance with authorised technical instructions. It also encompasses the undertaking of OHS and safe working practices and the rendering inoperative of the automatic re-closing device including its restoration in accordance with the work plan and the procedure of issuing/accepting electrical access permits and or relevant work document.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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) **2**)

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

BSBWOR402A	Promote team effectiveness
UETTDRIS25B	Contribute to coordinated HV live line work
UETTDRTP09B	Install and maintain electrical conductors and cables (towers)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare/plan to maintain energised lines (transmission) using live line stick technique	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	Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4	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.
	1.5	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.6	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7	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.

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ELEMENT		PERFORMANCE CRITERIA	
		1.8	Relevant personnel at work site are confirmed current in First Aid, CPR, and other rescue procedures according to requirements.
		1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
		1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
		1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
		1.12	Positioning of road signs, barriers and warning devices is planned in accordance with requirements.
2	Carry out the maintenance of energised lines (transmission) using live line stick technique	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
		2.2	First Aid, CPR and other Rescue procedures and other related work procedures are performed according to requirements and/or established procedures.
		2.3	Lifting, climbing, working aloft, and tools/equipment, techniques and practices are safely exercised according to requirements.
		2.4	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.
		2.5	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.6	Maintenance of energised high voltage overhead electrical transmission apparatus is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied in the safe maintenance of energised high voltage overhead electrical transmission apparatus to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.9	On going 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 maintenance of energised lines (transmission) using live line stick technique	3.1	Work is checked against schedule for conformance, anomalies reported in accordance with established procedures.
	3.2	Accidents and /or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and confirmed 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 work permit(s) (live line) are signed off and client/customer advised in accordance with requirements.
	3.6	Works completion records, reports, as installed/modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining energised lines (transmission) using live line stick technique.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.1.4	Basic rigging techniques
T2.2.21	Installation and maintenance on transmission lines and associated equipment
T2.2.35	Live line working up to 132kV with Hotstick
T2.2.36	Live line working for voltages greater than 132kV and up to 500kV with hotstick
T2.2.39	Plant, equipment and tools used for HV line work
T2.2.53	HV principles
T2.3.1	Powerline safety practices
T2.4.3	High voltage switching principles
T2.4.4	High voltage fault switching principles
T2.4.5	High voltage distribution transformer principles
T2.4.6	High voltage SWER system
T2.4.7	Feeder automation system

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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 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 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

9.2)

Before the critical aspects of evidence are considered all

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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 - UET09". 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	At least two of the following:	Ladder access EWP access

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		EWB access Structure access
B	All of the following:	Electrical integrity of insulators Replace strain insulators Replace suspension insulators
C	At least three of the following:	Replace/install vibration dampers Repair/replace conductor spacers Apply pre-formed helical fittings Install/remove vibration meter Replace crossarm Replace pole/s
D	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 live line stick technique application on energised transmission lines.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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

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	given in Volume 1, Part 3 "Assessment Guidelines". Note: Competent performance with inherent safe working practices is expected in the Transmission, Distribution and Rail Traction Industry. 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

8) 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 the maintenance of energised lines (transmission) using live line stick technique and includes the replacement of suspension and tension insulators, the calculating of conductor loads being both vertical and tension and conductor repairs.

Maintenance includes:

Live line Stick care and maintenance including mandatory testing.

Rope care and maintenance including mandatory testing.

Electrical testing of insulators.

Repair conductors.

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

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RANGE STATEMENT

- Assessing risk
- Assessment
- Authorisation
- 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

Custom Content Section

2.2) Literacy and numeracy skills

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"

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2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Transmission Units

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UETTDRTP12B Maintain energised lines (transmission) using Barehand Technique

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This Competency Standard Unit covers the maintenance of energised high voltage transmission overhead electrical apparatus, i.e. live line work using Bare Hand techniques and includes the verification of the site conditions and the potential hazards, the conformation and calculation of physical loads and the selection of appropriate and authorised work method. It includes the preparation and cleaning of specialist material and tools in accordance with authorised technical instructions. It also encompasses the undertaking of OHS and safe working practices and the rendering inoperative of the automatic re-closing device including its restoration in accordance with the work plan and the procedure of issuing/accepting electrical access permits and or relevant work document.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRTP11B	Maintain energised lines (transmission) using live line stick technique

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to maintain energised lines (Transmission) using Bare Hand technique	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 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.4 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.
	1.5 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.6 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7 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.

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ELEMENT		PERFORMANCE CRITERIA	
		1.8	Relevant personnel at work site are confirmed current in First Aid, CPR, and other rescue procedures according to requirements.
		1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
		1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
		1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
		1.12	Positioning of road signs, barriers and warning devices is planned and coordinated in accordance with requirements.
2	Carry out the maintenance of energised lines (Transmission) using Bare Hand technique	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
		2.2	First Aid, CPR and other Rescue procedures and other related work procedures are performed according to requirements and/or established procedures.
		2.3	Lifting, climbing, working aloft, and tools/equipment, techniques and practices are safely exercised according to requirements.
		2.4	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.
		2.5	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established

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ELEMENT	PERFORMANCE CRITERIA	
		procedures.
	2.6	Maintenance of energised high voltage overhead electrical transmission apparatus is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied in the safe maintenance of energised high voltage overhead electrical transmission apparatus to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.9	On going 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 maintenance of energised lines (Transmission) using Bare Hand technique	3.1	Work is checked against schedule for conformance, anomalies reported in accordance with established procedures.
	3.2	Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and confirmed 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 work permit(s) (live line) are signed off and client/customer advised in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and

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ELEMENT	PERFORMANCE CRITERIA
	appropriate personnel notified

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining energised lines (transmission) using Bare Hand technique.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.35	Live line working up to 132kV with hotstick
T2.2.50	Extra high voltage - Bare-Hand live-line principles
T2.2.51	Extra high voltage - Bare-Hand live line procedures
T2.2.53	HV principles
T2.3.1	Powerline safety practices

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.

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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 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 - UET09". Evidence shall also comprise:

- A representative body of Performance Criteria 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; 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	At least one of the following:	Ladder access EWP access EWB access Rope access
B	All of the following:	Replace strain insulators Replace suspension insulators
C	At least three of the following:	Replace/connect bridge/bonding connections Replace vibration damper Repair/replace conductor

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		spacers Repair/replace conductor joint Repair conductor
D	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 usage of Bare Hand technique in the maintenance of energised transmission lines.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction Industry. 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

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

8) 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 the maintenance of energised lines (transmission) using Bare Hand techniques and includes the replacement of suspension and tension insulators and the calculating of conductor loads being both vertical and tension and conductor repairs. In addition the work shall include rope care and maintenance including mandatory testing; electrical testing of insulators; conductive clothing application and maintenance.

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
- Assessment
- Authorisation
- 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

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5)**

Transmission Units

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UETTDRTP13B Maintain energised lines (transmission) using Barehand Technique on a helicopter platform

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance of energised high voltage transmission overhead electrical apparatus, i.e. live line work using Bare Hand techniques from a helicopter platform and includes the verification of the site conditions and the potential hazards, the conformation and calculation of physical loads and the selection of appropriate and authorised work method. It includes the preparation and cleaning of specialist material and tools in accordance with authorised technical instructions. It also encompasses the undertaking of OHS and safe working practices and the rendering inoperative of the automatic re-closing device including its restoration in accordance with the work plan and the procedure of issuing/accepting electrical access permits and or relevant work document.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRTP12B	Maintain energised lines (transmission) using live Bare Hand technique

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare/plan to maintain energised lines (transmission) using Bare Hand technique from a helicopter platform	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	Risk control measures are identified, prioritised and evaluated against the work method.
	1.4	Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.5	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.6	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7	Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and

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ELEMENT		PERFORMANCE CRITERIA	
			technical working order.
		1.8	Relevant personnel at work site are confirmed current in First Aid, CPR, and other rescue procedures according to requirements.
		1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
		1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
		1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and instructed in respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
		1.12	Positioning of road signs, barriers and warning devices is planned and coordinated in accordance with requirements.
2	Carry out the maintenance of energised lines (transmission) using Bare Hand technique from a helicopter platform	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
		2.2	First Aid, CPR and other Rescue procedures and other related work procedures are performed according to requirements and/or established procedures.
		2.3	Lifting and tools/equipment, techniques and practices are safely exercised according to requirements.
		2.4	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.

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ELEMENT	PERFORMANCE CRITERIA	
	2.5	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.6	Maintenance of energised high voltage overhead electrical transmission apparatus is carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied in the safe maintenance of energised high voltage overhead electrical transmission apparatus to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.9	On going 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 maintenance of energised lines (transmission) using Bare Hand technique from a helicopter platform	3.1	Work is checked against schedule for conformance, anomalies reported in accordance with established procedures.
	3.2	Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and confirmed 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.

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ELEMENT	PERFORMANCE CRITERIA	
	3.5	Relevant work permit(s) (live line) are signed off and client/customer advised in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining energised lines (transmission) using Bare Hand technique on a helicopter platform.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.52	Extra high voltage bare-hand live-line using a helicopter
T2.2.53	HV principles
T2.3.1	Powerline safety practices

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

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EVIDENCE GUIDE

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 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 - UET09". Evidence shall also

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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:	Usage of a helicopter Usage of a platform
B	At least one of the following:	Replace/connect bridge/bonding connections

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EVIDENCE GUIDE

		Replace vibration damper Repair/replace conductor spacers Repair/replace conductor joint Repair conductor Application of helical splice
C	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 usage of the Bare Hand technique from a helicopter platform.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction Industry. 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

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

8) 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 the maintenance of conductors and hardware, the calculating of conductor load in tension. In addition the work shall include conductive clothing application and maintenance; working from a helicopter platform; working safely from a helicopter platform; safe working practises in and around aircraft.

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
- Assessment
- Authorisation
- 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

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5)**

Transmission Units

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UETTDRTP14B Install and maintain overhead transmission network infrastructure

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the erection of non-energised, pyramid, delta, Pi or enterprise specific transmission towers and associated hardware and includes installation and maintenance of poles and/or structures and associated hardware and the installation and maintenance of overhead conductors and cables used on towers. It encompasses the erection of components in accordance with construction plans, specifications, work orders and standing enterprise requirements. Erection could also involve cleaning and welding. It also encompasses maintenance work associated with the diagnosing of faults, the conducting of visual inspections, the confirmation of phasing and the completion of other enterprise tests on overhead conductors and cables. It also encompasses confirming isolation of systems and circuits, and/accepting/ issuing electrical permits. The updating of system data, records and or completion of relevant documentation in accordance with enterprise requirements also forms part of this competency.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit requires 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) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

	UETTDREL02B	Operate plant and equipment near energised and exposed electrical conductors/apparatus
and	UETTDRIS22B	Implement and monitor the organisational OHS policies, procedures and programs
and	UETTDRIS23B	Implement and monitor the environmental and sustainable energy management policies and procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan for the installation and maintenance of transmission network infrastructure	1.1 Works 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 the installation and maintenance of transmission network infrastructure 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

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ELEMENT	PERFORMANCE CRITERIA	
		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 work permits are obtained to access and 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 work site are confirmed current in First Aid, Tower/Pole Top Rescue 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	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures.
	1.11	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.12	Traffic management plan is identified and implemented.
2 Carry out the installation and maintenance of transmission network infrastructure	2.1	OHS, sustainable energy and environmental 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 aloft, and use of power tools/equipment, techniques and practices are

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ELEMENT	PERFORMANCE CRITERIA	
		safely followed and, currency according to requirements confirmed.
	2.3	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements /permits and established procedures.
	2.4	Essential knowledge and associated skills are applied in the safe installation and maintenance of transmission network infrastructure to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.5	Poles and/or structures and their associated hardware to be installed are stabilised according to requirements.
	2.6	Installation of poles and/or structures is carried out, in accordance with the work schedule and requirements/established procedures.
	2.7	Towers and associated hardware to be erected are stabilised according to requirements.
	2.8	Maintenance, including repair and/or replacement of poles and/or structures is carried out, in accordance with the work schedule and requirements/established procedures.
	2.9	Overhead conductor/cables are strung, tensioned and terminated as per requirements/established procedures.
	2.10	Conductors and anti-vibration devices, spaces/spreaders are secured as per established procedures.
	2.11	Electrical connections are made in accordance with the requirements/established procedures.
	2.12	Maintenance, including repair and/or replacement of overhead conductors and cables used on towers is carried out, in accordance with the work schedule and requirements/established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.13	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.
	2.14	Erection of towers and associated hardware is carried out, in accordance with the work schedule and requirements/established procedures.
	2.15	Unplanned events in the erection of towers and associated hardware are undertaken within the scope of established procedures.
	2.16	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.17	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the installation and maintenance of transmission network infrastructure	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 or disposed of in accordance with established procedures.
	3.5	Relevant work permit(s) are signed off and, the transmission network infrastructure is returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 erecting transmission towers and associated hardware.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.8.2.2	Alternating current principles - power
E2.8.6	Electromagnetic principles
T2.1.1.	Engineering applications of mathematical principles
T2.1.2.	Engineering applications of mechanical principles
T2.1.3.	Engineering applications of material properties
T2.1.4.	Basic rigging techniques
T2.1.9.	Stores procedures
T2.2.1	Generation power systems
T2.2.2	Transmission, distribution and rail power systems
T2.2.3	Substations, power transformers and reactors
T2.2.6	Pole and hardware installation and maintenance
T2.2.10	Transmission structures and hardware
T2.2.11	Routine maintenance on transmission structures
T2.2.21	Installation and maintenance on transmission lines and associated equipment

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REQUIRED SKILLS AND KNOWLEDGE

T2.2.30 Powerline transmission installation safety

T2.3.1 Powerline safety practices

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 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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EVIDENCE GUIDE

on the decision as to how much and how detailed the data gathered will 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 - UET09". 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/oth

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EVIDENCE GUIDE

er variables		
Group No	**The minimum number of items on which skill is to be demonstrated**	**Item List**
A	Install and maintain at least one of the following:	Wood pole/structure Steel pole/structure Concrete pole/structure Composite pole/structure
B	With regards to "A" incorporate at least three of the following:	Insulators Cross arm braces Crossarms Pole steps Shackle straps Earth leads Traction supports Traction registration Bonding
C	With regards to "A" incorporate at least one of the following:	Baulking Stays Concreting including foundation
D	With regards to "A" incorporate at least one of the following:	Crane Auger/erector 'A' frame Lifting beam Pole pikes Helicopter lift
E	Erect any one of the following	Pyramid Delta pi

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	towers:	Enterprise specific type
F	With regards to "E" incorporate at least two of the following:	Insulators Clamps Bolts Structural components
G	With regards to "E" incorporate at least one of the following:	Welding Cleaning
H	Install and maintain at least one of the following:	Copper Aluminium Steel Composite Aluminium/steel reinforced Pilot
I	With regards to "H" incorporate at least two of the following:	Elevated work platform Portable platform Gondola Hook ladder* Elevated work box (*must do)
J	With regards to "H" incorporate at least five of the following:	Winches* Tension equipment* Stringing equipment Cable trailers Crimping equipment * Pre-formed splices Hardware Cable drum stands Ropes Rollers/ sheaves

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		Comealongs Swivels (*must do)
K	With regards to "H" incorporate at least two of the following:	Voltage/ de-energised indicating device Field intensity meter Operating rods (*must do)
L	With regards to "H" incorporate at least one of the following:	Dynamometer Site board Abney level Sag chart* Theodolite (*must do)
M	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 erection of towers and associated equipment.

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

9.4)

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assessment	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 Transmission, Distribution and Rail Traction Industry. 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

8) 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 the installation and maintenance of transmission network infrastructure in accordance with the following:

Tower types may include pyramid, delta and pi and other enterprise specific types.

Equipment may include:

Pole types and structures may include wood, concrete, steel and composite.

Maintenance may include the basic inspection, removal, repair and replacement of poles including welding, pole staking and rebutting.

Associated hardware includes insulators, crossarms, stays, earth down leads and bond wires, crossarm braces, pole steps, shackle straps and associated bolts and clamps, cantilever assembly, pull off, head span, portal, drop tube

Pole stabilisation techniques include back-fill consolidation, concreting, baulking, reinforcement nailing, approved steel reinforcing and temporary and permanent stay-wires.

Methods of erection may include crane, auger/erector, winch/'A' frame, lifting apparatus

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RANGE STATEMENT

and helicopter lift.

Installation and maintenance of overhead conductor and or cables used on transmission towers may include the stringing, tensioning, terminating, removal, repairing and replacement of the conductors/cables. Visual inspections and the diagnosing of faults is also included.

Structures include towers and columns.

Types of conductor include copper, aluminium, steel and composites. Conductor configurations may be single or bundled and include pilot cables.

Overhead conductors include earthing systems

Plant may include elevating work platform, winches and capstans, specialist tension stringing equipment, cable trailers, cable drum stands and equipotential equipment.

Testing and recording equipment includes, insulation resistance testers, recording meters and other approved devices and techniques applicable to the voltage.

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
- Assessment
- Authorisation
- 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

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- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5)**

Transmission Units

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UETTDRTP15B Install and maintain transmission network infrastructure electrical equipment

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance of non-energised, pyramid, delta, Pi or enterprise specific transmission towers and associated hardware and, the inspection as per requirements of overhead structures such as towers and electrical apparatus. Overhead structures include towers and overhead conductors and or cables include, underground and overhead transition points, electrical equipment, hardware and or earthing systems. This unit encompasses the repair, and or replacement of components in accordance with construction plans, specifications, work orders and standing enterprise requirements. Maintenance could also involve cleaning and welding. The updating of system data, records and or completion of relevant documentation in accordance with enterprise requirements also forms part of this competency.

Application of the Unit

Application of the Unit **4**)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

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Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit requires 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) **2)**

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence.

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRTP14B	Install and maintain overhead transmission network infrastructure

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to install and maintain transmission network infrastructure electrical equipment	1.1 Works 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 the installation and maintenance of transmission network infrastructure electrical equipment 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

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ELEMENT	PERFORMANCE CRITERIA	
		control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.
	1.6	Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.
	1.7	Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.
	1.8	Relevant personnel at work site are confirmed current in First Aid, Tower/Pole Top Rescue 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 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	Traffic management plan is identified and implemented.
2 Carry out the installation and maintenance of transmission network infrastructure electrical equipment	2.1	OHS, sustainable energy and environmental 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	Towers and associated hardware to be erected are stabilised according to requirements.
	2.3	Lifting, climbing, working aloft, and use of power tools/equipment, techniques and practices are

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ELEMENT	PERFORMANCE CRITERIA	
		safely followed and, currency according to requirements confirmed.
	2.4	Essential knowledge and associated skills are applied in the safe installation and maintenance of transmission network infrastructure electrical equipment to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.5	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.
	2.6	Inspection of overhead structures and electrical apparatus used on towers is carried out, in accordance with the work schedule and requirements/established procedures.
	2.7	Maintenance, including repair and/or replacement of towers is carried out, in accordance with the work schedule and requirements/established procedures.
	2.8	Unplanned events in the erection of towers and associated hardware are undertaken within the scope of established procedures.
	2.9	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.10	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the installation and maintenance of transmission network infrastructure electrical equipment	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

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ELEMENT	PERFORMANCE CRITERIA	
		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 or disposed of in accordance with established procedures.
	3.5	Relevant work permit(s) are signed off and, towers and associated hardware are returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining transmission towers and associated hardware.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.8.2.2	Alternating current principles - power
E2.8.6	Electromagnetic principles
T2.2.11	Routine maintenance on transmission structures
T2.2.28	Towers and structures inspection principles
T2.2.29	Transmission powerline inspection principles
T2.3.1	Powerline safety practices

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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 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 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.

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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 - UET09". 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	Maintain any	Pyramid

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	one of the following types of towers:	Delta pi Enterprise specific type
B	With regards to "A" incorporate at least two of the following	Insulators Clamps Bolts Structural components
C	With regards to "A" incorporate at least one of the following:	Welding Cleaning
D	Inspect at least four of the following:	Towers Overhead conductors/cables Structural fittings Electrical Equipment Hardware. Earthing systems
E	With regards to "D" incorporate at least two of the following:	Visual* Infra-red camera X-Ray Camera Binoculars/telescope (* must do)
F	With regards to "D" incorporate all of the following:	Reporting procedures Reporting outcomes
G	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.

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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 installation and maintenance of transmission network infrastructure electrical equipment.

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 Transmission, Distribution and Rail Traction Industry. 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

8) 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

This Competency Standard Unit shall/may be demonstrated in relation to the installation and maintenance of transmission network infrastructure electrical equipment in accordance with construction plans and specifications

Tower types may include pyramid, delta and pi and other enterprise specific types.

Maintenance may include the removal, repair and replacement of tower components, including welding where appropriate; and the replacement, repair and cleaning of associated hardware.

Inspection may be carried out on foot, and/or by conventional ground-based vehicle, or from the air. Aircraft may be helicopters or fixed-wing types.

Inspection techniques include use of X-ray and infrared camera.

Items to be inspected may include towers but not overhead poles and or structures.

Types of electrical apparatus to be inspected include overhead conductors, cables, hardware and footings, underground cables and overhead transition points and, electrical equipment such as pole-mounted transformers and air-break switches, hardware and or earthing systems.

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
- Assessment
- Authorisation
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5)**

Transmission Units

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UETTDRTS01B Maintain network protection and control systems (interdependent)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance of network protection and control in interdependent situations and includes isolation, inspection, monitoring, testing, adjustment, and repair, refurbishment and or overhaul and functional checks of interdependent network protection and control systems. It includes the requirements to prove the functionality of interdependent and discrete schemes such as, CB Fail, master controlled Earth Fault, inter-tripping, blocking, synchronising, pilot wire, phase comparison, load shedding, voltage control, parallel operation and load rejection.

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 5 or higher.

Licensing/Regulatory Information

1.2) License to practice

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

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1.2) License to practice

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)

2)

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRTS09B	Develop secondary isolation instructional documents

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills

3)

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of

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competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the maintenance of network protection and control systems (interdependent)	1.1 OHS practices/procedures and Environmental and sustainable energy procedures, which may influence the maintenance of, network protection and control systems (interdependent) are reviewed and determined.
	1.2 Purpose of the maintenance of network protection and control systems (interdependent) is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the maintenance of network protection and control systems (interdependent) are obtained or established with the appropriate personnel.
	1.4 Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5 Testing parameters are established from organisational established procedures on policies and specifications.
	1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7 Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8 Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities

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ELEMENT	PERFORMANCE CRITERIA	
		coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the maintenance of network protection and control systems (interdependent)	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Maintenance of network protection and control systems (interdependent) decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models of the scheme are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of network protection and control systems (interdependent) is undertaken according to requirements and established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the maintenance of network protection and control systems (interdependent)	3.1	Final inspections of the network protection and control systems (interdependent) are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the maintenance of network protection and control systems (interdependent) documents are issues and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **Essential Knowledge and Associated Skills** (**EKAS**): 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 maintaining network protection and control systems (interdependent).

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
E2.18.8.2	Occupational Health and Safety , - enterprise responsibilities
T2.3.3	Statutory and safety considerations
T2.3.4	Electrical equipment - protection and control schemes
T2.3.5	Discrete protection devices - isolation and tagging procedures
T2.3.6	Protection devices - maintenance and commissioning principles
T2.3.7	Protection devices - manufacturers requirements
T2.7.6	Disposal procedures for insulating materials
T2.10.1	Visual inspection procedures - substations
T2.10.2	Surge relay operation and maintenance - substations
T2.10.9	Analyse and interpret results and measurements - substations
T2.10.23	Infrared imaging principles - substations
T2.10.25	Commissioning of distribution protection and control systems - substations
T2.10.26	Voltage regulation scheme principles - substations
T2.10.27	Use of test equipment on discrete protection scheme - substations

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REQUIRED SKILLS AND KNOWLEDGE

T2.10.28	Electrical equipment - distribution field device protection and control schemes - substations
T2.11.2	Circuit breaker auxiliary systems
T2.11.18	Discrete protection systems
T2.11.19	Interdependent protection systems
T2.11.23	Locate and rectify faults in electrical equipment
T2.11.36	Disconnect and reconnect fixed wiring electrical equipment fundaments
T2.11.38	Disconnect and reconnect fixed wiring electrical equipment procedures
T2.11.40	Harmonics

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 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

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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 - UET09". 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

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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	Demonstrate five (5) times each of the following activities:	Isolate protection, control and alarms associated with interdependent protection and control schemes. Five of the protection groups as stated in the Range Statement of this unit must be included. Calibrate interdependent protection and control relays from at least 5 of the protection groups as stated in the Range Statement of this unit; Carry out function tests (trips, alarms etc.) on interdependent protection and control schemes. Five of the protection groups as stated in the Range Statement of this unit must be included. Write reports on performance of interdependent protection and control schemes. Five of the protection groups as stated in the Range Statement of this unit

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		must be included Isolate 'in service' current transformers
B	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 maintenance of network protection and control systems (interdependent).
- Operational access to relevant plant, protection equipment, scheme drawings and specialised testing equipment

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction Industry. 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

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

8) 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 the maintenance of network protection and control systems (interdependent) and may include the following:

Overcurrent, Frame leakage, Cooling, Bucholz, DC Supplies, Restricted Earth, Sensitive Earth Fault, CB Fail, Reclose, DC Frame leakage, CEL Fail, Under Frequency load shed

Instrument Transformers, Trip/Control circuits, Alarms, DC Supplies, CB Fail protection, Master controlled Earth Fault, Intertripping, Blocking, Synchronising, Pilot Wire, Phase Comparison, Load Shedding, Voltage control, parallel operation, load rejection, circuit isolations and restorations, mechanical adjustments, calibration, function tests, reporting, signals, thermals, contraphase, backup, reverse current

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
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

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Competency Field 5)

Testing Units

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UETTDRTS02B Commission network protection and control systems (interdependent)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the commissioning of network protection and control systems in interdependent situations and includes isolation, inspection, monitoring, testing, adjustment, and repair, refurbishment and or overhaul and functional checks. It also includes schemes such as, CB Fail, master controlled Earth Fault, impedance and differential relays intertripping, blocking, synchronising, pilot wire, phase comparison, load shedding, voltage control, parallel operation and load rejection. This includes commissioning of discrete and interdependent schemes.

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 5 or higher.

Licensing/Regulatory Information

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRTS01B	Maintain network protection and control systems (interdependent)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of

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competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan for the commissioning of network protection and control systems (interdependent)	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the commissioning of, network protection and control systems (interdependent) are reviewed and determined.
	1.2	Purpose of the commissioning of network protection and control systems (interdependent) is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established procedures on policies and specifications for the commissioning of network protection and control systems (interdependent) are obtained or established with the appropriate personnel.
	1.4	Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5	Testing parameters are established from organisational established procedures on policies and specifications.
	1.6	Equipment/tools and personal protective equipment is selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities

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ELEMENT	PERFORMANCE CRITERIA	
		coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the commissioning of network protection and control systems (interdependent)	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Commissioning of network protection and control systems (interdependent) decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models of the schemes are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of network protection and control systems (interdependent) is undertaken according to requirements and established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the commissioning of network protection and control systems (interdependent)	3.1	Final inspections of the network protection and control systems (interdependent) are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the commissioning of network protection and control systems (interdependent) documents are issues and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **Essential Knowledge and Associated Skills** (**EKAS**): 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 commissioning network protection and control systems (interdependent).

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
E2.18.8.2	Occupational Health and Safety , - enterprise responsibilities
T2.3.3	Statutory and safety considerations
T2.3.4	Electrical equipment - protection and control schemes
T2.3.5	Discrete protection schemes - isolation and tagging procedures
T2.3.6	Protection devices - maintenance and commissioning principles
T2.3.7	Protection devices - manufacturers requirements
T2.7.6	Disposal procedures for insulating materials
T2.10.1	Visual inspection procedures - substations
T2.10.2	Surge relay operation and maintenance - substations
T2.10.3	Commissioning of discrete protection devices - substations
T2.10.9	Analyse and interpret results and measurements - substations
T2.10.17	Static reactive plant principles - substations
T2.10.27	Use of test equipment on discrete protection scheme - substation
T2.11.18	Discrete protection systems

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REQUIRED SKILLS AND KNOWLEDGE

T2.11.19 Interdependent protection 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 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 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

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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 - UET09". 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

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Group No	The minimum number of items on which skill is to be demonstrated	Item List
A	Demonstrate commissioning a protection and control system involving at least five (5) of the following:	CB fail protection Master controlled earth fault Intertripping Blocking Synchronising Pilot wire Phase comparison Load shedding Voltage control protection Frame leakage Delta current Reverse power.
B	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 commissioning of network protection and control systems (interdependent).
- Operational access to relevant plant, protection equipment, scheme drawings and specialised testing equipment

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show

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EVIDENCE GUIDE

	demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction Industry. 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

8) 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 the commissioning of network protection and control systems (interdependent) and may include the following:

Overcurrent, Frame leakage, Cooling, Bucholz, DC Supplies, Restricted Earth, Sensitive Earth Fault, CB Fail, Reclose, DC Frame leakage, CEL Fail, Under Frequency load shed

Instrument Transformers, Trip/Control circuits, Alarms, DC Supplies, CB Fail protection, Master controlled Earth Fault, Intertripping, Blocking, Synchronising, Pilot Wire, Phase Comparison, Load Shedding, Voltage control, parallel operation, load rejection, circuit isolations and restorations, mechanical adjustments, calibration,

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RANGE STATEMENT

function tests, reporting, signals, thermals, contraphase, backup, reverse current

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
- 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

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Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Testing Units

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UETTDRTS03B Conduct evaluation of power system faults within a substation

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the procedure in evaluating power system incidents by following a process of downloading event and disturbance record information from protection relays. This includes interpreting such items as, alarms, relay targets, relay settings, event records, disturbance records and sequence of events records. It also encompasses the evaluation and or investigation of relay operation, relay schemes functionality and relay settings.

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 6 or higher.

Licensing/Regulatory Information

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UEENEED004B	Use engineering application software
UEENEEE007B	Use drawings, diagrams, schedules and manuals
UEENEEE024B	Compile and produce an electrotechnology report
UEENEEG049B	Solve problems in complex polyphase power circuits
BUETTDRIS22B	Implement and monitor organisation's OHS policies, procedures and programs
UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan for the evaluation of power system events	1.1	OHS practices/procedures and Environmental and sustainable energy procedures, which may influence the evaluation of power system failures, are reviewed and determined.
	1.2	Purpose of the evaluation of power system events, are established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established procedures on policies and specifications for the evaluation of power system failures are obtained or established with the appropriate personnel.
	1.4	Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5	Testing parameters are established from organisational established procedures on policies and specifications.

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ELEMENT	PERFORMANCE CRITERIA	
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the evaluation of power system events	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Following evaluation of power system events, decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and /or engineering models of the evaluation of power system events are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	Technical advice is given regarding potential hazards, safety risks and control measures so that monitoring and preventative action can be

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ELEMENT	PERFORMANCE CRITERIA	
		undertaken and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of power system is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the evaluation of power system events	3.1	Final evaluation of all relevant data pertaining to the power system event is undertaken to ensure the recommendations comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the evaluation of power system event documents are issues and records are updated in accordance with established

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ELEMENT	PERFORMANCE CRITERIA
	procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 conducting evaluation of power system faults within a substation.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
E2.18.8.2	Occupational Health and Safety , - enterprise responsibilities
T2.9.1	Interpretation of power distribution network drawings and documentation
T2.10.9	Analyse and interpret results and measurements - substations
T2.11.1	Power system layouts
T2.11.14	Fault calculation techniques
T2.11.17	Protection scheme requirements
T2.11.18	Discrete protection systems
T2.11.19	Interdependent protection systems
T2.11.20	Complex protection systems

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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 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 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

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 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 - UET09". 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	Demonstration of at least two (2) downloads from	Relay panel Remote location

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EVIDENCE GUIDE

	protection relays or recording equipment from each of the following:	
B	Development of five (5) evaluation reports on power system events including the following:	Interpretation of targets in a substation Interpretation of fault reports Interpretation of downloaded event data Development of valid conclusions and recommendations.
C	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 evaluation of power system events.
- Operational access to relevant plant, protection equipment, event data, scheme drawings and specialised testing equipment

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, in limited spaces, with different structural/construction types and method and in a variety of environments.

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EVIDENCE GUIDE

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 Transmission, Distribution and Rail Traction Industry. 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

8) 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 evaluating power system events that effect substation equipment and may include the following: secondary equipment, feeder outage, disturbance recorders, alarms, transformers, circuit breakers, DC supplies, SCADA and busbars.

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
- Assessment
- Authorisation
- Confined space

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

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Competency Field

Competency Field 5)

Testing Units

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UETTDRTS04B Design testing and commissioning procedures for substation and field devices

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the testing and commissioning procedures for new substation and field devices in accordance with design. This will involve analysis of settings, and a thorough understanding of the circuit design, which will involve covering such areas as metering, communication circuits and SCADA. It also includes the procedures needed to enable proof of correct operation of all circuits to design specifications. It also encompasses the need for supplying accurate communication in the format that is acceptable to the Operating or Testing Authority.

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 6 or higher.

Licensing/Regulatory Information

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRTS06B	Commission metering schemes
or	UETTDRTS08B	Test, repair and calibrate protection relays and meters
or	UETTDRTS12B	Conduct evaluation of primary plant
or	UETTDRTS15B	Maintain network protection and control systems (complex)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the design of testing and commissioning procedures for substation and field devices	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the undertaking of design of testing and commissioning procedures for substation and field devices, are reviewed and determined.
	1.2 Purpose for designing of testing and commissioning procedures for substation and field devices is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the design of testing and commissioning procedures for substation and field devices are obtained or established with the appropriate personnel.
	1.4 Testing procedures are discussed with the appropriate personnel in order to ascertain the project brief.
	1.5 Testing parameters are established from organisational established procedures on policies and specifications
	1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures
	1.7 Work roles and tasks are allocated according to requirements and individuals' competencies

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ELEMENT	PERFORMANCE CRITERIA	
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures
2 Carry out the design of testing and commissioning procedures for substation and field devices	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures
	2.3	Design testing and commissioning procedures for substation and field devices decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures
	2.4	Mathematical and/or engineering models of design testing and commissioning procedures for substation and field devices are used to analyse the effectiveness of the finished project as per requirements and established procedures
	2.5	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
	2.6	Essential knowledge and associated skills are

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ELEMENT	PERFORMANCE CRITERIA	
		applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing and commissioning procedures for substation and field devices are developed according to requirements and established procedures
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards Strategic plans are developed incorporating organisation initiatives as per established procedures.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the design of testing and commissioning procedures for substation and field devices	3.1	Final review of testing and commissioning procedures for substation and field devices are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval
	3.4	Approved copies of design testing and commissioning procedures for substation and field devices documents are issues and records are

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ELEMENT	PERFORMANCE CRITERIA
	updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing testing and commissioning procedures for substation and field 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
E2.18.8.2	Occupational Health and Safety , - enterprise responsibilities
T2.3.1	Powerline safety practices
T2.3.3	Statutory and safety considerations
T2.3.4	Electrical equipment - protection and control schemes
T2.3.5	Discrete protection schemes - isolation and tagging procedures
T2.3.6	Protection devices - maintenance and commissioning principles
T2.3.7	Protection devices - manufacturers requirements
T2.10.1	Visual inspection procedures - substations
T2.10.2	Surge relay operation and maintenance - substations

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REQUIRED SKILLS AND KNOWLEDGE

T2.10.9 Analyse and interpret results and measurements - substations

T2.10.11 Substation safety practices

T2.10.15 High voltage insulation system principles - substations

T2.10.16 Power transformer and reactor principles - substations

T2.10.17 Static reactive plant principles - substations

T2.10.18 On load tap changer principles - substations

T2.10.26 Voltage regulation scheme principles - substations

T2.10.27 Use of test equipment on discrete protection scheme - substations

T2.11.8 Voltage control devices on interconnected transmission systems

T2.11.11 Control of transient over voltages

T2.11.15 Visual inspection procedures

T2.11.16 Commissioning procedures

T2.11.18 Discrete protection systems

T2.11.19 Interdependent protection systems

T2.11.24 Metering devices and principles

T2.11.26 Test equipment A - fundamental

T2.11.27 Test equipment B - protection

T2.11.28 Test equipment C - metering

T2.11.30 Test equipment E - field

T2.11.41 Fault finding and diagnostic techniques

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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 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 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

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 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 - UET09". 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	Develop testing and commission	Bus protection Feeder/line protection

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EVIDENCE GUIDE

	procedures for at least three (3) of the following substation equipment:	Transformer protection Earth fault protection Backup protection Metering schemes Communicate and SCADA schemes
B	Develop testing and commission procedures for any two of the following field devices:	Regulator ACR/gas switch Line capacitors
C	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 design of testing and commissioning procedures for substation and field devices.
- Operational access to relevant plant, protection equipment, scheme drawings and specialised testing equipment.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

Method of assessment

9.4)

This Competency Standard Unit shall be assessed by methods given in Volume 1, Part 3 "Assessment Guidelines".

Note:

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EVIDENCE GUIDE

	Competent performance with inherent safe working practices is expected in the Transmission, Distribution and Rail Traction Industry. 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

8) 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 the undertaking the design of testing and commissioning procedures for substation and field devices.

Tests may include: DC/AC measurements, error, continuity, noise level, return loss, spectrum analysis, radio on receiver sensibility, surveys - mobile phones/pager, end to end, line levels both in and out, transmitter power, transmitter frequency, transmitter deviation, receiver frequency and sensitivity, level and quality of demodulated output - audio/bit error rate, antenna sweep measurements, power and environmental conditions including emergency power plant.

Diagnostic, testing and restoration may involve: Appropriate documentation relating to the protection device; Voltage, current and resistance measuring instruments; Microprocessor based diagnostic test equipment; Laptop computer and diagnostic software; Loop control test instruments.

Complex testing refers to dielectric dissipation factors tests, partial discharge, applied and induced HV tests, CT and VT accuracy tests (calibration), watts loss, ratio confirmation tests, tests on interconnected equipment, sf6 tests.

Testing and recording equipment could include: Digital bearer test equipment; Voice frequency analysers; RF mounting equipment; RF spectrum equipment; Multimeters; Communication testers; Transmission measuring sets; Directional couplers; Laptop

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RANGE STATEMENT

computers.

Test and recording equipment may include: Infrascan equipment; Phasing equipment; Recording meters; Trend monitoring equipment; Condition monitoring equipment; Diagnostic testing devices using computer hardware and software; Taplon sticks; Insulation and continuity test instruments; Voltage, resistance and current testers; Ductors; Ratio meters; Earth systems testing devices; Capacitor bridge meters; Doble Test sets devices; High voltage alternating current test sets; Scope meters; Clip on ammeters; Test plans for automatic relay testing SCADA systems used for developing and evaluating voltage regulation systems, circuit breaker reclosing systems, VAR's monitoring and similar computer controlled diagnostic testing and recording.

Test and recording equipment may include: AC/DC test sets; IR testers; earth resistance meters; cable fault location equipment; circuit breaker timers; recording equipment; devices utilising computer hardware and software; oil dielectric strength equipment; trend monitoring equipment; infrared thermographic equipment; schering bridge; partial discharge test equipment; double insulation test set; primary injection test sets; CT and VT calibration equipment and sf6 leakage testers.

Computerised test equipment work may include, for example: Secondary injection test sets, primary test sets, insulation test sets, timing test sets, Circuit breaker test sets, magnetic test sets.

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
- 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

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

Testing Units

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UETTDRTS05B Test and maintain metering schemes

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the testing of metering schemes and includes isolation, inspection, monitoring, testing, adjustment, and repair, refurbishment and or overhaul and functional checks on schemes including ammeters, voltmeters, wattmeters, VAR meters and energy metering. It also includes the understanding of the purpose of the testing so as to prove accuracy and suitability of the metering for the required task.

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 5 or higher.

Licensing/Regulatory Information

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRTS09B	Develop secondary isolation instructional documents

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of competency

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the testing and maintenance of metering schemes	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the testing and maintenance of metering schemes, are reviewed and determined.
	1.2 Purpose of the testing and maintenance of metering schemes is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the testing and maintenance of metering schemes are obtained or established with the appropriate personnel.
	1.4 Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5 Testing parameters are established from organisational established procedures on policies and specifications.
	1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7 Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8 Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11 Relevant work permits are secured to coordinate the performance of work according to

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ELEMENT	PERFORMANCE CRITERIA	
		requirements and/or established procedures.
2 Carry out the testing and maintenance of metering schemes	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Testing and maintenance of metering schemes decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical/engineering models of the testing and maintenance of metering schemes are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing and maintenance of metering schemes is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.

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ELEMENT	PERFORMANCE CRITERIA	
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the testing and maintenance of metering schemes	3.1	Final inspections of the testing and maintenance of metering schemes are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the testing and maintenance of metering schemes documents are issues and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 testing and maintaining metering schemes.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
E2.18.8.2	Occupational Health and Safety , - enterprise responsibilities
T2.3.3	Statutory and safety considerations
T2.11.15	Visual inspection procedures
T2.11.23	Locate and rectify faults in electrical equipment
T2.11.24	Metering devices and principles
T2.11.28	Test equipment C - metering
T2.11.36	Disconnect and reconnect fixed wiring electrical equipment fundaments
T2.11.38	Disconnect and reconnect fixed wiring electrical equipment procedures
T2.11.40	Harmonics
T2.11.41	Fault finding and 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 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

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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 the "Assessment Guidelines - UET09". 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

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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	Demonstrate, on at least three (3) occasions, testing accuracy to established plans of at least three (3) schemes using the following equipment:	Ammeter Voltmeter Wattmeter VAR meter Energy meter* (*Must do)
B	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.

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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 testing and maintenance of metering schemes. • Operational access to relevant plant, protection equipment, scheme drawings and specialised testing equipment. In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.
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 Transmission, Distribution and Rail Traction Industry. 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

8) 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

This Competency Standard Unit shall/may be demonstrated in relation to the testing and maintenance of metering schemes may include the following:

Isolation, functional checks, inspection, monitoring, testing, adjustment, and repair, refurbishment and or overhaul procedures on schemes including ammeters, voltmeters, wattmeters, VAR meters and energy metering.

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
- 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

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Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

Testing Units

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UETTDRTS06B Commission metering schemes

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the commissioning of metering schemes and includes, isolation, inspection, monitoring, testing, adjustment, and repair, refurbishment and or overhaul and function checks on schemes including ammeters, voltmeters, wattmeters, VAR meters and energy metering. It also includes an emphasis on ensuring that the metering is connected into the power system safely and correctly and that it returns valid information.

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 5 or higher.

Licensing/Regulatory Information

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRTS05B	Test and maintain metering schemes

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of competency

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan for the commissioning of metering schemes	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the commissioning of metering schemes, are reviewed and determined.
	1.2	Purpose of the commissioning of metering schemes is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established procedures on policies and specifications for the commissioning of metering schemes are obtained or established with the appropriate personnel.
	1.4	Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5	Testing parameters are established from organisational established procedures on policies and specifications.
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.

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ELEMENT	PERFORMANCE CRITERIA	
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the commissioning of metering schemes	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Commissioning of metering schemes decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical/engineering models of the commissioning of metering schemes are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of the commissioning of metering schemes is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified

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ELEMENT	PERFORMANCE CRITERIA	
		and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the commissioning of metering schemes	3.1	Final inspections of the commissioning of metering schemes are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the commissioning of metering schemes documents are issues and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 commissioning metering schemes.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
E2.18.8.2	Occupational Health and Safety , enterprise responsibilities
T2.2.15	Metering installations
T2.3.3	Statutory and safety considerations
T2.11.15	Visual inspection procedures
T2.11.16	Commissioning procedures
T2.11.24	Metering devices and principles
T2.11.28	Test equipment C - metering
T2.11.41	Fault finding and 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 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

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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 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 - UET09". 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

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EVIDENCE GUIDE

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	Demonstrate commissioning metering schemes on at least three (3) occasions, testing accuracy to established plans of at least three (3) schemes using the following equipment.	Ammeter Voltmeter Wattmeter VAR meter Energy meter* (*Must do)
B	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:

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- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual commissioning of metering schemes.
- Operational access to relevant plant, protection or metering equipment, scheme drawings, manufacture's specifications/manuals and testing equipment.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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

8) 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 the commissioning of metering schemes and may include the following: isolation, inspection, monitoring, testing, adjustment, and repair, refurbishment and or overhaul

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RANGE STATEMENT

and function checks on schemes including ammeters, voltmeters, wattmeters, VAR meters and energy metering.

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
- 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

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Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Testing Units

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UETTDRTS07B Perform accuracy checks on instrument transformers

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the task of undertaking accuracy checks on instrument transformers and includes proving their functionality. It also includes both current and voltage instrument transformers having various operating principles, which are designed for metering, protection, monitoring or control usage. It also encompasses tasks associated with the isolation from other secondary circuits, inspection, measurement of excitation curves, measurement of phase and ratio errors and comparison of results with previous historical results and/or published specifications.

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 5 or higher.

Licensing/Regulatory Information

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UEENEED004B	Use engineering application software
UEENEEE007B	Use drawings, diagrams, schedules and manuals
UEENEEE024B	Compile and produce an electrotechnology report
UEENEEG049B	Solve problems in complex polyphase power circuits
UETTDRIS22B	Implement and monitor organisation's OHS policies, procedures and programs
UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for accuracy checks on instrument transformers	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the performance of accuracy checks on instrument transformers, are reviewed and determined.
	1.2 Purpose of the performance of accuracy checks on instrument transformers is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the performance of accuracy checks on instrument transformers are obtained or established with the appropriate personnel.
	1.4 Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.

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ELEMENT	PERFORMANCE CRITERIA	
	1.5	Testing parameters are established from organisational established procedures on policies and specifications.
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out accuracy checks on instrument transformers	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Performance of accuracy checks on instrument transformer decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models of the performance of accuracy checks on instrument transformers are used to analyse the effectiveness of the finished project as per requirements and

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ELEMENT	PERFORMANCE CRITERIA	
		established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Accuracy checks on instrument transformers are undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the performance of accuracy checks on instrument transformers	3.1	Final review of test results on instrument transformers are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or

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ELEMENT	PERFORMANCE CRITERIA
	regulatory approval.
	3.4 Approved copies of the performance of accuracy checks on instrument transformers documents are issues and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 accuracy checks on instrument transformers.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
E2.18.8.2	Occupational Health and Safety , enterprise responsibilities
T2.2.1	Generation power systems
T2.2.2	Transmission, distribution and rail power systems
T2.2.3	Substations, power transmission and reactors
T2.2.49	Coordinating permit access authority procedures
T2.3.3	Statutory and safety considerations
T2.4.8	System switching operations and authorisation procedures - HV

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REQUIRED SKILLS AND KNOWLEDGE

T2.4.9	System switching operations and authorisation procedures - LV
T2.11.22	Instrument transformers
T2.11.53	Protection schemes
T2.11.59	Generator control systems - EHV

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 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 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 - UET09". 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

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tools/equipment/materials/procedures/workplaces/other variables		
Group No	**The minimum number of items on which skill is to be demonstrated**	**Item List**
A	Perform five (5) accuracy checks on instrument transformers and incorporate all of the following:	Isolation from other secondary circuits Inspection Measurement of excitation curves
B	Measure phase and ratio errors on all of the following:	Current transformers Voltage transformers
C	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 accuracy checks on instrument transformers.
- Operational access to relevant plant, protection or metering equipment, scheme drawings, manufacture's specifications/manuals and testing equipment.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show

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	demonstrated competency working in realistic environment and a variety of conditions.
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 Transmission, Distribution and Rail Traction Industry. 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

8) 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 the task of undertaking accuracy checks on instrument transformers and includes proving their functionality and, shall/may be demonstrated using the following: current instrument transformers, voltage instrument transformers

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
- Assessment

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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"

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2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Testing Units

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UETTDRTS08B Test, repair and calibrate protection relays and meters

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the repair, calibration and testing of various types of protection relays. These can include electromechanical, analogue, digital electronic and numerical devices. It also involves the finding and replacing faulty components, testing to manufacturers or users specifications and proving all functions of the devices under test.

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 5 or higher.

Licensing/Regulatory Information

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UEENEED004B	Use engineering application software
UEENEEE007B	Use drawings, diagrams, schedules and manuals
UEENEEE024B	Compile and produce an electrotechnology report
UEENEEG049B	Solve problems in complex polyphase power circuits
UETTDRIS22B	Implement and monitor organisation's OHS policies, procedures and programs
UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan for the testing, repair and calibration of protection relays and meters	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the testing, repair and calibration of protection relays and meters, are reviewed and determined.
	1.2	Purpose of the testing, repair and calibration of protection relays and meters is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established procedures on policies and specifications for the testing, repair and calibration of protection relays and meters are obtained or established with the appropriate personnel.
	1.4	Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.

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ELEMENT	PERFORMANCE CRITERIA	
	1.5	Testing parameters are established from organisational established procedures on policies and specifications.
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the testing, repair and calibration of protection relays and meters	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Testing, repair and calibration decisions of protection relays and meters are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models of the testing, repair and calibration of protection relays and meters are used to analyse the effectiveness of the finished project as per

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ELEMENT	PERFORMANCE CRITERIA	
		requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing, repair and calibration of protection relays and meters is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the testing, repair and calibration of protection relays and meters	3.1	Final review of test results of tested, repaired and calibrated protection relays and meters are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.

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ELEMENT	PERFORMANCE CRITERIA
	3.3 Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4 Approved copies of the testing, repair and calibration of protection relays and meters documents are issues and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 testing, repairing and calibrating protection relays and meters.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
E2.18.8.2	Occupational Health and Safety , enterprise responsibilities
T2.2.1	Generation power systems
T2.2.2	Transmission, distribution and rail power systems
T2.2.3	Substations, power transmission and reactors
T2.2.34	Generator control systems - HV
T2.2.48	Electrical equipment - HV and LV powerline
T2.2.49	Coordinating permit access authority

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REQUIRED SKILLS AND KNOWLEDGE

	procedures
T2.3.3	Statutory and safety considerations
T2.4.8	System switching operations and authorisation procedures - HV
T2.4.9	System switching operations and authorisation procedures - LV
T2.11.23	Locate and rectify faults in electrical equipment
T2.11.24	Metering devices and principles
T2.11.26	Test equipment A - fundamental
T2.11.27	Test equipment B - protection
T2.11.53	Protection schemes
T2.11.59	Generator control systems - EHV

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,

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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 the "Assessment Guidelines - UET09". 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

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- 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 simple protection schemes:	Auxiliary Overcurrent Timers Voltage
B	At least three (3) of the following intermediate protection devices:	Inverse time delay overcurrent Voltage regulating relays Differential Pilot wire
C	At least two (2) of the following advanced protection schemes:	Multi zone impedance Multi function feeder protection Phase comparison Digital current differential

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EVIDENCE GUIDE

D	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 testing, repair and calibration of protection relays and meters.
- Operational access to relevant plant, protection and or metering equipment, scheme drawings, manufacture's specifications/manuals and testing equipment.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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.

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Range Statement

RANGE STATEMENT

8) 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 the testing, repair and calibration of protection relays and meters and may include the following:

Frame leakage relays; distance relays; pilot wire relays; transformer differential relays; busbar differential relays; impedance bus zone relays; overcurrent and earth fault relays; transformer neutral check relays; circuit breaker fail relays; multi-trip relays; auto recloser relays; voltage transformer failure relays; surge protection relays; buchholz relays; winding temperature relays; sensitive earth fault relays; phase failure relays; frequency relays; load shedding relays.

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
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

Testing Units

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UETTDRTS09B Develop secondary isolation instructional documents

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the skills needed to develop secondary isolations. This will involve analysis of tripping and a thorough understanding of secondary voltage and current, DC, alarm, metering and communication circuits. It also involves accurate communication of this information in a format acceptable to the Operating or Testing authority.

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 5 or higher.

Licensing/Regulatory Information

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UEENEED004B	Use engineering application software
UEENEEE007B	Use drawings, diagrams, schedules and manuals
UEENEEE024B	Compile and produce an electrotechnology report
UEENEEG049B	Solve problems in complex polyphase power circuits
UETTDRIS22B	Implement and monitor organisation's OHS policies, procedures and programs
UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan for the development of secondary isolation instructional documents	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the development of secondary isolation instructional documents, are reviewed and determined.
	1.2	Purpose of the development of secondary isolation instructional documents is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established procedures on policies and specifications for the development of secondary isolation instructional documents are obtained or established with the appropriate personnel.
	1.4	Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.

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ELEMENT	PERFORMANCE CRITERIA	
	1.5	Testing parameters are established from organisational established procedures on policies and specifications.
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the development of secondary isolation instructional documents	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Development of secondary isolation instructional documents decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models of the development of secondary isolation

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ELEMENT	PERFORMANCE CRITERIA	
		instructional documents are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of the development of secondary isolation instructional documents is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the development of secondary isolation instructional documents	3.1	Final inspections of the development of secondary isolation instructional documents are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of

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ELEMENT	PERFORMANCE CRITERIA	
		completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the development of secondary isolation instructional documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 developing secondary isolation instructional documents.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
E2.18.8.2	Occupational Health and Safety , enterprise responsibilities
T2.2.1	Generation power systems
T2.2.2	Transmission, distribution and rail power systems
T2.2.3	Substations, power transmission and reactors
T2.2.34	Generator control systems - HV

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REQUIRED SKILLS AND KNOWLEDGE

T2.2.48	Electrical equipment - HV and LV powerline
T2.2.49	Coordinating permit access authority procedures
T2.4.8	System switching operations and authorisation procedures - HV
T2.4.9	System switching operations and authorisation procedures - LV
T2.11.35	Secondary switching/isolation principles and sheet preparation
T2.11.53	Protection schemes
T2.11.59	Generator control systems - EHV

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 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

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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 - UET09". 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

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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	Develop secondary isolation instructional documents for four (4) of the following substation equipment:	Bus protection High impedance bus protection Feeder/line protection Transformer protection Earth fault protection Backup protection Pilot wire protection
B	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 development of secondary isolation instructional documents.

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- Operational access to relevant plant, protection or metering equipment, scheme drawings, manufacture's specifications/manuals and testing equipment.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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

8) 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 the development of secondary isolation instructional documents.

Tests may include: DC/AC measurements, error, continuity, noise level, return loss, spectrum analysis, radio on receiver sensibility, surveys - mobile phones/pager, end to end, line levels both in and out, transmitter power, transmitter frequency, transmitter deviation, receiver frequency and sensitivity, level and quality of demodulated output - audio/bit error rate, antenna sweep measurements, power and environmental conditions

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RANGE STATEMENT

including emergency power plant.

Diagnostic, testing and restoration may involve: Appropriate documentation relating to the protection device; Voltage, current and resistance measuring instruments; Microprocessor based diagnostic test equipment; Laptop computer and diagnostic software; Loop control test instruments.

Complex testing refers to dielectric dissipation factors tests, partial discharge, applied and induced HV tests, CT and VT accuracy tests (calibration), watts loss, ratio confirmation tests, tests on interconnected equipment, sf6 tests.

Testing and recording equipment could include: Digital bearer test equipment; Voice frequency analysers; RF mounting equipment; RF spectrum equipment; Multimeters; Communication testers; Transmission measuring sets; Directional couplers; Laptop computers.

Test and recording equipment may include: Infrascan equipment; Phasing equipment; Recording meters; Trend monitoring equipment; Condition monitoring equipment; Diagnostic testing devices using computer hardware and software; Taplon sticks; Insulation and continuity test instruments; Voltage, resistance and current testers; Ductors; Ratio meters; Earth systems testing devices; Capacitor bridge meters; Doble Test sets devices; High voltage alternating current test sets; Scope meters; Clip on ammeters; Test plans for automatic relay testing SCADA systems used for developing and evaluating voltage regulation systems, circuit breaker reclosing systems, VAR's monitoring and similar computer controlled diagnostic testing and recording.

Test and recording equipment may include: AC/DC test sets; IR testers; earth resistance meters; cable fault location equipment; circuit breaker timers; recording equipment; devices utilising computer hardware and software; oil dielectric strength equipment; trend monitoring equipment; infrared thermographic equipment; schering bridge; partial discharge test equipment; double insulation test set; primary injection test sets; CT and VT calibration equipment and sf6 leakage testers.

Computerised test equipment work may include, for example: Secondary injection test sets, primary test sets, insulation test sets, timing test sets, Circuit breaker test sets, magnetic test sets.

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
- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration
- Documenting detail work events, record keeping and or

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RANGE STATEMENT

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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

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Competency Field

Competency Field 5)

Testing Units

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UETTDRTS10B Design secondary isolation instructional documents

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the skills needed to design secondary isolations. This will involve analysis of tripping and a thorough understanding of secondary voltage and current, DC, alarm, metering and communication circuits. It also involves accurate communication of this information in a format acceptable to the Operating or Testing authority.

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 6 or higher.

Licensing/Regulatory Information

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2**)

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UEENEED004B	Use engineering application software
UEENEEE007B	Use drawings, diagrams, schedules and manuals
UEENEEE024B	Compile and produce an electrotechnology report
UEENEEG049B	Solve problems in complex polyphase power circuits
UETTDRIS22B	Implement and monitor organisation's OHS policies, procedures and programs
UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the design of secondary isolation instructional documents	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the design of secondary isolation instructional documents, are reviewed and determined.
	1.2 Purpose of the design of secondary isolation instructional documents is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the design of secondary isolation instructional documents are obtained or established with the appropriate personnel.
	1.4 Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5 Testing parameters are established from organisational established procedures on policies

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ELEMENT	PERFORMANCE CRITERIA	
		and specifications.
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the design of secondary isolation instructional documents	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Design of secondary isolation instructional documents decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models of the design of secondary isolation instructional documents are used to analyse the effectiveness of the finished project as per requirements and established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of the design of secondary isolation instructional documents is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the design of secondary isolation instructional documents	3.1	Final inspections of the design of secondary isolation instructional documents are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.

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ELEMENT	PERFORMANCE CRITERIA
	3.4 Approved copies of the design of secondary isolation instructional documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 designing secondary isolation instructional documents.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
E2.18.8.2	Occupational Health and Safety , enterprise responsibilities
T2.11.35	Secondary switching/isolation principles and sheet preparation

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

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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 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 - UET09". Evidence shall also

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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	Design secondary isolation instructional documents for four (4) of the following substation equipment:	Bus protection High impedance bus protection Feeder/line protection Transformer protection Earth fault protection Backup protection Pilot wire protection

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B	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 design of secondary isolation instructional documents
- Operational access to relevant plant, protection or metering equipment, scheme drawings, manufacture's specifications/manuals and testing equipment.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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.

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Range Statement

RANGE STATEMENT

8) 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 the design of secondary isolation instructional documents.

Tests may include: DC/AC measurements, error, continuity, noise level, return loss, spectrum analysis, radio on receiver sensibility, surveys - mobile phones/pager, end to end, line levels both in and out, transmitter power, transmitter frequency, transmitter deviation, receiver frequency and sensitivity, level and quality of demodulated output - audio/bit error rate, antenna sweep measurements, power and environmental conditions including emergency power plant.

Diagnostic, testing and restoration may involve: Appropriate documentation relating to the protection device; Voltage, current and resistance measuring instruments; Microprocessor based diagnostic test equipment; Laptop computer and diagnostic software; Loop control test instruments.

Complex testing refers to dielectric dissipation factors tests, partial discharge, applied and induced HV tests, CT and VT accuracy tests (calibration), watts loss, ratio confirmation tests, tests on interconnected equipment, sf6 tests.

Testing and recording equipment could include: Digital bearer test equipment; Voice frequency analysers; RF mounting equipment; RF spectrum equipment; Multimeters; Communication testers; Transmission measuring sets; Directional couplers; Laptop computers.

Test and recording equipment may include: Infrascan equipment; Phasing equipment; Recording meters; Trend monitoring equipment; Condition monitoring equipment; Diagnostic testing devices using computer hardware and software; Taplon sticks; Insulation and continuity test instruments; Voltage, resistance and current testers; Ductors; Ratio meters; Earth systems testing devices; Capacitor bridge meters; Doble Test sets devices; High voltage alternating current test sets; Scope meters; Clip on ammeters; Test plans for automatic relay testing SCADA systems used for developing and evaluating voltage regulation systems, circuit breaker reclosing systems, VAR's monitoring and similar computer controlled diagnostic testing and recording.

Test and recording equipment may include: AC/DC test sets; IR testers; earth resistance meters; cable fault location equipment; circuit breaker timers; recording equipment; devices utilising computer hardware and software; oil dielectric strength equipment; trend monitoring equipment; infrared thermographic equipment; schering bridge; partial discharge test equipment; double insulation test set; primary injection test sets; CT and VT calibration equipment and sf6 leakage testers.

Computerised test equipment work may include, for example: Secondary injection test

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RANGE STATEMENT

sets, primary test sets, insulation test sets, timing test sets, Circuit beaker test sets, magnetic test sets.

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
- 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

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Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Testing Units

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UETTDRTS11B Maintain, test and commission voltage regulating equipment

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance, testing and commissioning of Distribution field devices to relevant standards, including voltage regulators, automatic circuit reclosers control boxes, line capacitors, and associated communication devices. It includes communicating with the Operating Authority, testing, clearing after test and energisation using techniques that are acceptable to the Operating Authority

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 5 or higher.

Licensing/Regulatory Information

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UEENEED004B	Use engineering application software
UEENEEE007B	Use drawings, diagrams, schedules and manuals
UEENEEE024B	Compile and produce an electrotechnology report
UEENEEG049B	Solve problems in complex polyphase power circuits
UETTDRIS22B	Implement and monitor organisation's OHS policies, procedures and programs
UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and coordinate the maintenance, testing and commissioning of Distribution field devices	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the maintenance testing and commissioning of distribution field devices, are reviewed and determined.
	1.2	Purpose of the work is established and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Established organisational procedures, policies and specifications for the work are obtained or established with the appropriate personnel.
	1.4	Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures
	1.5	Work is prioritised and sequenced for the most efficient and effective outcome following

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ELEMENT		PERFORMANCE CRITERIA	
			consultation with others for completion within acceptable timeframes, to a quality standard and in accordance with established procedures.
		1.6	Risk control measures are identified, prioritised and evaluated against the work schedule.
		1.7	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
		1.8	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.
		1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
		1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
2	Carry out and coordinate the maintenance, testing and commissioning of Distribution field devices	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
		2.2	OHS and sustainable energy principles, functionality and practices to avoid the incidence of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
		2.3	Maintenance, testing and commissioning decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
		2.4	Mathematical models of the distribution system are used to analyse the effectiveness of the finished project as per requirements and established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.8	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3 Complete and coordinate the maintenance, testing and commissioning of Distribution field devices	3.1	Final inspections of the work are undertaken to ensure it complies with all requirements and includes all specifications and documentation needed to complete the brief.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of test documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining, testing and commissioning voltage regulating 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
E2.18.8.2	Occupational Health and Safety , enterprise responsibilities
T2.2.1	Generation power systems
T2.2.2	Transmission, distribution and rail power systems
T2.2.3	Substations, power transmission and reactors
T2.2.49	Coordinating permit access authority procedures
T2.3.1	Powerline safety practices
T2.3.2	Powerline safety implementation and monitoring
T2.3.3	Statutory and safety considerations
T2.4.8	System switching operations and authorisation procedures - HV
T2.4.9	System switching operations and authorisation procedures - LV
T2.8.7	Enterprise specific - equipment installation procedures
T2.10.16	Power transformer and reactor principles - substations
T2.10.17	Static reactive plant principles - substations

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REQUIRED SKILLS AND KNOWLEDGE

T2.10.18	On load tap changer principles - substations
T2.10.21	Circuit breaker construction principles - substations
T2.10.24	Rotating reactive plant principles - substations
T2.10.26	Voltage regulation scheme principles - substations
T2.10.28	Electrical equipment - Distribution field device protection and control schemes - substations
T2.11.8	Voltage control devices on interconnected transmission. systems
T2.11.9	Calculation of rating of voltage control devices
T2.11.11	Control of transient overvoltages
T2.11.16	Commissioning procedures
T2.11.23	Locate and rectify faults in electrical equipment
T2.11.36	Disconnect and reconnect fixed wiring electrical equipment fundaments
T2.11.38	Disconnect and reconnect fixed wiring electrical equipment procedures
T2.11.40	Harmonics
T2.11.41	Fault finding and diagnostic techniques
T2.11.53	Protection schemes
T2.11.59	Generator control systems - EHV

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be

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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 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

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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 - UET09". 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	Test, on two (2) occasions, at least two (2) of the following:	ACR control box and recloser functions. Line capacitor controller Voltage regulating relay and voltage regulator

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B	Commission, on two (2) occasions, at least two (2) of the following.	ACR control box and recloser. Line capacitors. Voltage regulating relay and voltage regulator
C	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 maintenance, testing and commissioning of Distribution field devices
- Operational access to relevant plant, protection or metering equipment, scheme drawings, manufacture's specifications/manuals and testing equipment.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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

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	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 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 the maintenance testing and commissioning of distribution field devices and may include the following equipment:

Voltage regulator, voltage regulating relays, line drop compensators, tap changers, automatic reclosers, gas switches, line capacitors, control boxes, TMR Radio, mobile phones, communications, settings, downloads, min ops, timing tests, energisation, testing, commissioning, primary injection tests, secondary injection tests, SCADA, overcurrent, earth fault. Inverse times, DC supplies, batteries.

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
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

Testing Units

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UETTDRTS12B Conduct evaluation of primary plant

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the commissioning and maintenance testing requirements (excluding HV Tests) for primary plant and equipment. It includes both the practical application of the tests and analysis of results, covering, but is not limited to; applied HV testing and induced HV testing, ratio, polarity, winding resistance, impedance, dielectric loss angle, partial discharge and watts loss insulation resistance and transformer vector group. It encompasses a complete understanding of the nature of the tests being conducted and the ability to conduct the tests in a safe manner.

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 6.

Licensing/Regulatory Information

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRTS09B	Develop secondary isolation instructional documents

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of competency

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan for the testing of primary plant	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the testing of primary plant systems, are reviewed and determined.
	1.2	Purpose of the testing of primary plant is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established procedures on policies and specifications for the testing of primary plant are obtained or established with the appropriate personnel.
	1.4	Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5	Testing parameters are established from organisational established procedures on policies and specifications.
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.

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ELEMENT	PERFORMANCE CRITERIA	
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the testing of primary plant	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Testing of primary plant decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical/engineering models of the testing of primary plant are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of primary plant is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge

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ELEMENT	PERFORMANCE CRITERIA	
		and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the testing of primary plant	3.1	Final inspections of the primary plant are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the testing of primary plant documents are issues and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 conducting evaluation of primary 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.2	Electrical safe working practices
E2.18.8.2	Occupational Health and Safety , enterprise responsibilities
T2.11.26	Test equipment A - fundamental
T2.11.27	Test equipment B - protection
T2.11.28	Test equipment C - metering
T2.11.31	Primary plant 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 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 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

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that may be required and the critical nature of the competencies being assessed.

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 - UET09". 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

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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	Do five (5) of the following tests on primary plant - Transformers. Note: At least two (2) (*) must be included:	*DC high voltage tests, *AC high voltage tests, *induced high voltage tests, Ratio tests Polarity tests Winding resistance tests Impedance tests Insulation resistance tests Transformer vector group test Winding temperature indicator test Alarm tests Neutral CT tests
B	Do five (5) of the following tests on primary plant - Circuit breakers. Note: At least two (2) (*) must be included:	*DC high voltage tests *AC high voltage tests *induced high voltage tests function tests, minimum voltage operation test insulation resistance test contact resistance test auxiliary contact test

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		alarm tests
C	Do five (5) of the following tests on primary plant - Capacitor banks. Note: At least two (2) (*) must be included:	*DC high voltage tests *AC high voltage tests *induced high voltage tests Neutral CT tests Balance tests Insulation resistance
D	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 the testing of primary plant.
- Operational access to relevant plant, protection or metering equipment, scheme drawings, manufacture's specifications/manuals and testing equipment.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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

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	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

8) 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 testing the primary plant and may include the following: transformers, circuit breakers, capacitor banks, DC supplies, remote operated isolators (ROIs), CT's, VTs, oil and winding temperature indicators.

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
- 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

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5)**

Testing Units

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UETTDRTS13B Undertake project management of substation augmentation and maintenance

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the coordination, planning and supervision of projects including but not limited to; commissioning of new plant and equipment, maintenance projects and retrofit works. It includes the coordinating and facilitating of the work of others and the collation of the relevant outcomes and results and involves an overview of both primary and secondary works to ensure completion of all aspects of the project, and must encompass at least 20 identifiable tasks.

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 6 or higher.

Licensing/Regulatory Information

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRTS06B	Commission metering schemes
or	UETTDRTS08B	Test, repair and calibrate protection relays and meters
or	UETTDRTS12B	Conduct evaluation of primary plant
or	UETTDRTS15B	Maintain network protection and control systems (complex)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan for the project management of substation augmentation and maintenance	1.1	OHS practices/procedures and environmental and sustainable energy procedures, which may influence the undertaking of project management of substation augmentation and maintenance, are reviewed and determined.
	1.2	Purpose of the undertaking of project management of substation augmentation and maintenance is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established procedures on policies and specifications for the undertaking of project management of substation augmentation and maintenance are obtained or established with the appropriate personnel.
	1.4	Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5	Testing parameters are established from organisational established procedures on policies and specifications.
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in

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ELEMENT	PERFORMANCE CRITERIA	
		accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out project management of substation augmentation and maintenance	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Undertaking of project management of substation augmentation and maintenance decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical/engineering models of the undertaking of project management of substation augmentation and maintenance are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed

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ELEMENT	PERFORMANCE CRITERIA	
		timeframe according to requirements.
	2.7	Testing of substation augmentation and maintenance is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the project management of substation augmentation and maintenance	3.1	Final inspections of substation augmentation and maintenance are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the project management of substation augmentation and maintenance documents are issues and records are updated in accordance with established procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 undertaking project management of substation augmentation and 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
E2.18.8.2	Occupational Health and Safety , enterprise responsibilities
T2.3.3	Statutory and safety considerations
T2.11.21	Financial impact statements
T2.11.37	Negotiation techniques
T2.11.39	Project management
T2.11.62	Preparing policies and 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 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

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assessment, such as Profiling, require data to be reliably gathered in a 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 the "Assessment Guidelines - UET09". 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

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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; 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	Manage three (3) projects that encompass at least 20 identifiable tasks. Projects should include installation, testing and commissioning stages. The project management	Work planning Coordination of labour resources On site supervision Controlling quality Use of quality systems Planned versus actual comparisons Communication with designers Control of materials

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	skills should include all of the following:	Substation primary plant Substation secondary equipment Substations civil projects
B	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 project management of substation augmentation and maintenance.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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

9.5)

There are no concurrent assessment recommendations for this

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other units unit.

Range Statement

RANGE STATEMENT

8) 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 undertaking project management of substation augmentation and maintenance and may include the following.

Projects related to substation activities.

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
- 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

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RANGE STATEMENT

- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Testing Units

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UETTDRTS14B Install and maintain power system communication equipment

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the installation and maintenance of Network Communication Systems and includes the isolation and functional checks of discrete and interdependent communication schemes associated with power systems. It also encompasses power line carrier equipment, protection signalling equipment, radio systems and telephone systems, VF systems, multiplexing systems and fibre optic systems, but does not include wiring.

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 5 or higher.

Licensing/Regulatory Information

1.2) License to practice

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

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1.2) License to practice

legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UEENEED004B	Use engineering application software
UEENEEE007B	Use drawings, diagrams, schedules and manuals
UEENEEE024B	Compile and produce an electrotechnology report
UEENEEG049B	Solve problems in complex polyphase power circuits
UETTDRIS22B	Implement and monitor organisation's OHS policies, procedures and programs
UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the installation and maintenance of power system communication equipment	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the installation and maintenance of power system communication equipment systems, are reviewed and determined.
	1.2 Purpose of the installation and maintenance of power system communication equipment is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the installation and maintenance of power system communication equipment are obtained or established with the appropriate personnel.
	1.4 Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.

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ELEMENT	PERFORMANCE CRITERIA	
	1.5	Testing parameters are established from organisational established procedures on policies and specifications
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the installation and maintenance of power system communication equipment	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Installation and maintenance of power system communication equipment decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical/engineering models of the installation and maintenance of power system communication equipment are used to analyse

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ELEMENT	PERFORMANCE CRITERIA	
		the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of the installed and/or maintained power system communication equipment is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the installation and maintenance of power system communication equipment	3.1	Final inspections of the installed and/or maintained power system communication equipment are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are

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ELEMENT	PERFORMANCE CRITERIA	
		finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the installation and maintenance of power system communication equipment documents are issues and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 installing and maintaining power system communication 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
T2.2.1	Generation power systems
T2.2.2	Transmission, distribution and rail power systems
T2.2.3	Substations, power transmission and reactors
T2.2.49	Coordinating permit access authority procedures
T2.3.3	Statutory and safety considerations

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REQUIRED SKILLS AND KNOWLEDGE

T2.4.8	System switching operations and authorisation procedures - HV
T2.4.9	System switching operations and authorisation procedures - LV
T2.8.7	Enterprise specific - equipment installation procedures
T2.11.25	Communication devices and principles
T2.11.41	Fault finding and diagnostic techniques
T2.11.53	Protection schemes
T2.11.59	Generator control systems - EHV

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 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 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 - UET09". 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

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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	Carry out maintenance testing on Substation communications equipment, to include isolation and functional checks on at least three (3) of the following systems:	Supervisory cables Power line carrier systems Protection signalling equipment Telephone systems VF systems Fibre optics
B	Carry out commissioning tests on Substation communications equipment, to include isolation and functional checks on at least three (3) of the following systems:	Supervisory cables Power line carrier systems Protection signalling equipment Telephone systems VF systems Fibre optics
C	At least one occasion	Dealing with an unplanned event by drawing on essential knowledge and associated 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 installation and maintenance of power system communication equipment.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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 Transmission, Distribution and Rail Traction Industry. 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

8) 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.

This Competency Standard Unit shall/may be demonstrated in relation to the installation and maintenance of power system communication equipment and may include the following:

Power Line Carrier Equipment, Protection Signalling Equipment, Radio Systems and Telephone Systems, VF Systems, Multiplexing systems and Fibre Optic Systems, but does not include wiring.

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
- 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

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RANGE STATEMENT

- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Testing Units

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UETTDRTS15B Maintain network protection and control systems (Complex)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the maintenance of network protection and control systems in complex situations and includes isolation, inspection, monitoring, testing, adjustment, and repair, refurbishment and or overhaul and functional checks. It includes schemes from discrete and interdependent and also schemes such as, distance, differential, transformer differential, bus zone, bus overcurrent, revenue metering, SCADA, communications, harmonic control, point on wave.

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 6 or higher.

Licensing/Regulatory Information

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRTS01B	Maintain network protection and control systems (interdependent)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements describe the essential outcomes of a unit of competency

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan for the maintenance of network protection and control systems (complex)	1.1	OHS practices/procedures and Environmental and sustainable energy procedures, which may influence the maintenance of, network protection and control systems (complex) are reviewed and determined.
	1.2	Purpose of the maintenance of network protection and control systems (complex) is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3	Organisational established procedures on policies and specifications for the maintenance of network protection and control systems (complex) are obtained or established with the appropriate personnel.
	1.4	Testing procedures are discussed with and/or directed to the appropriate personnel in order to ascertain the project brief.
	1.5	Testing parameters are ascertained from organisational established procedures, policies and specifications
	1.6	Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7	Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8	Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.

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ELEMENT	PERFORMANCE CRITERIA	
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the maintenance of network protection and control systems (complex)	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Maintenance of network protection and control systems (complex) decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models of the scheme are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of network protection and control systems (complex) is undertaken according to requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established

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ELEMENT	PERFORMANCE CRITERIA	
		procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the maintenance of network protection and control systems (complex)	3.1	Final inspections of the network protection and control systems (complex) are undertaken to ensure they comply with all requirements and include all specifications and documentation needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the maintenance of network protection and control systems (complex) documents are issued and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 maintaining network protection and control systems (complex).

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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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
T2.3.3	Statutory and safety considerations
T2.3.4	Electrical equip - protection and control schemes
T2.3.5	Discrete protection schemes - isolation and tagging procedures
T2.3.6	Protection devices - maintenance and commissioning principles.
T2.3.7	Protection devices - manufacturers requirements
T2.7.6	Disposal procedures for insulating materials
T2.10.1	Visual inspection procedures - substations
T2.10.2	Surge relay operation and maintenance - substations
T2.10.9	Analyse and interpret results and measurements - substations
T2.10.17	Static reactive plant principles - substations
T2.10.27	Use of test equipment on discrete protection scheme - substations
T2.11.18	Discrete protection systems
T2.11.19	Interdependent protection systems
T2.11.20	Complex protection systems

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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 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 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

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 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 - UET09". 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	Do all of the following:	Isolate protection, control and alarms associated with complex protection and

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EVIDENCE GUIDE

	Note: Utilise different schemes from within the complex schemes in the Range Statement of this unit.	control schemes. Calibrate complex protection and control relays. Carry out function tests (Trips, alarms etc.) on complex protection and control schemes. Write reports on performance of complex protection and control schemes. Isolate 'in service' Current Transformers.
B	Do all of the following:	Activities that address the correction of errors in network protection and control systems
C	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 maintenance of network protection and control systems (complex).

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

Method of assessment

9.4)

This Competency Standard Unit shall be assessed by methods given in Volume 1, Part 3 "Assessment Guidelines".

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EVIDENCE GUIDE

	Note: Competent performance with inherent safe working practices is expected in the Transmission, Distribution and Rail Traction Industry. 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

8) 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 the maintenance of network protection and control systems (complex) and may include the following:

Discrete: Overcurrent, earth fault, frame leakage, cooling, buchholz, DC supplies, restricted earth, sensitive earth fault, reclose, DC frame leakage, CEL fail under frequency load shed.

Interdependent :Instrument transformers, trip/control circuits, alarms, DC supplies, CB fail protection, master controlled earth fault, intertripping, blocking, synchronising, pilot wire, phase comparison, load shedding, voltage control, parallel operation, load rejection, circuit isolations and restorations, mechanical adjustments, calibration, function tests, reporting, signals, thermals, contraphase, backup, reverse current

Complex: distance, differential, transformer differential, bus zone, bus overcurrent, revenue metering, SCADA, communications, harmonic control, point on wave.

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)

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RANGE STATEMENT

- Appropriate authorities
- Appropriate work platform
- Assessing risk
- 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

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Custom Content Section

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Testing Units

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UETTDRTS16B Commission network protection and control systems (complex)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the commissioning of network protection and control systems in complex situations and includes isolation, inspection, monitoring, testing, adjustment, and repair, refurbishment and or overhaul and functional checks. It includes schemes from discrete and interdependent and also schemes such as, distance, differential, transformer differential, bus zone, bus overcurrent, revenue metering, current transformer accuracy, SCADA, communications, harmonic control, point on wave, HV plant testing.

Application of the Unit

Application of the Unit **4**)

This competency standards unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 6 or higher.

Licensing/Regulatory Information

1.2) License to practice

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

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRTS02B	Commission network protection and control systems (interdependent)
UETTDRTS15B	Maintain network protection and control systems (complex)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements

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describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the commissioning of network protection and control systems (complex)	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the commissioning of, network protection and control systems (complex) are reviewed and determined.
	1.2 Purpose of the commissioning of network protection and control systems (complex) is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures on policies and specifications for the commissioning of network protection and control systems (complex) are obtained or established with the appropriate personnel.
	1.4 Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5 Testing parameters are established from organisational established procedures on policies and specifications
	1.6 Equipment/tools and personal protective equipment is selected based on specified Performance Criteria and established procedures.
	1.7 Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8 Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.11	Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2 Carry out the commissioning of network protection and control systems (complex)	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.
	2.2	OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.
	2.3	Commissioning of network protection and control systems (complex) decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.
	2.4	Mathematical and/or engineering models of the schemes are used to analyse the effectiveness of the finished project as per requirements and established procedures.
	2.5	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.
	2.6	Essential knowledge and associated skills areapplied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.
	2.7	Testing of network protection and control systems (complex) is undertaken according to

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ELEMENT	PERFORMANCE CRITERIA	
		requirements and established procedures.
	2.8	Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.
	2.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
	2.10	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
	2.11	Strategic plans are developed incorporating organisation initiatives as per established procedures.
3 Complete the commissioning of network protection and control systems (complex)	3.1	Final inspections of the network protection and control systems (complex) are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project.
	3.2	Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.
	3.3	Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.
	3.4	Approved copies of the commissioning of network protection and control systems (complex) documents are issues and records are updated in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **Essential Knowledge and Associated Skills** (**EKAS**): This describes the essential

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REQUIRED SKILLS AND KNOWLEDGE

skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of commissioning network protection and control systems (complex).

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
T2.3.3	Statutory and safety considerations
T2.3.4	Electrical equipment - protection and control schemes
T2.3.5	Discrete protection schemes - isolation and tagging procedures
T2.3.6	Protection devices - maintenance and commissioning principles
T2.3.7	Protection devices - manufacturers requirements
T2.7.6	Disposal procedures for insulating materials
T2.10.1	Visual inspection procedures - substations
T2.10.2	Surge relay operation and maintenance - substations
T2.10.3	Commissioning of discrete protection devices - substations
T2.10.9	Analyse and interpret results and measurements - substations
T2.10.17	Static reactive plant principles - substations
T2.10.27	Use of test equipment on discrete protection scheme - substations
T2.11.18	Discrete protection systems
T2.11.19	Interdependent protection systems

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REQUIRED SKILLS AND KNOWLEDGE

T2.11.20 Complex protection 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 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 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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EVIDENCE GUIDE

on the decision as to how much and how detailed the data gathered will 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 - UET09". 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

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EVIDENCE GUIDE

Group No	The minimum number of items on which skill is to be demonstrated	Item List
A	Do all of the following: Note: Utilise different schemes from within the complex schemes in the Range Statement of this unit.	Commissioning of a protection and control system involving five (5) complex schemes
B	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 commissioning of network protection and control systems (complex).

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

Method of assessment

9.4)

This Competency Standard Unit shall be assessed by methods

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	given in Volume 1, Part 3 "Assessment Guidelines". Note: Competent performance with inherent safe working practices is expected in the Transmission, Distribution and Rail Traction Industry. 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

8) 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 the commissioning of network protection and control systems (complex) and may include the following:

Discrete: overcurrent, earth fault, frame leakage, cooling, bucholz, DC supplies, restricted earth, sensitive earth fault, CB fail, reclose, DC frame leakage, CEL fail, under frequency load shed;

Interdependent: instrument transformers, trip/control circuits, alarms, DC supplies, CB fail protection, master controlled earth fault, intertripping, blocking, synchronising, pilot wire, phase comparison, load shedding, voltage control, parallel operation, load rejection, circuit isolations and restorations, mechanical adjustments, calibration, function tests, reporting, signals, thermals, contraphase, backup, reverse current;

Complex: distance, differential, transformer differential, bus zone, bus overcurrent, revenue metering, current transformer accuracy, SCADA, communications, harmonic control, point on wave, HV plant testing.

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

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RANGE STATEMENT

integral part of the Range Statement of this unit:

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform
- Assessing risk
- 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

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2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5

Competency Field

Competency Field **5**)

Testing Units

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UETTDRVC01B Cut vegetation above ground outside live work zone near live electrical apparatus (climbing)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This Competency Standard Unit covers cutting and/or pruning vegetation above ground level (using climbing techniques) and removal of vegetation obstructions, up to the climber exclusion zone as defined for both Authorised and Instructed Persons in the industry guidelines associated with live electrical apparatus, using the established cutting plan relevant to the vegetation type. It encompasses the safe use of appropriate/specialised tools and equipment according to requirements and established procedures. It includes the utilisation of climbing techniques in conjunction with aerial emergency rescue procedures and, inspection and preparation of climbing equipment with recommendations for corrective action being referred to appropriate authorities.

It includes safely accessing trees from above ground level to install restraints/slings, removing tree limbs in a safe manner and, clearing debris from the felling site to eliminate the occurrence of electrical incidents. It DOES NOT include entry of persons, mobile plant, equipment, and/or specialised tools into to the safe approach distance (SAD) as defined.

Also included is the preparation of risk assessment control measures that encompass job safety assessment. All work and zones are in compliance with 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.

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Application of the Unit

Application of the Unit **4**)

This unit shall apply to Transmission, Distribution, Rail Traction, Telecommunications and Vegetation Management Control industry sectors.

Licensing/Regulatory Information

1.**2**) **License to practice**

The skills and knowledge described in this unit may only be practiced under the regulations pertaining to each State and Territory for the safe planning and removal of vegetation around live powerlines up to the live work zone including near live electrical apparatus, and regulations that directly relate to Occupational Health and Safety and/or contracts of training where they apply.

Pre-Requisites

Prerequisite Unit(**s**) **2**)

2.**1**) **Competencies**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRVC07B	Monitor safety compliance for vegetation work near live electrical apparatus

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to cut/prune vegetation above ground (using climbing technique) up to the vegetation exclusion zone near live electrical apparatus.	1.1 Work instructions and cutting plan are received and confirmed.
	1.2 Relevant requirements and established procedures to be followed for the work to be performed in accord with the cutting are discussed with all personnel to establish and confirm the work schedule.
	1.3 OHS policies and procedures to be followed for the work to be performed are received and confirmed.
	1.4 Suggestions to assist and/or improve meeting the cutting of vegetation above ground level outside the climber exclusion zone near electrical apparatus outcomes are made to others involved in the work.
	1.5 Hazards are identified, OHS risks associated with working near live electrical apparatus are identified and reported according to established

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ELEMENT	PERFORMANCE CRITERIA	
		procedures.
	1.6	Scope of responsibility under the relevant work permit(s)/access authorisation(s) identified according to requirements and established procedures with relevant personnel.
	1.7	Resources including, equipment, tools, approved platforms and personal protective equipment required for the job are obtained and, in working order according to established procedures.
	1.8	Relevant responsibility associated with First Aid, working aloft, and/or other related work safety procedures at the worksite are confirmed in accordance with requirements and established procedures to ensure safety measures are followed in the instance of an incident.
	1.9	Client issues including environmental values are identified and referred to appropriate personnel in accordance with industry/acceptable /community standards.
	1.10	Site is prepared to produce a quality outcome, follow sustainable energy principles and practices, and to minimise risk and damage to property, commerce, stock and individuals in accordance with established procedures.
	1.11	Road signs, barriers and warning devices are obtained and positioned in accordance with given instructions and requirements.
	1.12	Pre-operational checks are undertaken to confirm safe and correct operation of tools and equipment for safe use near live electrical apparatus according to requirements and established procedures.
	1.13	Work permit(s)/access authorisation(s) are confirmed and received, where applicable, for commencement of the work according to requirements and established procedures with relevant personnel.
2 Carry out the	2.1	OHS and sustainable energy principles and

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ELEMENT	PERFORMANCE CRITERIA	
cutting/pruning of vegetation above ground (using climbing technique) up to the vegetation exclusion zone near live electrical apparatus.		practices to reduce the incidents of accidents and minimise waste are followed in accordance with given instructions, requirements and/or established procedures.
	2.2	Lifting, climbing, working aloft, and use of tools/equipment, techniques and practices are safely followed in accordance with given instructions and, according to requirements confirmed to eliminate the prospects of incidents.
	2.3	Operational knowledge for the cutting of vegetation above ground level outside the climber exclusion zone near electrical apparatus is confirmed to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements and established procedures.
	2.4	Cutting of vegetation above ground level outside the climber exclusion zone near electrical apparatus is carried out in accordance with the cutting plan and work schedule and, given instructions and established procedures.
	2.5	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are monitored and reported/referred to the immediate authorised personnel for directions according to established procedures.
	2.6	Non-routine events are referred to the immediate authorised personnel for directions according to established procedures.
	2.7	Problems associated with cutting vegetation above ground level outside of the vegetation exclusion zone near electrical apparatus are attended to using acquired known solutions and skills related to routine procedures to ensure work instructions and established procedures are met.
	2.8	On going checks of quality of the work are

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ELEMENT	PERFORMANCE CRITERIA	
		undertaken in accordance with given instructions and established procedures.
3 Complete the cutting/pruning of vegetation above ground (using climbing technique) up to the vegetation exclusion zone near live electrical apparatus.	3.1	Work undertaken is checked against cutting plan and work schedule, work schedule and anomalies reported to Authorised personnel in accordance with established procedures.
	3.2	Accidents and/or incidents are actioned and reported to authorised personnel in accordance with established procedures.
	3.3	Work site is rehabilitated, cleaned-up, sustainable energy principles and practices applied, and made safe in accordance with given instructions and established procedures or an agreed standard.
	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	Appropriate personnel are notified of work completion according to established procedures.
	3.6	Post-operational checks, minor maintenance and/or relevant documentation of equipment and tools/platform are conducted according to requirements.
	3.7	Requirements for returning work permit(s) and/or access authorisation permits are confirmed, where applicable.
	3.8	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

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REQUIRED SKILLS AND KNOWLEDGE

7) **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 cutting vegetation above ground outside live work zone near live electrical apparatus (climbing).

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical Safe working practice
T2.3.1	Powerline safety practices
T2.5.5	Powerline clearances and approach distances
T2.5.16	Climbing techniques
T2.5.17	Emergency procedures for climbers
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions

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

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EVIDENCE GUIDE

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 the "Assessment Guidelines - UET09". 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:

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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; 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	Confirm operational knowledge associated with the cutting vegetation above ground outside Live Work Zone near live electrical apparatus in all of the following:	Principles of electricity, the three phase power system. Power system. Recognition of aerial voltage systems. Identification of Low Voltage Aerial Circuits. Identification of High Voltage Aerial Circuits. "Safe working zone" and "Ordinary person zone" so defined by relevant authorities.

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		Use of technical standards, acts, regulations, codes /guidelines and established/enterprise/asset owner's procedures. System Control - Information required and function. Vicinity Permit - Information required and function. Sensitive Earth Fault (SEF) System Confirm environmental principals and procedures
B	Confirm safe practices associated with the cutting vegetation above ground outside Live Work Zone near live electrical apparatus in all of the following:	OHS safety practices and procedures. Electric shock and resuscitation. Release and rescue Role of the Safety Observer Events constituting an incident. Procedures in the event of/responding to, incidents. Methods of identifying hazards. Risk assessment procedures for both worksite and pre-job checklist. Selection of the best position for monitoring and controlling work (cutting) Selection of correct line of site to the cutter Correct observation of the work from ground level Constant analysis and decision making relevant to the safety of the work, taking into account prevailing site

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		conditions (lay of the land) and on-going weather conditions.
C	Confirm vegetation control associated with the cutting vegetation above ground outside Live Work Zone near live electrical apparatus in all of the following:	Identify tree types Confirm vegetation species and types Confirm vegetation cutting techniques for different vegetation Confirm appropriate vegetation machinery and equipment to be used Use of feeder route plans
D	Confirm the safe cutting of vegetation above ground outside Live Work Zone near live electrical apparatus in all of the following:	Use of cutting plans relevant to the vegetation type. Safe use of all relevant personnel protective equipment Safe rigging and climbing procedures and techniques Safe operation of restraints, slings, lifting and loads Safe use of tools and equipment such as hand saws, chainsaws, specialised tools and equipment and or power pruners above ground. Safe use of chemical control and application above ground. Safe cutting, pruning and tree trimming techniques above ground near electrical apparatus Conduction of pre and post operational checks, inspection and minor maintenance.

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		Safe deployment of equipment and tools in varying ground conditions and weather. Safe debris removal
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 to safely undertake actual cutting/pruning of vegetation above ground up to the vegetation exclusion zone near live electrical apparatus using the climbing technique.

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 Transmission, Distribution and Rail Traction Industry. 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

9.5)

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EVIDENCE GUIDE

relationship with other units

UETTDRVC02B	Operate vegetation control plant, machinery and equipment near live electrical apparatus
UETTDRVC03B	Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus
UETTDRVC05B	Cut vegetation above ground outside live work zone near live electrical apparatus (platform)
UETTDRVC08B	Safe use of Elevating Work Platform (EWP) near live electrical apparatus

Range Statement

RANGE STATEMENT

8) 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 the cutting and/or pruning vegetation above ground level (using climbing technique) and removal of vegetation obstructions up to the climber exclusion zone as defined for both Authorised and Instructed Persons in the industry guidelines associated with live electrical apparatus.

Utilisation of climbing techniques in conjunction with aerial emergency rescue procedures and, inspection and preparation of climbing equipment with recommendations for corrective action being referred to appropriate authorities

Aerial work is conducted using regulator and/or industry approved climbing technique and includes height fall protection emergency rescue near live electrical apparatus

Use of established cutting plan(s) relevant to the vegetation type

Safety practices include: the safe use of appropriate/specialised tools and equipment, the safe use of vegetation climbing equipment and techniques and may include safely accessing trees to install restraints/slings, removing tree limbs in a safe manner, clearing debris from the felling site to eliminate the occurrence of electrical incidents and reparation of risk assessment control measures that encompass job safety assessment. It

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RANGE STATEMENT

also includes working safely up to the defined "ordinary person zone" near energised electrical apparatus (inc. electrical powerlines) for non-electrical worker/ordinary persons and risk assessment control measures that encompass job safety assessment.

Excludes entry of persons, mobile plant, equipment, and/or specialised tools into to the safe approach distance (SAD) as defined.

Work and zones is in compliance with 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

Excludes any work that is or may be performed by other competent operatives within the defined "live work zone"

Electricity supply infrastructure assets condition - sagging, swaying, ties, cross arms, poles, insulators, conductors, service wires, electrical apparatus/equipment, etc.

Safe approach distances zones/Safe Working Clearance

Other areas which may need to be taken into consideration are: work permit(s) and/or access authorisation permits, technical standards and Industry Guidelines, rural applications, inclement weather, ground configuration and access - undulations, uneven ground, soft ground, damp, road construction, pavements, etc, feeder route plans and the use of technology and mathematical calculations

Equipment and specialised tools for use in electrical environments and loading and slinging techniques

Vegetation control includes: site rehabilitation, horticultural vegetation cutting and pruning techniques to minimise regrowth - chemicals and physical cutting and pruning tools/equipment, concerns for vegetation type/species and significance - heritage, significant, urban/rural; vegetation fire prone areas and areas of particular significance.

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
- Assessment
- Authorisation
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications
- Emergency
- Environmental and sustainable energy procedures
- Environmental legislation

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RANGE STATEMENT

- 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
- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	2	Writing	2	Numeracy	2

Competency Field

Competency Field **5)**

Vegetation Units

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UETTDRVC02B Operate vegetation control plant, machinery and equipment near live electrical apparatus

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the operation and routine maintenance of vegetation control machinery and equipment such as chippers, chainsaws, brush cutters, power pruners, chemical control and other related associated and powered vegetation control machinery and equipment used near live electrical apparatus. It excludes plant and machinery that encompasses driving/flying and associated licenses, such as aerial croppers, slashers, tritters, boom-operated mowers, stump grinders, insulated elevating work platforms and the like. Also included is the preparation of risk assessment control measures that encompass job safety assessment. It also includes traffic control measures and compliance with relevant State or Territory regulatory agencies/bodies, local government legislation, Industry bi-partite body - Guidelines/Codes of Practices or other related requirements for safe use of equipment near live electrical and mechanical apparatus.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

The skills and knowledge described in this unit may only be practiced under the regulations pertaining to each State and Territory for the safe planning for the removal of vegetation around live powerlines up to the live work zone including near live electrical apparatus, and regulations that directly relate to Occupational Health and Safety and/or contracts of training where they apply.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRVC03B	Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to operate and conduct routine maintenance of vegetation control machinery and equipment near live electrical apparatus.	1.1 Work instructions are received and confirmed.
	1.2 Relevant requirements and established procedures to be followed for the work to be preformed are discussed with all personnel to establish and confirm the work schedule.
	1.3 OHS policies and procedures to be followed for the work to be performed are received and confirmed.
	1.4 Suggestions to assist and/or improve meeting safe operation of vegetation control machinery and equipment near live electrical apparatus outcomes are made to others involved in the work.
	1.5 Scope of responsibility under the relevant work permit(s)/access authorisation(s) identified according to requirements and established procedures with relevant personnel.
	1.6 Hazards are identified, OHS risks are identified and reported according to established procedures.
	1.7 Resources including, equipment, tools and personal protective equipment required for the job are obtained and, confirmed in working order according to established procedures.
	1.8 Relevant responsibility associated with First Aid and/or other related work safety procedures at the worksite are confirmed in accordance with requirements and established procedures to ensure safety measures are followed in the instance of an incident.

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ELEMENT	PERFORMANCE CRITERIA	
	1.9	Client issues are identified and referred to appropriate personnel in accordance with industry/acceptable /community standards.
	1.10	Site is prepared to produce a quality outcome, follow sustainable energy principles and practices, and to minimise risk and damage to property, commerce, stock and individuals in accordance with established procedures.
	1.11	Road signs, barriers and warning devices are obtained and positioned in accordance with given instructions and requirements.
	1.12	Pre-operational checks are undertaken to confirm safe and correct operation of machinery and equipment for safe use near live electrical apparatus according to requirements and established procedures.
	1.13	Work permit(s)/access authorisation(s) are confirmed and received, where applicable, for commencement of the work according to requirements and established procedures with relevant personnel.
2 Operate and conduct routine maintenance of vegetation control machinery and equipment near live electrical apparatus.	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are followed in accordance with given instructions, requirements and/or established procedures.
	2.2	Use of machinery and equipment, techniques and practices are safely followed in accordance with given instructions and, according to requirements confirmed to eliminate the prospects of incidents.
	2.3	Operational knowledge for the usage of vegetation control machinery and equipment near live electrical apparatus to be applied to the work is confirmed to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements and established procedures.
	2.4	Vegetation control machinery and equipment is safely operated near live electrical apparatus in

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ELEMENT	PERFORMANCE CRITERIA	
		accordance with the work schedule, requirements, given instructions and established procedures.
	2.5	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are monitored and reported/referred to the immediate authorised personnel for directions according to established procedures.
	2.6	Non-routine events are referred to the immediate authorised personnel for directions according to established procedures.
	2.7	Problems associated with the operation of vegetation control machinery and equipment near live electrical apparatus are attended to using acquired known solutions and skills related to routine procedures to ensure work instructions and established procedures are met.
	2.8	On going checks of quality of the work are undertaken in accordance with given instructions and established procedures.
3 Complete the operation and routine maintenance of vegetation control machinery and equipment near live electrical apparatus.	3.1	Work undertaken is checked against work schedule and anomalies reported to Authorised personnel in accordance with established procedures.
	3.2	Accidents and/or incidents are actioned and reported to authorised personnel in accordance with established procedures.
	3.3	Work site is rehabilitated, cleaned-up, sustainable energy principles and practices applied, and made safe in accordance with given instructions and established procedures or an agreed standard.
	3.4	Machinery, equipment, tools and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures.
	3.5	Appropriate personnel are notified of work completion according to established procedures.
	3.6	Post-operational checks, minor maintenance and/or relevant documentation of machinery and

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ELEMENT	PERFORMANCE CRITERIA
	equipment are conducted according to requirements.
	3.7 Requirements for returning work permit(s) and/or access authorisation permits are confirmed, where applicable.
	3.8 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

7) **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 vegetation control plant, machinery and equipment near live electrical apparatus.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.11.1 Hand tools

E2.11.2.1 Power tools

E2.18.1 Occupational Health and Safety principles

E2.18.2 Electrical safe working practice

T2.1.3 Engineering applications of material properties.

T2.1.7 Enterprise vehicles

T2.1.8. Chain saw principles

T2.2.1 Generation power systems

T2.3.1 Powerline safety practices.

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REQUIRED SKILLS AND KNOWLEDGE

T2.5.5	Powerline clearances and approach distances
T2.8.12	Enterprise specific - vegetation control 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 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 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 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 - UET09". 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

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EVIDENCE GUIDE

tools/equipment/materials/procedures/workplaces/other variables		
Group No	**The minimum number of items on which skill is to be demonstrated**	**Item List**
A	Confirm operational knowledge associated with the operation of control plant, machinery and equipment near live electrical apparatus in all of the following:	Principles of electricity, the three phase power system. Power system. Recognition of aerial voltage systems. Identification of Low Voltage Aerial Circuits. Identification of High Voltage Aerial Circuits. "Safe working zone" so defined by relevant authorities. Use of technical standards, acts, regulations, codes /guidelines and established/enterprise/asset owner's procedures. System Control - Information required and function. Vicinity Permit - Information required and function. Sensitive Earth Fault (SEF) System Confirm environmental principals and procedures
B	Confirm safe practices associated with the operation of control plant,	OHS safety practices and procedures. Electric shock and resuscitation.

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	machinery and equipment near live electrical apparatus in all of the following:	Release and rescue Role of the Safety Observer Events constituting an incident. Procedures in the event of/responding to, incidents. Methods of identifying hazards. Risk assessment procedures. Selection of the best position for monitoring and controlling work (cutting) Selection of correct line of site to the cutter Correct observation of the work from ground level Constant analysis and decision making relevant to the safety of the work, taking into account prevailing site conditions (lay of the land) and on-going weather conditions
C	Confirm vegetation control associated with the operation of control plant, machinery and equipment near live electrical apparatus in all of the following:	Identify tree types Confirm vegetation species and types Confirm vegetation cutting techniques for different vegetation Confirm appropriate vegetation machinery and equipment to be used Use of feeder route plans Conduct calculations related to loading and slinging
D	Confirm the safe operation of machinery and	Chippers. Chainsaws.

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	equipment used in the control of vegetation near live electrical apparatus, in at least 6 of the following:	Brush cutters. Slashers. Power pruners. Chemical control. *Pre and post operational checks, inspections and minor maintenance. *Safe deployment of machinery and equipment in varying conditions and weather. (* Must do)
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 to safely undertake actual operation and routine maintenance of vegetation control machinery and equipment 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:

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EVIDENCE GUIDE

Competent performance with inherent safe working practices is expected in the Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with the following units:

UETNEEE001B	Comply with workplace OHS procedures and practices
UETTDREL03B	Comply with environmental and incidence response procedures
UETTDREL04B	Working safely near live electrical apparatus as non-electrical worker
UETTDRVC03B	Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus

Range Statement

RANGE STATEMENT

8) 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 is to be demonstrated in relation to the operation and routine maintenance of vegetation control machinery and equipment such as chippers, chainsaws, brush cutters, power pruners, chemical control and other related associated and powered vegetation control machinery and equipment used near live electrical apparatus.

Excludes plant and machinery that encompasses driving/flying and associated licenses, such as aerial croppers, slashers, tritters, boom-operated mowers, stump grinders, insulated elevating work platforms and the like.

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RANGE STATEMENT

Preparation of risk assessment control measures that encompass job safety assessment and includes traffic control measures and compliance with relevant State or Territory regulatory agencies/bodies, local government legislation, Industry bi-partite body - Guidelines/Codes of Practices or other related requirements for Safe use of equipment near live Electrical and Mechanical Apparatus.

Prevailing Licensing Requirements

Excludes any work that is or may be performed by other competent operatives within the defined "ordinary person zone"

Working near energised live electricity supply infrastructure assets

Includes periodical and pre-operational checks of the machinery and equipment for safe operation and conduct of maintenance checks and, associated documentation

Safe approach distances zones/Safe Working Clearance

Work permit(s) and/or access authorisation permits

Technical standards and Industry Guidelines

It may also include other areas such as: Feeder route plans, infrastructure constructions and excavations, rural applications, road construction, pavements and inclement weather

Ground configuration - undulations, uneven ground, soft ground, damp, etc

Plant, equipment and tools for use in electrical environments

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
- Assessment
- Authorisation
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications
- Emergency
- Environmental and sustainable energy procedures
- Environmental legislation
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Inspect

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RANGE STATEMENT

- Legislation
- MSDS
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	2	Writing	2	Numeracy	2

Competency Field

Competency Field **5**)

Vegetation Units

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UETTDRVC03B Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the preparation for the controlled removal of vegetation near live electrical apparatus up to the live work zone as defined for both Authorised and Instructed Persons in the industry guidelines associated with live electrical apparatus. This includes electrical and communications conductors and cables/powerlines and associated equipment on poles and structures according to requirements and established procedures. It does not include the full gamut of rigging techniques and practices required of a Rigger or entry into to the safe approach distance (SAD) as defined for persons, mobile plant, equipment and specialised tools.

It includes the preparation of a plan for the control and removal of vegetation, specification of appropriate chemical control methods, use of slinging and loading techniques and practices to be used, traffic management, and appropriate pruning and/or cutting techniques and practices (encompasses cutting plan) for given vegetation species to minimise regrowth within the electrical field according to requirements and procedures. Also included is the preparation of risk assessment control measures that encompass job safety assessment. Encompassed is compliance with 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.

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Application of the Unit

Application of the Unit **4**)

This competency standards unit shall apply to Transmission, Distribution, Rail Traction, Telecommunications and Vegetation Management Control industry sectors.

Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit may only be practiced under the regulations pertaining to each State and Territory for the safe planning for the removal of vegetation around live powerlines up to the live work zone including near live electrical apparatus, and regulations that directly relate to Occupational Health and Safety and/or contracts of training where they apply.

Pre-Requisites

Prerequisite Unit(s) **2**)

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UEENEEE001B	Apply OHS practices in the workplace
and	UETTDREL03B	Comply with environmental and incidence response procedures
and	UETTDREL04B	Working safely near live electrical apparatus as non-electrical worker

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for the development of the plan for the removal of vegetation up to vegetation exclusion zone near electrical apparatus.	1.1 Work instructions are received and confirmed.
	1.2 Relevant requirements and established procedures to be followed for the development of the work plan are discussed with all personnel to establish and confirm the work schedule.
	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 planning for the removal of vegetation up to the live work zone near live electrical apparatus outcomes are made to others involved in the work.
	1.5 Hazards are identified, OHS risks are identified

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ELEMENT	PERFORMANCE CRITERIA	
		and reported according to established procedures.
	1.6	Scope of responsibility under the relevant work permit(s) /access authorisation(s) are identified and confirmed according to requirements and established procedures with relevant personnel.
	1.7	Resources including, plant, equipment, tools and personal protective equipment required for the job are identified in accordance with established procedures.
	1.8	Relevant responsibility associated with First Aid, Aerial Rescue, Tree-Top Rescue and/or other related work safety procedures at the worksite are confirmed, where appropriate, in accordance with requirements and established procedures to ensure safety measures are followed in the instance of an incident.
	1.9	Client issues are identified and referred to appropriate personnel in accordance with industry/acceptable /community standards.
	1.10	Site preparation requirements are confirmed according to given instructions and planning of the work schedule for a quality outcome and to meet sustainable energy principles and practices to minimise risk and damage to property, commerce, stock, and individuals in accordance and established procedures.
	1.11	Road signs, barriers and warning device requirements and positioning in accordance with given instructions and requirements are confirmed.
2 Carry out the development of the Plan for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are confirmed in accordance with given instructions, requirements and/or established procedures.
	2.2	Lifting, climbing, working aloft, and use of power tools/equipment, techniques and practices

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ELEMENT	PERFORMANCE CRITERIA	
		are confirmed in accordance with given instructions and, according to requirements confirmed to eliminate the prospects of incidents.
	2.3	Operational knowledge for planning the removal of vegetation up to the live work zone near live electrical apparatus to be applied to the work, is confirmed to ensure completion will be within an agreed timeframe and, to quality standards with a minimum of waste according to requirements and established procedures.
	2.4	Produce plan for the removal of vegetation up to the live work zone near live electrical apparatus accordance with given instructions and established procedures.
	2.5	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are monitored and reported/referred to the immediate authorised personnel for directions according to established procedures.
	2.6	Non-routine events are referred to the immediate authorised personnel for directions according to established procedures.
	2.7	Development of the plan is carried out in accordance with the work schedule and to requirements.
	2.8	Problems associated with producing the plan for the removal of vegetation up to the live work zone live electrical apparatus are attended to according to acquired known solutions and skills related to routine procedures to ensure the plan is produced as per instructions and established procedures.
	2.9	On going checks of quality of the work are undertaken in accordance with given instructions and established procedures.
3 Complete development of the plan for the removal of vegetation up to vegetation exclusion	3.1	Work undertaken is checked against work schedule and anomalies reported to Authorised personnel in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
zone near electrical apparatus.		
	3.2	Potential accidents and/or incidents are identified and reported to authorised personnel in accordance with established procedures.
	3.3	Work site to be rehabilitated, cleaned up and made safe is identified in accordance with given instructions and 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	Appropriate personnel are notified of work completion according to established procedures.
	3.6	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

7) **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 planning for the removal of vegetation up to vegetation exclusion zone near live electrical apparatus.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.8.5	Magnetism
E2.8.8	Electrotechnology science and materials
E2.18.1	Occupational Health and Safety principles

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REQUIRED SKILLS AND KNOWLEDGE

E2.18.2	Electrical safe working practices
T2.3.1	Powerline safety practices
T2.5.5	Powerline clearances and approach distances
T2.5.6	Basic vegetation control hazard assessment and risk management principles
T2.5.7	Pruning principles near powerline
T2.5.8	Establishing rigging requirements for vegetation control
T2.5.9	Powerline access and isolation procedures
T2.5.10	Tree preservation principles
T2.5.13	Chemical control of foliage
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions

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)

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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 the "Assessment Guidelines - UET09". 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

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EVIDENCE GUIDE

- 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	Confirm operational knowledge associated with the planning of the removal of vegetation in all of the following:	Principles of electricity, the three phase power system. Power system. Recognition of aerial voltage systems. Identification of Low Voltage Aerial Circuits. Identification of High Voltage Aerial Circuits. "Safe working zone" so defined by relevant authorities. Use of technical standards, acts, regulations, codes /guidelines and established/enterprise/asset

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		owner's procedures. Confirm environmental principals and procedures.
B	Confirm safe practices associated with the planning of the removal of vegetation in all of the following:	OHS safety practices and procedures. Electric shock and resuscitation. Release and rescue Role of the Safety Observer Events constituting an incident. Procedures in the event of/responding to, incidents. Hierarchy and methods of identifying and controlling hazards. Risk assessment procedures. Selection of the best position for monitoring and controlling work (cutting) Selection of correct line of site to the cutter Correct observation of the work from ground level Constant analysis and decision making relevant to the safety of the work, taking into account prevailing site conditions (lay of the land) and on-going weather conditions.
C	Confirm vegetation control associated with the planning of the removal of vegetation in all of the following:	Identify tree types Confirm vegetation species and types Confirm vegetation cutting techniques for different vegetation Confirm appropriate vegetation machinery and equipment to be

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		used Use of feeder route plans Conduct calculations related to loading and slinging.
D	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 safely undertake actual planning for the removal of vegetation up to the vegetation exclusion zone 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 Transmission, Distribution and Rail Traction Industry. 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

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

8) 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 preparation for the controlled removal of vegetation around live powerlines up to the live work zone as defined for both Instructed and Authorised Persons in the industry guidelines associated with live electrical apparatus.

Includes electrical and communications conductors and cables/powerlines and associated equipment on poles and structures according to requirements and established procedures.

Excludes the full gamut of rigging techniques and practices required of a Rigger or entry into to the safe approach distance (SAD) as defined for persons, mobile plant, equipment and specialised tools.

Includes the preparation of a plan for the control and removal of vegetation, specifying appropriate chemical control methods, using slinging and loading techniques and practices to be used, traffic management, and appropriate pruning and/or cutting techniques and practices (encompasses cutting plan) for given vegetation species to minimise regrowth within the electrical field according to requirements and procedures.

Includes the preparation of risk assessment control measures that encompass job safety assessment and compliance with 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.

Working safely up to the defined "ordinary person zone" near energised electrical apparatus (inc. electrical powerlines) for non-electrical worker/ordinary persons and in some instances vegetation.

Risk assessment control measures that encompass job safety assessment.

Excludes any work that is or may be performed by other competent operatives within the defined "ordinary person zone"

Electricity supply infrastructure assets including electrical apparatus, electrical and

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RANGE STATEMENT

communication conductors, and equipment

Safe approach distances zones/Safe Working Clearance

It may also include other areas such as: Feeder route plans, infrastructure constructions and excavations, rural applications, road construction, pavements and inclement weather

Plant, equipment and tools for use in electrical environments for vegetation control, loading and slinging equipment.

Vegetation control includes: site rehabilitation, horticultural vegetation cutting and pruning techniques to minimise regrowth - chemicals and physical cutting and pruning tools/equipment, concerns for vegetation type/species and significance - heritage, significant, urban/rural; vegetation fire prone areas and areas of particular significance.

Constants and variables included in this unit are fully described in the Definitions Section 1 of this volume and form an integral part of the Range Statement.

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform
- Assessing risk
- Assessment
- Authorisation
- 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

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RANGE STATEMENT

- Work clearance systems

Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	2	Writing	2	Numeracy	2

Competency Field

Competency Field **5**)

Vegetation Units

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UETTDRVC04B Assess vegetation and recommend control measures for work near live electrical apparatus

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the assessment of vegetation and in particular trees for defects and hazards prior to cutting and pruning around live powerlines up to the live work zone as defined for both Instructed and Authorised Persons in the industry guidelines associated with live electrical apparatus. The assessment is compiled and recorded in accordance with requirements and/or established procedures for defined species of vegetation and/or particular tree types.

Also included is the preparation of risk assessment control measures that encompass job safety assessment and compliance with 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 **4**)

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

1.2) License to practice

The skills and knowledge described in this unit may only be practiced under the regulations pertaining to each State and Territory for the safe planning for the removal of vegetation around live powerlines up to the live work zone including near live electrical apparatus, and regulations that directly relate to Occupational Health and Safety and/or contracts of training where they apply.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRVC08B	Safe use of Elevating Work Platform (EWP) near live electrical apparatus
or	UETTDRVC06B	Cut vegetation at ground level outside 'vegetation exclusion zone' near live electrical apparatus
or	UETTDRVC05B	Cut vegetation above ground outside live work zone near live electrical apparatus (platform)
or	UETTDRVC01B	Cut vegetation above ground outside work zone near live electrical apparatus (climbing)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare and plan to conduct assessment of vegetation and, recommend control measures for work near live electrical apparatus.	1.1 Work instructions are identified and confirmed.
	1.2 Relevant requirements and established procedures to be followed for the work to be preformed are discussed with all personnel to establish and confirm the work schedule.
	1.3 OHS policies and procedures to be followed for the work to be performed are received and confirmed.
	1.4 Recommendations to assist in meeting assessment of vegetation and recommendation of control measures for working near live electrical apparatus outcomes are made to others involved in the work.
	1.5 Hazards are identified, OHS risks associated with working near live electrical apparatus are identified and reported according to established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	1.6	Scope of responsibility under the relevant work permit(s)/access authorisation(s) are received and confirmed according to requirements and established procedures with relevant personnel.
	1.7	Resources including, equipment, tools and personal protective equipment required for the job are identified and, where to be used confirmed in working order according to established procedures.
	1.8	First Aid, Pole Top Rescue 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.
	1.9	Client issues are identified and referred to appropriate personnel in accordance with industry/acceptable /community standards.
	1.10	Work schedule is prepared, to produce a quality outcome, follow sustainable energy principles and practices, and to minimise risk and damage to property, commerce, stock and individuals in accordance with established procedures.
	1.11	Road signs, barriers and warning devices are identified, where appropriate, in accordance with given instructions and requirements.
2 Conduct assessment of vegetation and, recommend control measures for work near live electrical apparatus.	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are followed in accordance with given instructions, requirements and/or established procedures.
	2.2	Lifting, climbing, working aloft, and use of power tools/equipment, techniques and practices are identified for inclusion in the assessment report according to requirements confirmed to eliminate the prospects of incidents.
	2.3	Operational knowledge for the assessment of vegetation and recommendation of control measures for working near live electrical apparatus to be applied to the work is confirmed

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ELEMENT	PERFORMANCE CRITERIA	
		to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements and established procedures.
	2.4	Assessment of vegetation and in particular trees for defects is undertaken in accordance with established procedures.
	2.5	Analysis of assessment results and recommendation is made of vegetation control measures to be deployed for working near live electrical apparatus in accordance with requirements and/or established procedures.
	2.6	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are monitored and reported/referred to the immediate authorised personnel for directions according to established procedures.
	2.7	Non-routine events are responded and referred to the immediate authorised personnel for directions according to established procedures.
	2.8	Problems associated with the assessment of vegetation and the recommendation of control measures for working near live electrical apparatus are attended to using acquired known solutions and skills to ensure requirements and established procedures are met.
	2.9	On going checks of quality of the work are undertaken in accordance with given instructions and established procedures.
3 Complete the assessment of vegetation and recommend control measures for work near live electrical apparatus.	3.1	Work undertaken is checked against work schedule and anomalies reported to authorised personnel in accordance with established procedures.
	3.2	Accidents and/or incidents are actioned and reported to authorised personnel in accordance with established procedures.
	3.3	Work site is made safe in accordance with given instructions and established procedures.

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ELEMENT	PERFORMANCE CRITERIA
	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 Appropriate personnel are notified of work completion according to established procedures.
	3.6 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

7) **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 assessing vegetation and recommending control measures for work near live electrical apparatus.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
T2.3.1	Powerline safety practices
T2.5.5	Powerline clearances and approach distances
T2.5.12	Assessment of vegetation principles
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions

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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 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 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.

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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 - UET09". 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	Confirm	Principles of electricity, the three

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	operational knowledge associated with the assessment of vegetation and making recommendations prior to working near live electrical apparatus, in all of the following:	phase power system. Power system. Recognition of aerial voltage systems. Identification of Low Voltage Aerial Circuits. Identification of High Voltage Aerial Circuits. "Safe working zone" so defined by relevant authorities. Use of technical standards, acts, regulations, codes /guidelines and established/enterprise/asset owner's procedures. System Control - Information required and function. Vicinity Permit - Information required and function. Sensitive Earth Fault (SEF) System Confirm environmental principals and procedures Safe approach distances for insulated cranes and plant. Safe approach distances for persons and hand held tools.
B	Confirm safe practices associated with the assessment of vegetation and making recommendations prior to working near live electrical apparatus, in all of the following:	OHS safety practices and procedures. Electric shock and resuscitation. Release and rescue Role of the Safety Observer Events constituting an incident. Procedures in the event of/responding to, incidents. Methods of identifying hazards. Risk assessment procedures. Selection of the best position for

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		monitoring and controlling work (cutting) Selection of correct line of site to the cutter Correct observation of the work from ground level Constant analysis and decision making relevant to the safety of the work, taking into account prevailing site conditions (lay of the land) and on-going weather conditions
C	Confirm vegetation control associated with the assessment of vegetation and making recommendations prior to working near live electrical apparatus, in all of the following:	Identify tree types Confirm vegetation species and types Confirm vegetation cutting techniques for different vegetation Confirm appropriate vegetation machinery and equipment to be used Use of feeder route plans Conduct calculations related to loading and slinging
D	Confirm the safe assessment of vegetation and making recommendations prior to working near live electrical apparatus, in all of the following:	Safe use of tools, plant and equipment. Safe storage, transportation and use of chemicals. Pre and post operational checks, inspections and minor maintenance on tools and equipment. Safe deployment of machinery and equipment in varying conditions and weather. Safe use of appropriate personal protective equipment. Safe cutting/pruning and tree

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		trimming methods Correct advice on vegetation species, types and characteristics Correct advice on cutting plans relevant to the vegetation species and type Analysis of vegetation control measures particularly of trees for defects Safe assessments techniques of vegetation for defects and hazards. Correct recommendations for appropriate pruning and/or cutting processes to be used near live electrical apparatus Preparing assessment reports with appropriate recommendations for course of action.
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 to safely undertake an assessment of vegetation and make recommendations of control measures for 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.

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EVIDENCE GUIDE

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 Transmission, Distribution and Rail Traction Industry. 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

8) 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 the assessment of vegetation and in particular trees for defects and hazards prior to cutting and pruning near live electrical apparatus up to the live work zone as defined for both Authorised and Instructed Persons in the industry guidelines associated with live electrical apparatus.

The assessment is compiled and recorded in accordance with requirements and/or established procedures for established species of vegetation and/or particular tree species, types and characteristics

Also included is the preparation of risk assessment control measures that encompass job safety assessment and compliance with 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

Working safely up to the defined "safe working zone" near energised electrical

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RANGE STATEMENT

apparatus (inc. electrical powerlines) for non-electrical worker/ordinary persons.

Risk assessment control measures that encompass job safety assessment.

Excludes any work that is or may be performed by other competent operatives within the defined "live work zone"

Electricity supply infrastructure assets condition - sagging, swaying, ties, cross arms, poles, insulators, conductors, service wires, electrical apparatus/equipment, etc.

Safe approach distances zones/Safe Working Clearance

Other areas which may need to be taken into consideration are: work permit(s) and/or access authorisation permits, technical standards and Industry Guidelines, rural applications, inclement weather, ground configuration and access - undulations, uneven ground, soft ground, damp, road construction, pavements, etc, feeder route plans and the use of technology and mathematical calculations

Equipment and specialised tools for use in electrical environments and loading and slinging techniques

Vegetation control includes: site rehabilitation, horticultural vegetation cutting and pruning techniques to minimise regrowth - chemicals and physical cutting and pruning tools/equipment, concerns for vegetation type/species and significance - heritage, significant, urban/rural; vegetation fire prone areas and areas of particular significance.

Areas of particular significance

Loading and slinging techniques

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
- Assessment
- Authorisation
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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	2	Writing	2	Numeracy	2

Competency Field

Competency Field **5)**

Vegetation Units

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UETTDRVC05B Cut vegetation above ground outside live work zone near live electrical apparatus (platform)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers cutting and/or pruning vegetation above ground level and removal of vegetation obstructions, up to the live work zone as defined for both Authorised and Instructed Persons in the industry guidelines associated with live electrical apparatus, using the established cutting plan relevant to the vegetation type. It encompasses the safe use of appropriate/specialised tools and equipment according to requirements and established procedures. It includes safely accessing trees from above ground level to install restraints/slings, removing tree limbs in a safe manner and, clearing debris from the felling site to eliminate the occurrence of electrical incidents. It DOES NOT include entry of persons, mobile plant, equipment, and/or specialised tools into to the safe approach distance (SAD) as defined.

Also included is the preparation of risk assessment control measures that encompass job safety assessment. All work and zones is in compliance with 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 **4**)

This competency standards unit shall apply to Transmission, Distribution, Rail Traction, Telecommunications and Vegetation Management Control

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Application of the Unit **4**)

industry sectors.

Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit may only be practiced under the regulations pertaining to each State and Territory for the safe planning and the removal of vegetation around live powerlines up to the live work zone including near live electrical apparatus, and regulations that directly relate to Occupational Health and Safety and/or contracts of training where they apply.

Pre-Requisites

Prerequisite Unit(s) **2**)

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRVC07B	Monitor safety compliance for vegetation work near live electrical apparatus

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to cut/prune vegetation above ground up to the vegetation exclusion zone near live electrical apparatus using an elevating platform.	1.1 Work instructions and cutting plan are received and confirmed.
	1.2 Relevant requirements and established procedures to be followed for the work to be performed in accord with the cutting are discussed with all personnel to establish and confirm the work schedule.
	1.3 OHS policies and procedures to be followed for the work to be performed are received and confirmed.
	1.4 Suggestions to assist and/or improve meeting the cutting of vegetation above ground level outside the live work zone near electrical apparatus outcomes are made to others involved in the work.
	1.5 Hazards are identified, OHS risks associated with working near live electrical apparatus are identified and reported according to established

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ELEMENT	PERFORMANCE CRITERIA	
		procedures.
	1.6	Scope of responsibility under the relevant work permit(s)/access authorisation(s) identified according to requirements and established procedures with relevant personnel.
	1.7	Resources including, equipment, tools, approved platforms and personal protective equipment required for the job are obtained and, in working order according to established procedures.
	1.8	Relevant responsibility associated with First Aid, working aloft, and/or other related work safety procedures at the worksite are confirmed in accordance with requirements and established procedures to ensure safety measures are followed in the instance of an incident.
	1.9	Client issues including environmental values are identified and referred to appropriate personnel in accordance with industry/acceptable /community standards.
	1.10	Site is prepared to produce a quality outcome, follow sustainable energy principles and practices, and to minimise risk and damage to property, commerce, stock and individuals in accordance with established procedures.
	1.11	Road signs, barriers and warning devices are obtained and positioned in accordance with given instructions and requirements.
	1.12	Pre-operational checks are undertaken to confirm safe and correct operation of tools and equipment for safe use near live electrical apparatus according to requirements and established procedures.
	1.13	Work permit(s)/access authorisation(s) are confirmed and received, where applicable, for commencement of the work according to requirements and established procedures with relevant personnel.
2 Carry out the	2.1	OHS and sustainable energy principles and

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ELEMENT	PERFORMANCE CRITERIA
cutting/pruning of vegetation above ground up to the vegetation exclusion zone near live electrical apparatus using an elevating platform.	practices to reduce the incidents of accidents and minimise waste are followed in accordance with given instructions, requirements and/or established procedures.
	2.2 Lifting, climbing, working aloft, and use of tools/equipment, techniques and practices are safely followed in accordance with given instructions and, according to requirements confirmed to eliminate the prospects of incidents.
	2.3 Operational knowledge for the cutting of vegetation above ground level outside the live work zone near electrical apparatus is confirmed to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements and established procedures.
	2.4 Cutting of vegetation above ground level outside the live work zone near electrical apparatus using a EWP is carried out in accordance with the cutting plan and work schedule and, given instructions and established procedures.
	2.5 Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are monitored and reported/referred to the immediate authorised personnel for directions according to established procedures.
	2.6 Non-routine events are referred to the immediate authorised personnel for directions according to established procedures.
	2.7 Problems associated with cutting vegetation above ground level outside of the vegetation exclusion zone near electrical apparatus are attended to using acquired known solutions and skills related to routine procedures to ensure work instructions and established procedures are met.
	2.8 On going checks of quality of the work are

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ELEMENT	PERFORMANCE CRITERIA	
		undertaken in accordance with given instructions and established procedures.
3 Complete the cutting/pruning of vegetation above ground up to the vegetation exclusion zone near live electrical apparatus using an elevating platform.	3.1	Work undertaken is checked against cutting plan and work schedule, work schedule and anomalies reported to Authorised personnel in accordance with established procedures.
	3.2	Accidents and/or incidents are actioned and reported to authorised personnel in accordance with established procedures.
	3.3	Work site is rehabilitated, cleaned-up, sustainable energy principles and practices applied, and made safe in accordance with given instructions and established procedures or an agreed standard.
	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	Appropriate personnel are notified of work completion according to established procedures.
	3.6	Post-operational checks, minor maintenance and/or relevant documentation of equipment and tools/platform are conducted according to requirements.
	3.7	Requirements for returning work permit(s) and/or access authorisation permits are confirmed, where applicable.
	3.8	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

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REQUIRED SKILLS AND KNOWLEDGE

7) **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 cutting vegetation above ground outside live work zone near live electrical apparatus (platform).

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
T2.3.1	Powerline safety practices
T2.5.5	Powerline clearances and approach distances
T2.5.15	Operating tools and equipment from a platform
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions

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

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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 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 - UET09". 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	Confirm operational knowledge associated with the cutting vegetation above ground outside Live Work Zone near live electrical apparatus using a platform in all of the following:	Principles of electricity, the three phase power system. Power system. Recognition of aerial voltage systems. Identification of Low Voltage Aerial Circuits. Identification of High Voltage Aerial Circuits. "Safe working zone" and "Ordinary person zone" so defined by relevant authorities. Use of technical standards, acts, regulations, codes /guidelines and established/enterprise/asset

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		owner's procedures. System Control - Information required and function. Vicinity Permit - Information required and function. Sensitive Earth Fault (SEF) System Confirm environmental principals and procedures
B	Confirm safe practices associated with the cutting vegetation above ground outside Live Work Zone near live electrical apparatus using a platform in all of the following:	OHS safety practices and procedures. Electric shock and resuscitation. Release and rescue and height safety including platform aerial emergency rescue procedure Role of the Safety Observer Events constituting an incident. Procedures in the event of/responding to, incidents. Methods of identifying hazards. Risk assessment procedures for both worksite and pre-job checklist. Selection of the best position for monitoring and controlling work (cutting) Selection of correct line of site to the cutter Correct observation of the work from ground level Constant analysis and decision making relevant to the safety of the work, taking into account prevailing site conditions (lay of the land) and on-going weather conditions.
C	Confirm vegetation	Identify tree types

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	control associated with the cutting vegetation above ground outside Live Work Zone near live electrical apparatus using a platform in all of the following:	Confirm vegetation species and types Confirm vegetation cutting techniques for different vegetation Confirm appropriate vegetation machinery and equipment to be used Use of feeder route plans
D	Confirm the safe cutting/pruning of vegetation above ground outside Live Work Zone near live electrical apparatus using a platform in all of the following:	Use of cutting plans relevant to the vegetation type. Safe use of all relevant personnel protective equipment Safe operation of restraints, slings, lifting and loads Safe use of tools and equipment such as hand saws, chainsaws, specialised tools and equipment and or power pruners above ground on a platform. Safe use of chemical control and application above ground on a platform. Safe use of regulatory and/or approved industry cutting/pruning platforms Safe working aloft on a platform and undertaking cutting, pruning and tree trimming techniques near electrical apparatus Conduction of pre and post operational checks, inspection and minor maintenance. Safe deployment of equipment and tools in varying ground conditions and weather.

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		Safe debris removal
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 to safely undertake actual cutting/pruning of vegetation above ground up to the vegetation exclusion zone near live electrical apparatus using platforms.

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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with the following units:

UETTDRVC01 Cut vegetation above ground outside live work

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B	zone near live electrical apparatus (climbing)
UETTDRVC06 B	Cut vegetation at ground level outside 'vegetation exclusion zone' near live electrical apparatus
UETTDRVC08 B	Safe use of Elevating Work Platform (EWP) near live electrical apparatus

Range Statement

RANGE STATEMENT

8) 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 the cutting and/or pruning of vegetation above ground level and removal of vegetation obstructions up to the live work zone (using platform technique) as defined for both Authorised and Instructed Persons in the industry guidelines associated with live electrical apparatus.

Aerial work is conducted using regulator and/or industry approved platform(s) and includes insulated type and aerial emergency rescue near live electrical apparatus

Use of established cutting plan(s) relevant to the vegetation type

Safety practices include: the safe use of appropriate/specialised tools and equipment, the safe use of vegetation climbing equipment and techniques and may include safely accessing trees to install restraints/slings, removing tree limbs in a safe manner, clearing debris from the felling site to eliminate the occurrence of electrical incidents and reparation of risk assessment control measures that encompass job safety assessment. It also includes working safely up to the defined "ordinary person zone" near energised electrical apparatus (inc. electrical powerlines) for non-electrical worker/ordinary persons and risk assessment control measures that encompass job safety assessment.

Excludes entry of persons, mobile plant, equipment, and/or specialised tools into to the safe approach distance (SAD) as defined.

Work and zones is in compliance with 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

Working safely up to the defined "safe working zone" near energised electrical apparatus (inc. electrical powerlines) for non-electrical worker/ordinary persons.

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RANGE STATEMENT

Excludes any work that is or may be performed by other competent operatives within the defined "live work zone"

Electricity supply infrastructure assets condition - sagging, swaying, ties, cross arms, poles, insulators, conductors, service wires, electrical apparatus/equipment, etc.

Safe approach distances zones/Safe Working Clearance

Other areas which may need to be taken into consideration are: work permit(s) and/or access authorisation permits, technical standards and Industry Guidelines, rural applications, inclement weather, ground configuration and access - undulations, uneven ground, soft ground, damp, road construction, pavements, etc, feeder route plans and the use of technology and mathematical calculations

Equipment and specialised tools for use in electrical environments and loading and slinging techniques

Vegetation control includes: site rehabilitation, horticultural vegetation cutting and pruning techniques to minimise regrowth - chemicals and physical cutting and pruning tools/equipment, concerns for vegetation type/species and significance - heritage, significant, urban/rural; vegetation fire prone areas and areas of particular significance.

Safe operation and care of an Elevating Work Platform

Work permit(s) and/or access authorisation permits

Technical standards and Industry Guidelines

Loading and slinging techniques

Use of technology and mathematical calculations

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
- Assessment
- Authorisation
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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	2	Writing	2	Numeracy	2

Competency Field

Competency Field **5)**

Vegetation Units

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UETTDRVC06B Cut vegetation at ground level outside 'vegetation exclusion zone' near live electrical apparatus

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers cutting and/or pruning vegetation at ground level and removal of vegetation obstructions up to the live work zone as defined for both Instructed and Authorised Persons in the industry guidelines associated with live electrical apparatus using the established cutting plan relevant to the vegetation type. It encompasses the safe use of appropriate/specialised tools and equipment according to requirements and established procedures. It includes safely accessing trees to install restraints/slings, removing small trees in a safe manner and, clearing debris from the felling site to eliminate the occurrence of electrical incidents. It DOES NOT include entry of persons, mobile plant, equipment, and/or specialised tools into to the safe approach distance (SAD) as defined.

Also included is the preparation of risk assessment control measures that encompass job safety assessment. All work is in compliance with 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 **4**)

This competency standards unit shall apply to Transmission, Distribution, Rail Traction, Telecommunications and Vegetation Management Control

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Application of the Unit **4**)

industry sectors.

Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit may only be practiced under the regulations pertaining to each State and Territory for the safe planning for the removal of vegetation around live powerlines up to the live work zone including near live electrical apparatus, and regulations that directly relate to Occupational Health and Safety and/or contracts of training where they apply.

Pre-Requisites

Prerequisite Unit(s) **2**)

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRVC07B	Monitor safety compliance for vegetation work near live electrical apparatus

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to cut/prune vegetation at ground level up to vegetation exclusion zone near live electrical apparatus.	1.1 Work instructions and cutting plan are received and confirmed.
	1.2 Relevant requirements and established procedures to be followed for the work to be performed in accord with the cutting are discussed with all personnel to establish and confirm the work schedule.
	1.3 OHS policies and procedures to be followed for the work to be performed are received and confirmed.
	1.4 Suggestions to assist and/or improve meeting the cutting of vegetation at ground level outside of the live work zone near electrical apparatus outcomes are made to others involved in the work.
	1.5 Hazards are identified, OHS risks associated with working near live electrical apparatus are identified and reported according to established

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ELEMENT	PERFORMANCE CRITERIA	
		procedures.
	1.6	Scope of responsibility under the relevant work permit(s)/access authorisation(s) identified according to requirements and established procedures with relevant personnel.
	1.7	Resources including, vehicles, equipment, tools and personal protective equipment required for the job are obtained and, confirmed in working order according to established procedures.
	1.8	Relevant responsibility associated with First Aid and/or other related work safety procedures at the worksite are confirmed in accordance with requirements and established procedures to ensure safety measures are followed in the instance of an incident.
	1.9	Client issues including environmental values are identified and referred to appropriate personnel in accordance with industry/acceptable /community standards.
	1.10	Site is prepared to produce a quality outcome, follow sustainable energy principles and practices, and to minimise risk and damage to property, commerce, stock and individuals in accordance with established procedures.
	1.11	Road signs, barriers and warning devices are obtained and positioned in accordance with given instructions and requirements.
	1.12	Pre-operational checks are undertaken to confirm safe and correct operation of tools and equipment for safe use near live electrical apparatus according to requirements and established procedures.
	1.13	Work permit(s)/access authorisation(s) are confirmed and received, where applicable, for commencement of the work according to requirements and established procedures with relevant personnel.
2 Carry out the	2.1	OHS and sustainable energy principles and

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ELEMENT	PERFORMANCE CRITERIA	
cutting/pruning of vegetation at ground level up to vegetation exclusion zone near live electrical apparatus.		practices to reduce the incidents of accidents and minimise waste are followed in accordance with given instructions, requirements and/or established procedures.
	2.2	Lifting, climbing, working in confined spaces, and use of tools/equipment, techniques and practices are safely followed in accordance with given instructions and, according to requirements confirmed to eliminate the prospects of incidents.
	2.3	Operational knowledge for cutting vegetation species and types at ground level outside of the live work exclusion zone near electrical apparatus is confirmed to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements and established procedures.
	2.4	Cutting of vegetation at ground level outside of the live work zone near electrical apparatus is carried out in accordance with the cutting plan and work schedule, and given instructions and established procedures.
	2.5	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are reported/referred to the immediate authorised personnel for directions according to established procedures.
	2.6	Non-routine events are referred to the immediate authorised personnel for directions according to established procedures.
	2.7	Problems associated with cutting vegetation at ground level outside of the vegetation exclusion zone near electrical apparatus are attended to using acquired known solutions and skills related to routine procedures to ensure work instructions and established procedures are met.
	2.8	On going checks of quality of the work are undertaken in accordance with given instructions and established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.9	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are followed in accordance with given instructions, requirements and/or established procedures.
3 Complete the cutting/pruning of vegetation at ground level up to vegetation exclusion zone near live electrical apparatus.	3.1	Work undertaken is checked against cutting plan and work schedule, and anomalies reported to Authorised personnel in accordance with established procedures.
	3.2	Accidents and/or incidents are actioned and reported to authorised personnel in accordance with established procedures.
	3.3	Work site is rehabilitated, cleaned-up, sustainable energy principles and practices applied, and made safe in accordance with given instructions and established procedures or an agreed standard.
	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	Appropriate personnel are notified of work completion according to established procedures.
	3.6	Post-operational checks, minor maintenance and/or relevant documentation of equipment and tools are conducted according to requirements.
	3.7	Requirements for returning work permit(s) and/or access authorisation permits are confirmed, where applicable.
	3.8	Works completion records, report forms/data sheets are completed accurately in accordance with given instructions and established procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 cutting vegetation at ground level outside 'vegetation exclusion zone' near live electrical apparatus.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
T2.3.1	Powerline safety practices
T2.5.5	Powerline clearances and approach distances
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions
T2.8.12	Enterprise Specific - vegetation control 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 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

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in a 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 the "Assessment Guidelines - UET09". 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:

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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; 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	Confirm operational knowledge associated with the cutting vegetation at ground level near live electrical apparatus in all of the following:	Principles of electricity, the three phase power system. Power system. Recognition of aerial voltage systems. Identification of Low Voltage Aerial Circuits. Identification of High Voltage Aerial Circuits. "Safe working zone" and "Ordinary person zone" so defined by relevant authorities.

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		Use of technical standards, acts, regulations, codes /guidelines and established/enterprise/asset owner's procedures. System Control - Information required and function. Vicinity Permit - Information required and function. Sensitive Earth Fault (SEF) System Confirm environmental principals and procedures
B	Confirm safe practices associated with the cutting vegetation at ground level near live electrical apparatus in all of the following:	OHS safety practices and procedures. Electric shock and resuscitation. Release and rescue Role of the Safety Observer Events constituting an incident. Procedures in the event of/responding to, incidents. Methods of identifying hazards. Risk assessment procedures for both worksite and pre-job checklist. Selection of the best position for monitoring and controlling work (cutting) Selection of correct line of site to the cutter Correct observation of the work from ground level Constant analysis and decision making relevant to the safety of the work, taking into account prevailing site

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		conditions (lay of the land) and on-going weather conditions.
C	Confirm vegetation control associated with the cutting vegetation at ground near live electrical apparatus in all of the following:	Identify tree types Confirm vegetation species and types Confirm vegetation cutting techniques for different vegetation Confirm appropriate vegetation machinery and equipment to be used Use of feeder route plans
D	Confirm the safe cutting of vegetation at ground near live electrical apparatus in all of the following:	Use of cutting plans relevant to the vegetation type. Safe use of all relevant personnel protective equipment Safe use of tools and equipment such as hand saws, chainsaws, specialised tools and equipment and or power pruners at ground level. Safe use of chemical control and application at ground level. Safe cutting, pruning and tree trimming techniques at ground near electrical apparatus Safe stump removal Conduction of pre and post operational checks, inspection and minor maintenance on tools and equipment. Safe deployment of equipment and tools in varying ground conditions and weather. Safe debris removal

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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 to safely undertake actual cutting of vegetation at ground level outside the 'vegetation exclusion zone' 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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with the following units:

UETTDRVC08B Safe use of Elevating Work Platform (EWP)

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	near live electrical apparatus
UETTDRVC07B	Monitor safety compliance for vegetation work near live electrical apparatus
UETTDRVC01B	Cut vegetation above ground outside live work zone near live electrical apparatus (climbing)
UETTDRVC05B	Cut vegetation above ground outside live work zone near live electrical apparatus (platform)

Range Statement

RANGE STATEMENT

8) 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 cutting and/or pruning vegetation at ground level and removal of vegetation obstructions up to the live work zone as defined for both Authorised and Instructed Persons in the industry guidelines associated with live electrical apparatus.

Use of established cutting plan(s) relevant to the vegetation type

Safety practices includes; the safe use of appropriate/specialised tools and equipment and may include safely accessing trees to install restraints/slings, removing tree limbs in a safe manner, clearing debris from the felling site to eliminate the occurrence of electrical incidents and reparation of risk assessment control measures that encompass job safety assessment.

Excludes entry of persons, mobile plant, equipment, and/or specialised tools into to the safe approach distance (SAD) as defined.

Work and zones is in compliance with 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

Working safely up to the defined "safe working zone" near energised electrical apparatus (inc. electrical powerlines) for non-electrical worker/ordinary persons.

Excludes any work that is or may be performed by other competent operatives within

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RANGE STATEMENT

the defined "live work zone"

Electricity supply infrastructure assets condition - sagging, swaying, ties, cross arms, poles, insulators, conductors, service wires, electrical apparatus/equipment, etc.

Infrastructure constructions and excavations

Safe approach distances zones/Safe Working Clearance

Other areas which may need to be taken into consideration are: work permit(s) and/or access authorisation permits, technical standards and Industry Guidelines, rural applications, inclement weather, ground configuration and access - undulations, uneven ground, soft ground, damp, road construction, pavements, etc, feeder route plans and the use of technology and mathematical calculations

Plant, equipment and specialised tools for use in electrical environments

Vegetation control includes: site rehabilitation, horticultural vegetation cutting and pruning techniques to minimise regrowth - chemicals and physical cutting and pruning tools/equipment, concerns for vegetation type/species and significance - heritage, significant, urban/rural; vegetation fire prone areas and areas of particular significance.

Use of technology and mathematical calculations

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
- Assessment
- Authorisation
- 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

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RANGE STATEMENT

- 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

Custom Content Section

2.2) Literacy and numeracy skills

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	2	Writing	2	Numeracy	2

Competency Field

Competency Field **5)**

Vegetation Units

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UETTDRVC07B Monitor safety compliance for vegetation work near live electrical apparatus

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the control and monitor of work associated with vegetation control near live electrical apparatus. This includes observing, spotting, rendering warnings to stop unsafe work activities, and/or encroachment of ordinary persons, public, personnel and mobile plant and equipment into the safe approach distance (SAD) as defined for persons and mobile plant and equipment. A person designated as a Safety Observer, solely dedicated to the role, normally carries out this work.

Also included is the preparation of risk assessment control measures that encompass job safety assessment. All work and zones is in compliance with 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 **4**)

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

1.2) License to practice

The skills and knowledge described in this unit may only be practiced under the regulations pertaining to each State and Territory for the safe planning for the removal of vegetation around live powerlines up to the live work zone including near live electrical apparatus, and regulations that directly relate to Occupational Health and Safety and/or contracts of training where they apply.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRVC02B	Operate vegetation control plant, machinery and equipment near live electrical apparatus

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to control safety compliance for vegetation work near live electrical apparatus	1.1 Work instructions are received and confirmed.
	1.2 Relevant requirements and established procedures to be followed for the work to be performed are discussed with all personnel to establish and confirm the work schedule.
	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 control of safety compliance for vegetation work near live electrical apparatus outcomes are made to others involved in the work.
	1.5 Hazards are identified, OHS risks associated with working near live electrical apparatus are identified and reported according to established procedures.
	1.6 Scope of responsibility under the relevant work permit(s)/access authorisation(s) are received and confirmed according to requirements and established procedures with relevant personnel.
	1.7 Resources including, equipment, tools and personal protective equipment required for the job are identified and, in working order according to established procedures.
	1.8 Relevant responsibility associated with First Aid, Pole Top and Aerial Rescue and/or other related work safety procedures at the worksite are confirmed in accordance with requirements and established procedures to ensure safety measures

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ELEMENT	PERFORMANCE CRITERIA	
		are followed in the instance of an incident.
	1.9	Client issues are identified and referred to appropriate personnel in accordance with industry/acceptable /community standards.
	1.10	Site preparation is in accord with given instructions and established procedures.
	1.11	Work schedule is prepared, to produce a quality outcome, follow sustainable energy principles and practices, and to minimise risk and damage to property, commerce, stock and individuals in accordance with established procedures.
	1.12	Road signs, barriers and warning devices are planned and positioned in accordance with given instructions, established procedures and requirements.
2 Carry out the control of safety compliance for vegetation work near live electrical apparatus.	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste/energy are followed in accordance with given instructions, requirements and/or established procedures.
	2.2	Lifting, climbing, working aloft, and use of power tools/equipment, techniques and practices are observed in accordance with given instructions and, according to requirements to eliminate the prospects of incidents.
	2.3	Operational knowledge for controlling the safety compliance for vegetation work near live electrical apparatus is applied to the work to ensure safe systems of work are observed and completion is in an agreed timeframe and, to quality standards.
	2.4	Safety compliance is controlled and monitored for vegetation work near live electrical apparatus in accordance with given instructions, requirements and established procedures.
	2.5	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are reported/referred to the immediate authorised

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ELEMENT	PERFORMANCE CRITERIA	
		personnel for directions according to established procedures.
	2.6	Non-routine events are responded and referred to the immediate authorised personnel for directions according to established procedures.
	2.7	Work is performed in accordance with the work schedule and to requirements.
	2.8	Problems associated with the control of safety compliance and monitoring for vegetation work near live electrical apparatus is responded to using acquired known solutions and skills related to routine procedures to ensure work instructions and established procedures are met.
	2.9	On going checks of quality of the work are undertaken in accordance with given instructions and established procedures.
3 Complete the control of safety compliance for vegetation work near live electrical apparatus.	3.1	Work undertaken is checked against work schedule and anomalies reported to authorised personnel in accordance with established procedures.
	3.2	Accidents and/or incidents are actioned and reported to authorised personnel in accordance with established procedures.
	3.3	Work site is rehabilitated, cleaned-up, sustainable energy principles and practices applied, and made safe in accordance with given instructions and established procedures or an agreed standard.
	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	Appropriate personnel are notified of work completion according to established procedures.
	3.6	Requirements for returning work permit(s) and/or access authorisation permits are confirmed.
	3.7	Works completion records, report forms/data sheets are completed accurately in accordance

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ELEMENT	PERFORMANCE CRITERIA
	with given instructions and established procedures within.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 monitoring safety compliance for vegetation work near live electrical apparatus.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1	Occupational Health and Safety principles
E2.18.2	Electrical safe working practices
T2.3.1	Powerline safety practices
T2.5.5	Powerline clearances and approach distances
T2.5.14	Safety observer principles
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions

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.

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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 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 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

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EVIDENCE GUIDE

with the "Assessment Guidelines - UET09". 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	Confirm operational knowledge associated with the monitoring safety compliance for	Principles of electricity, the three phase power system. Power system. Recognition of aerial voltage systems. Identification of Low Voltage

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	vegetation work near live electrical apparatus in all of the following:	Aerial Circuits. Identification of High Voltage Aerial Circuits. "Safe working zone" and "Ordinary person zone" so defined by relevant authorities. Use of technical standards, acts, regulations, codes /guidelines and established/enterprise/asset owner's procedures. Switching requirements for Authorised tree trimming work on voltage overhead lines. System Control - Information required and function. Vicinity Permit - Information required and function. Sensitive Earth Fault (SEF) System Confirm environmental principals and procedures
B	Confirm safe practices associated with the monitoring safety compliance for vegetation work near live electrical apparatus in all of the following:	OHS safety practices and procedures. Electric shock and resuscitation. Release and rescue Role of the Safety Observer Events constituting an incident. Procedures in the event of/responding to, incidents. Selection of the best position for monitoring and controlling work (cutting) Selection of correct line of site to the cutter Correct observation of the

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		work from ground level Constant analysis and decision making relevant to the safety of the work, taking into account prevailing site conditions (lay of the land) and on-going weather conditions
C	Confirm hazards and risk assessment procedures associated with the monitoring safety compliance for vegetation work near live electrical apparatus in all of the following:	Identifying hazards. Risk assessment procedures. Conducting work site hazard assessment Essential components of hazards assessment checks. Pre-job Hazard Assessment Check (HAC) Items Worksite hazard and risk assessment checklist Procedure for planned inspection
D	Confirm vegetation control associated with the monitoring safety compliance for vegetation work near live electrical apparatus in all of the following:	Identify tree types Confirm vegetation species and types Confirm vegetation cutting techniques for different vegetation Confirm appropriate vegetation machinery and equipment to be used Use of feeder route plans Conduct calculations related to loading and slinging
E	All of the following;	Duties of Safety Observer's at the work site
F	At least one occasion	Dealing with an unplanned event by drawing on essential knowledge and associated

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		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 safely undertake actual monitoring of safety compliance for vegetation 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 Transmission, Distribution and Rail Traction Industry. 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.

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Range Statement

RANGE STATEMENT

8) 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 monitoring and controlling vegetation work near live electrical apparatus and/or including the following:

Voltages exceeding 240 V, 11/22/33 and/or 66 KV

Includes observing, spotting, rendering warnings to stop unsafe work activities, and/or encroachment of ordinary persons, public, personnel and mobile plant and equipment into the safe approach distance (SAD) as defined for persons and mobile plant and equipment. A person designated as a Safety Observer, solely dedicated to the role, normally carries out this work.

Work and zones is in compliance with 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.

Working safely up to the defined "ordinary person zone" near energised electrical apparatus (inc. electrical powerlines) for non-electrical worker/ordinary persons.

Risk assessment control measures that encompass job safety assessment.

Excludes any work that is or may be performed by other competent operatives within the defined "live work zone"

Electricity supply infrastructure assets and infrastructure constructions and excavations

Safe approach distances zones/Safe Working Clearance

It may also include other areas such as: Feeder route plans, infrastructure constructions and excavations, rural applications, road construction, pavements and inclement weather

Ground configuration - undulations, uneven ground, soft ground, damp, etc

Plant, machinery, equipment and tools for use in electrical environments

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
- Assessment
- Authorisation
- Documenting detail work events, record keeping and or

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RANGE STATEMENT

storage of information
- Drawings and specifications
- Emergency
- Environmental and sustainable energy procedures
- Environmental legislation
- 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
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	2	Writing	2	Numeracy	2

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Competency Field

Competency Field 5)

Vegetation Units

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UETTDRVC08B Safe use of Elevating Work Platform (EWP) near live electrical apparatus

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This Competency Standard Unit covers the operation of the use of insulated Elevating Work Platform (EWP) near live electrical apparatus. It includes the identification of hazards and the correct procedures to follow to minimise risk to self and to others. It also encompasses periodical and pre-operational checks on the insulated EWP according to requirements and established procedures.

Also included is the preparation of risk assessment control measures that encompass job safety assessment. All work and zones is in compliance with 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 **4**)

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

1.2) License to practice

The skills and knowledge described in this unit may only be practiced under the regulations pertaining to each State and Territory for the safe planning for the removal of vegetation around live powerlines up to the live work zone including near live electrical apparatus, and regulations that directly relate to Occupational Health and Safety and/or contracts of training where they apply.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRVC07B	Monitor safety compliance for vegetation work near live electrical apparatus

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to use insulated Elevating Work Platform (EWP) safely near live electrical and mechanical apparatus	1.1 Work instructions are received and confirmed.
	1.2 Relevant requirements and established procedures to be followed for the work to be preformed are discussed with all personnel to establish and confirm the work schedule.
	1.3 OHS policies and procedures to be followed for the work to be performed are received and confirmed.
	1.4 Suggestions to assist and/or improve meeting safe use of insulated Elevating Work Platform (EWP) near live electrical apparatus are made to others involved in the work.
	1.5 Hazards are identified, OHS risks associated with working near live electrical apparatus are identified and reported according to established procedures.
	1.6 Scope of responsibility under the relevant work permit(s)/access authorisation(s) identified according to requirements and established procedures with relevant personnel.
	1.7 Resources including equipment, tools and personal protective equipment required for the job are obtained and, in working order according to established procedures.
	1.8 Relevant responsibilities associated with First Aid, Emergency Lowering of EWP, Control Descent Device (CDD) and/or other related work safety procedures at the worksite are confirmed in

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ELEMENT	PERFORMANCE CRITERIA	
		accordance with requirements and established procedures to ensure safety measures are followed in the instance of an incident.
	1.9	Client issues are identified and referred to appropriate personnel in accordance with industry/acceptable /community standards.
	1.10	Site is prepared to produce a quality outcome, follow sustainable energy principles and practices, and to minimise risk and damage to property, commerce, stock and individuals in accordance with established procedures.
	1.11	Pre-operational checks are undertaken to confirm safe and correct operation of insulated Elevating Work Platform (EWP) near live electrical apparatus according to requirements and established procedures, and where applicable insulation integrity is confirmed.
	1.12	Road signs, barriers and warning devices are obtained and positioned in accordance with given instructions and requirements.
	1.13	Work permit(s)/access authorisation(s) are confirmed and received, where applicable, for commencement of the work according to requirements and established procedures with relevant personnel.
2 Carry out the safe use of insulated Elevating Work Platform (EWP) near live electrical and mechanical apparatus.	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are followed in accordance with given instructions, requirements and/or established procedures.
	2.2	Requirements for working aloft, and use of tools/equipment, techniques and practices are complied with in accordance with given instructions and, according to requirements confirmed to eliminate the prospects of incidents.
	2.3	Operational knowledge for the safe use of insulated Elevating Work Platform (EWP) safely near live Electrical and Mechanical Apparatus to be applied to the work is applied to ensure

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ELEMENT	PERFORMANCE CRITERIA	
		completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements and established procedures.
	2.4	Insulated Elevating Work Platform (EWP) is safely operated near live Electrical and Mechanical Apparatus in accordance with the work schedule, requirements, given instructions and established procedures.
	2.5	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are reported /referred to the immediate authorised personnel for directions according to established procedures.
	2.6	Non-routine events are referred to the immediate authorised personnel for directions according to established procedures.
	2.7	Problems associated with the safe operation of insulated Elevating Work Platform (EWP) near live Electrical and Mechanical Apparatus are attended to, using acquired known solutions and skills related to routine procedures to ensure work established procedures are met.
	2.8	On going checks of quality of the work are undertaken in accordance with given instructions and established procedures.
3 Complete the safe use of insulated Elevating Work Platform (EWP) near live electrical and mechanical apparatus.	3.1	Operation of insulated Elevating Work Platform (EWP) near live Electrical and Mechanical Apparatus is checked against work schedule and anomalies reported to Authorised personnel in accordance with established procedures.
	3.2	Accidents and/or incidents are actioned and reported to authorised personnel in accordance with established procedures.
	3.3	Work site is rehabilitated, cleaned-up, sustainable energy principles and practices applied, and made safe in accordance with given instructions and established procedures or an agreed standard.
	3.4	Appropriate personnel are notified of work completion according to established procedures

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ELEMENT	PERFORMANCE CRITERIA
	3.5 Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures.
	3.6 Post-operational checks, minor maintenance and/or relevant documentation of the insulated Elevating Work Platform (EWP) are conducted according to requirements.
	3.7 Requirements for returning work permit(s) and/or access authorisation permits are confirmed, where applicable.
	3.8 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

7) **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 safely using EWP near live electrical apparatus.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

E2.18.1 Occupational Health and Safety principles

E2.18.2 Electrical safe working practices

T2.1.5 Elevating work platform operational principles

T2.3.1 Powerline safety practices

T2.5.5 Powerline clearances and approach distances

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REQUIRED SKILLS AND KNOWLEDGE

T2.8.1 Enterprises specific - policies and procedure instructions

T2.8.2 Enterprises specific - OHS instructions

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 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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EVIDENCE GUIDE

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 - UET09". 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

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tools/equipment/materials/procedures/workplaces/other variables		
Group No	**The minimum number of items on which skill is to be demonstrated**	**Item List**
A	Confirm operational knowledge associated with the safe operation of a Elevating Work Platform near live electrical apparatus in all of the following:	Principles of electricity, the three phase power system. Power system. Recognition of aerial voltage systems. Identification of Low Voltage Aerial Circuits. Identification of High Voltage Aerial Circuits. "Safe working zone" and "Ordinary person zone" so defined by relevant authorities. Use of technical standards, acts, regulations, codes /guidelines and established/enterprise/asset owner's procedures. System Control - Information required and function. Vicinity Permit - Information required and function. Sensitive Earth Fault (SEF) System Confirm environmental principals and procedures
B	Confirm safe practices associated with the operation of a Elevating Work Platform near live	OHS safety practices and procedures. Electric shock and resuscitation. Release and rescue

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	electrical apparatus in all of the following:	Role of the Safety Observer Events constituting an incident. Procedures in the event of/responding to, incidents. Methods of identifying hazards. Risk assessment procedures for both worksite and pre-job checklist. Selection of the best position for monitoring and controlling work (cutting) Selection of correct line of site to the cutter Correct observation of the work from ground level Constant analysis and decision making relevant to the safety of the work, taking into account prevailing site conditions (lay of the land) and on-going weather conditions. Communication techniques from the EWP
C	Confirm vegetation control associated with the operation of a Elevating Work Platform near live electrical apparatus in all of the following:	Identify tree types Confirm vegetation species and types Confirm vegetation cutting techniques for different vegetation Confirm appropriate vegetation machinery and equipment to be used Use of feeder route plans Conduct calculations related to loading and slinging

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D	Confirm the safe operation of a Elevating Work Platform near live electrical apparatus in all of the following:	Use of mathematical calculations related to weights, boom extension and height Insulation integrity verification and compliance Safe set-up near electrical apparatus Release and rescue procedures Emergency boom lowering procedures Working with Safety Observer Documentation and schedules Currency of licence Pre and post operational checks, inspection and minor maintenance Safe deployment in varying ground conditions and weather Safe operation of insulated elevating work platform near live electrical apparatus. Safe use of tools and equipment from an EWP.
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:

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EVIDENCE GUIDE

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake safely use insulated Elevating Work Platform (EWP) near live electrical and mechanical 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 Transmission, Distribution and Rail Traction Industry. 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 may be assessed concurrently with the following units:

UETTDREL04B	Working safely near live electrical apparatus as non-electrical worker
UETTDREL03B	Comply with environmental and incidence response procedures
UETNEEE001B	Comply with workplace OHS procedures and practices
UETTDRVC05B	Cut vegetation above ground outside live work zone near live electrical apparatus (platform)
UETTDRVC01B	Cut vegetation above ground outside live work zone near live electrical apparatus (climbing)

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UETTDRVC02B	Operate vegetation control plant, machinery and equipment near live electrical apparatus

Range Statement

RANGE STATEMENT

8) 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 the safe use of elevating work Platforms for the control of vegetation near electrical apparatus.

Operation of insulated Elevating Work Platforms (EWP) near live electrical apparatus.

Includes the identification of hazards and the correct procedures to follow to minimise risk to self and to others.

Included is the preparation of risk assessment control measures that encompass job safety assessment.

Work and zones are in compliance with 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

Insulated elevating work platforms may include are not limited to appropriately rated equipment.

The elevating work platform to comply with relevant Australian Standards (AS.1418.10)

Prevailing Licensing Requirements

Risk assessment control measures that encompass job safety assessment.

Excludes any work that is or may be performed by other competent operatives within the defined "ordinary person zone"

Working near energised live electricity supply infrastructure assets

Emergency lowering

Includes periodical and pre-operational checks on the insulated Elevating Work Platform (EWP) and operational and maintenance checks and, associated documentation

Verification of insulation integrity

Safe approach distances zones/Safe Working Clearance

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RANGE STATEMENT

Work permit(s) and/or access authorisation permits

Technical standards and Industry Guidelines

It may also include other areas such as: Feeder route plans, infrastructure constructions and excavations, rural applications, road construction, pavements and inclement weather

Ground configuration - undulations, uneven ground, soft ground, damp, etc

Plant, equipment and tools for use in electrical environments

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
- Assessment
- Authorisation
- Confined space
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications
- Emergency
- Environmental and sustainable energy procedures
- Environmental legislation
- 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
- Work clearance systems

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Unit Sector(s)

Not Applicable

Custom Content Section

2.2) Literacy and numeracy skills

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	2	Writing	2	Numeracy	2

Competency Field

Competency Field **5**)

Vegetation Units

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UETTDRVC09B Control vegetation (linework)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the control of vegetation including tree trimming in accordance with enterprise practices with relevant and complimentary linework competencies. It includes working near live low voltage conductors, as specified in the relevant State/Territory legislation and the completion of inspection reports and the updating of records to enterprise requirements.

Application of the Unit

Application of the Unit **4**)

This competency standards unit shall apply to Transmission, Distribution, Rail Traction, Telecommunications and Vegetation Management Control industry sectors.

Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit may only be practiced under the regulations pertaining to each State and Territory for the safe planning for the removal of vegetation around live powerlines up to the live work zone including near live electrical apparatus, and regulations that directly relate to Occupational Health and Safety and/or contracts of training where they apply.

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Pre-Requisites

Prerequisite Unit(s) **2**)

2.1) **Competencies**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

UETTDRIS14B	Install and maintain overhead conductors and cables (poles and structures)

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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**: Elements describe the essential outcomes of a unit of competency

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to control vegetation	1.1 Works 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 the control of vegetation near live low voltage conductors 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 work permits are obtained to access and 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, Pole Top Rescue 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.

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ELEMENT		PERFORMANCE CRITERIA	
		1.10	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with 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 vegetation control	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 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 for the safe control of vegetation near live low voltage conductors are applied to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
		2.4	Vegetation control is carried out, in accordance with the work schedule and requirements/established procedures.
		2.5	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.
		2.6	Unplanned events in vegetation control are undertaken within the scope of established procedures.
		2.7	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.

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ELEMENT	PERFORMANCE CRITERIA	
	2.8	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete vegetation control	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 work permit(s) are signed off and, the site is returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 controlling vegetation (linework.)

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 (EKAS) required is given in

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REQUIRED SKILLS AND KNOWLEDGE

Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.5.1 Ecological principles for vegetation control

T2.5.2 Vegetation control 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 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 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 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 - UET09". 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

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tools/equipment/materials/procedures/workplaces/other variables		
Group No	**The minimum number of items on which skill is to be demonstrated**	**Item List**
A	At least one of the following:	Non conductive ladder EWP Ground level
B	At least two of the following:	Hand clearing Specialised tools and equipment Machinery assisted clearing Herbicidal clearing
C	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 control of vegetation.

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

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EVIDENCE GUIDE

	given in Volume 1, Part 3 "Assessment Guidelines". Note: Competent performance with inherent safe working practices is expected in the Transmission, Distribution and Rail Traction Industry. 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

8) 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 the control of vegetation including tree trimming with relevant and complimentary linework competencies and includes working near live low voltage conductors, as specified in the relevant State/Territory legislation.

Vegetation control measures may include hand clearing, growth retardants, machinery-assisted clearing and herbicidal clearing.

Work may be conducted from a ladder, an elevating work platform, a tree or on the ground under minimal supervision.

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
- Assessment

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RANGE STATEMENT

- Authorisation
- 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

Custom Content Section

2.2) Literacy and numeracy skills

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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Competency Field

Competency Field **5**)

Vegetation Units

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UETTDRVC10B Coordinate vegetation control work

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This Competency Standard Unit covers the coordination and implementation of continuous vegetation control and takes into account, arboreal regeneration, environmental issues and liaison and consultation procedures with, appropriate government agencies, property owners and environmental groups. It also encompasses conducting and/or contributing to public education processes and legislation issues.

1.2) License to practice

Application of the Unit

Application of the Unit **4**)

This competency standards unit shall apply to Transmission, Distribution, Rail Traction, Telecommunications and Vegetation Management Control industry sectors.

Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit may only be practiced under the regulations pertaining to each State and Territory for the safe planning for the removal of vegetation around live powerlines up to the live work zone including near live electrical apparatus, and regulations that directly relate to Occupational Health and

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1.2) License to practice

Safety and/or contracts of training where they apply.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:.

	UETTDRIS22B	Implement and monitor the organisation's OHS policies, procedures and programs
and	UETTDRIS23B	Implement and monitor environmental and sustainable energy management policies and procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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: Elements

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describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare/plan to coordinate vegetation control work	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 Risk control measures are identified, prioritised and evaluated against the work schedule.
	1.4 Relevant requirements and established procedures for the work are to all personnel and identified for all work sites.
	1.5 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.6 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7 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.
	1.8 Clients/Customers are provided with possible solutions and/or options within the scope,

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ELEMENT	PERFORMANCE CRITERIA	
		acceptable cost and requirements.
	1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
	1.11	Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.12	Positioning of road signs, barriers and warning devices is planned in accordance with requirements.
2 Carry out the coordination of vegetation control work	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
	2.2	First Aid, Pole Top Rescue and other related work procedures are performed according to requirements and/or established procedures.
	2.3	Lifting, climbing, working aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
	2.4	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.
	2.5	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
	2.6	Coordination of vegetation control work is carried out, in accordance with the work schedule and

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ELEMENT	PERFORMANCE CRITERIA	
		requirements and/or established procedures.
	2.7	Essential knowledge and associated skills are applied in the safe coordination of vegetation control work to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.8	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
	2.9	On going 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 coordination of vegetation control work	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	Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3	Work site is rehabilitated, cleaned up and confirmed 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 work permit(s) are signed off and are returned to service and advised to client/customer in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) **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 coordinating vegetation control 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

T2.2.53	HV principles
T2.5.1	Ecological principles for vegetation control
T2.5.2	Vegetation control techniques
T2.5.3	Fundamentals for working safely near live electrical apparatus
T2.5.4	Coordinate vegetation control inspection programs

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)

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EVIDENCE GUIDE

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 the "Assessment Guidelines - UET09". 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

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- 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	At least three of the following;	Hand clearing Machinery assisted clearing Growth retardants Fire clearing, Herbicidal clearing
B	At least two of the following:	Ladder EWP Tree Ground
C	All of the following;	Personnel aspects Material aspects Financial aspects
D	At least one	Dealing with an unplanned

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	occasion	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 coordination of vegetation control.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, 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 Transmission, Distribution and Rail Traction Industry. 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.

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Range Statement

RANGE STATEMENT

8) 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 the coordination of vegetation control work and may include the following:

Coordinating vegetation control measures which may include hand clearing, growth retardants, machinery-assisted clearing and herbicidal clearing.

Coordinating work, which may be conducted from a ladder, an elevating work platform, a tree or on the ground under minimal supervision.

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
- Assessment
- Authorisation
- 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

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RANGE STATEMENT

- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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	4	Writing	4	Numeracy	4

Competency Field

Competency Field **5**)

Vegetation Units

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CPCCCM2007A Use explosive power tools

Modification History

Not Applicable

Unit Descriptor

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

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

Prerequisite units

CPCCOHS2001A	Apply OHS requirements, policies and procedures in the construction industry

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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 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

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ELEMENT	PERFORMANCE CRITERIA
	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, 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.

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ELEMENT	PERFORMANCE CRITERIA
	5.4. Diminished stocks of charges and fasteners are 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

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:

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REQUIRED SKILLS AND KNOWLEDGE

- 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.

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

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

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	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 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

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- 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 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

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	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.

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 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.

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RANGE STATEMENT

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
	  • lighting
	  • 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 include:	• direct action EPT • indirect action EPT • clamps and levels.
Materials include:	• timber • metals • patented fasteners.
Environmental requirements	• clean-up management

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RANGE STATEMENT

include:	• 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 fasteners is to be in accordance with:	• regulated minimum distances • bases, including concrete, masonry or steel.
Use ofEPT 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)

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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CPCCOHS1001A Work safely in the construction industry

Modification History

Not Applicable

Unit Descriptor

Unit descriptor

This unit of competency specifies the outcomes required to undertake Occupational Health and Safety (OHS) induction training within the construction industry.

It requires the ability to demonstrate personal awareness of OHS legislative requirements, and the basic principles of risk management and prevention of injury and illness in the construction industry.

Licensing requirements will apply to this unit of competency depending on the regulatory requirements of each jurisdiction.

Application of the Unit

Application of the unit

This unit of competency supports the attainment of the basic OHS knowledge required prior to undertaking designated work tasks within any of the sectors within the construction industry. The unit relates directly to the general induction training program specified by the *National Code of Practice for Induction for Construction Work* (ASCC 2007).

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. Identify OHS legislative requirements.	1.1. Applicable ***OHS legislative requirements*** relevant to own work, role and responsibilities are identified and explained. 1.2. Duty of care requirements are identified. 1.3. Own responsibilities to comply with ***safe work practices*** are identified and explained.
2. Identify construction hazards and control measures.	2.1. Basic principles of risk management are identified. 2.2. ***Common construction hazards*** are identified and discussed. 2.3. ***Measures for controlling*** hazards and risks are identified.
3. Identify OHS communication and reporting processes.	3.1. OHS communication processes, information and documentation are identified and discussed. 3.2. Role of ***designated OHS personnel*** is identified and explained.

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ELEMENT	PERFORMANCE CRITERIA
	3.3. ***Safety signs and symbols*** are identified and explained. 3.4. Procedures and ***relevant authorities*** for reporting hazards, ***incidents*** and injuries are identified.
4. Identify OHS incident response procedures.	4.1. ***General procedures*** for responding to incidents and ***emergencies*** are identified and explained. 4.2. Procedures for accessing first aid are identified. 4.3. Requirements for the selection and use of relevant ***personal protective equipment*** are identified and demonstrated. 4.4. ***Fire safety equipment*** is identified and discussed.

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 skills to:
  - clarify OHS legislative requirements
  - verbally report construction hazards and risks
  - ask effective questions
  - relay information to others
  - discuss OHS issues and information
- comprehension skills to:
  - explain the basic OHS legislative requirements which will be applicable to own work
  - explain the meaning of safety signs and symbols
  - identify common construction hazards
  - discuss the basic principles of risk management.

Required knowledge

Required knowledge for this unit is:

- applicable Commonwealth, State or Territory OHS legislation, regulations, standards, codes of practice and industry standards/guidance notes relevant to own

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REQUIRED SKILLS AND KNOWLEDGE

work, role and responsibilities

- basic principles of risk management and assessment for construction work
- common construction hazards
- common construction safety signage and its meanings
- general construction emergency response and evacuation procedures
- general construction work activities that require licenses, tickets or certificates of competency
- general first aid response requirements
- general procedures for raising OHS issues
- general procedures for reporting OHS hazards, accidents, incidents, emergencies, injuries, near misses and dangerous occurrences
- general procedures for responding to hazards, incidents and injuries
- general workers' compensation and injury management requirements
- OHS hierarchy of controls
- OHS responsibilities and rights of duty holders, including:
  - persons in control of construction work/projects
  - employers and self-employed persons
  - supervisors
  - employees
  - designers
  - inspectors
  - manufacturers and suppliers
- own responsibilities to comply with safe work practices relating to:
  - housekeeping
  - identification of hazards
  - preventing bullying or harassment
  - smoking
  - use of amenities
  - use of drugs and alcohol
- role of OHS committees and representatives
- types of common personal protective equipment and fire safety equipment
- types of OHS information and documentation.

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

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence must confirm personal awareness of the following:

- applicable OHS legislative and safety requirements for construction work including duty of care
- the range of common construction hazards and procedures for the assessment of risk and application of the hierarchy of control
- OHS communication processes, information and documentation including the role of OHS committees and representatives, the meaning of common safety signs and symbols, and procedures for reporting hazards, incidents and injuries
- general procedures for responding to incidents and emergencies including evacuation, first aid, fire safety equipment and PPE.

Context of and specific resources for assessment

- Resources must be available to support the program including participant materials and other information or equipment related to the skills and knowledge covered by the program.
- It is recommended that the assessment tool designed specifically to support this unit of competency will provide consistency in assessment outcomes.
- Where applicable, physical resources should include equipment modified for people with disabilities
- Access must be provided to appropriate assessment support when required.
- Assessment processes and techniques must be culturally appropriate, and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed
- In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in such a

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	manner as is appropriate to the oracy, language and literacy 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.
Method of assessment	Assessment methods may include more than one of the following: • practical assessment • oral questioning • written test • work-based activities • simulated project based 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 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.

OHS legislative requirements relate to:	• Australian standards • construction industry OHS standards and guidelines • duty of care • health and safety representatives, committees and supervisors • licences, tickets or certificates of competency • National Code of Practice for Induction Training for Construction Work • national safety standards • OHS and welfare Acts and regulations • safety codes of practice.
Duty of care requirements relate to:	• legal responsibility under duty of care to do everything reasonably practicable to protect others from harm

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RANGE STATEMENT

	• own responsibilities to comply with safe work practices, including activities that require licences, tickets or certificates of competency • relevant state OHS requirements, including employers and self-employed persons, persons in control of the work site, construction supervisors, designers, manufacturers and suppliers, construction workers, subcontractors and inspectors.
Safe work practices include:	• access to site amenities, such as drinking water and toilets • general requirements for safe use of plant and equipment • general requirements for use of personal protective equipment and clothing • housekeeping to ensure a clean, tidy and safer work area • no drugs and alcohol at work • preventing bullying and harassment • smoking in designated areas • storage and removal of debris.
Risk relates to:	• likelihood of a hazard causing injury or harm.
Principles of risk management include:	• assessing the risks involved • consulting and reporting ensuring the involvement of relevant workers • controlling the hazard • identifying hazards • reviewing to identify change or improvement.
Hazard relates to:	• any thing (including an intrinsic property of a thing) or situation with the potential to cause injury or harm.
Common construction hazards include:	• confined spaces • electrical safety • excavations, including trenches • falling objects • hazardous substances and dangerous goods • HIV and other infectious diseases • hot and cold working environments • manual handling • noise • plant and equipment

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RANGE STATEMENT

	• traffic and mobile plant • unplanned collapse • ultraviolet (UV) radiation • working at heights.
Measures for controlling risk to eliminate or minimise hazards in accordance with the hierarchy of control include:	• elimination • substitution • isolation • engineering control • administrative control • personal protective equipment.
OHS communication processes include:	• discussions with OHS representatives • OHS meetings • OHS notices, newsletters, bulletins and correspondence • OHS participative arrangements • processes for raising OHS issues • toolbox talks • workplace consultation relating to OHS issues and changes.
OHS information and documentation includes:	• accident and incident reports • Acts and regulations • Australian standards • codes of practice • construction documentation and plans • emergency information contact • evacuation plans • guidance notes • job safety analyses • labels • material safety data sheets (MSDS) • proformas for reporting hazards, incidents and injuries • reports of near misses and dangerous occurrences • risk assessments • safe work method statements • safety meeting minutes • site safety inspection reports.
Designated OHS personnel includes:	• first aid officers • OHS committee members

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RANGE STATEMENT

	• OHS representatives • supervisors.
Safety signs and symbols include:	• emergency information signs (e.g. exits, equipment and first aid) • fire signs (e.g. location of fire alarms and firefighting equipment) • hazard signs (e.g. danger and warning) • regulatory signs (e.g. prohibition, mandatory and limitation or restriction) • safety tags and lockout (e.g. danger tags, out of service tags).
Relevant authorities include:	• emergency services (e.g. police, ambulance, fire brigade and emergency rescue) • OHS regulatory authority • supervisor.
Incidents include:	• accidents resulting in personal injury or damage to property • near misses or dangerous occurrences which do not cause injury but may pose an immediate and significant risk to persons or property, and need to be reported so that action can be taken to prevent recurrence, for example: • breathing apparatus malfunctioning to the extent that the user's health is in danger • collapse of the floor, wall or ceiling of a building being used as a workplace • collapse or failure of an excavation more than 1.5 metres deep (including any shoring) • collapse or partial collapse of a building or structure • collapse, overturning or failure of the load bearing of any scaffolding, lift, crane, hoist or mine-winding equipment • damage to or malfunction of any other major plant • electric shock. • electrical short circuit, malfunction or explosion • uncontrolled explosion, fire or escape of gas, hazardous substance or steam • any other unintended or uncontrolled incident or event arising from operations carried on at a

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RANGE STATEMENT

	workplace.
General procedures for responding to incidents and emergencies include:	• basic emergency response (keep calm, raise alarm, obtain help) • evacuation • notification of designated OHS personnel and authorities • notification of emergency services (e.g. when and how) • referring to site emergency plans and documentation.
Emergencies include:	• chemical spill • fire • injury to personnel • structural collapse • toxic and/or flammable vapours emission • vehicle/mobile plant accident.
Personal protective equipment includes:	• aprons • arm guards • eye protection • gloves • hard hat • hearing protection • high visibility retro reflective vests • protective, well fitting clothing • respiratory protection • safety footwear • UV protective clothing and sunscreen.
Fire safety equipment includes:	• breathing apparatus • fire blankets • firefighting equipment.

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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HLTCPR201A Perform CPR

Modification History

Unit Descriptor

This unit of competency describes the skills and knowledge required to perform Cardiopulmonary Resuscitation (CPR) in line with the Australian Resuscitation Council (ARC) Guidelines

Application of the Unit

The skills and knowledge described here relate specifically to performing Cardiopulmonary Resuscitation (CPR) and do **NOT** address other aspects of resuscitation, life support or first aid

Licensing/Regulatory Information

Pre-Requisites

Employability Skills Information

The required outcomes described in this unit of competency contain applicable facets of 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

Elements define the essential outcomes of a unit of competency.

The Performance Criteria specify the level of performance required to demonstrate achievement of the Element. Terms in italics are elaborated in the Range Statement.

Elements and Performance Criteria

Elements and Performance Criteria

Element	Performance Criteria
1 Respond to signs of an unconscious casualty	1.1 Identify **hazards** to health and safety of self and others

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		1.2 Minimise immediate risk to health and safety of self, casualty and others by isolating any hazard(s)
		1.3 Approach the casualty in a calm, culturally aware, sensitive and respectful manner
		1.4 Assess vital signs of casualty
		1.5 Recognise the need for CPR
2	Perform CPR	2.1 Perform CPR in line with ARC Guidelines
		2.2 Seek assistance from others and/or ambulance support as appropriate
3	Communicate details of the incident	3.1 Request ambulance support or appropriate medical assistance and/or ambulance support using available means of communication
		3.2 Accurately convey details of casualty's condition and CPR procedures performed to emergency services/relieving personnel
		3.3 Calmly provide information to reassure casualty, adopting a communication style to match the casualty's level of consciousness
		3.4 Provide reports, where applicable, in a timely manner, presenting all relevant facts relating to performing CPR according to established procedures

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Essential knowledge:

Basic anatomy and physiology relating to performing CPR

Procedures for performing CPR

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State and territory regulatory requirements, ARC Guidelines and accepted industry practice relating to currency of skill and knowledge

How to access ambulance/medical assistance and/or emergency response support

Understanding of the use of an Automated External Defibrillator (AED), including when to use and when not to

Privacy and confidentiality requirements

Chain of survival

Need to be culturally aware, sensitive and respectful

Duty of care requirements

Relevant workplace hazards

Infection control principles and procedures, including use of standard precautions

Own skills and limitations

Awareness of stress management techniques and available support

Essential skills:

Ability to:

Assess vital signs of casualty

Demonstrate correct procedures for performing CPR using a manikin, including standard precautions

Call an ambulance

Call for medical assistance

Identify and minimise hazards to health and safety of self and others in the immediate workplace or community environment

Report details of incident and CPR as provided

Use infection control procedures, including standard precautions

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 this Training Package.

Critical aspects of assessment:	Assessment must include demonstrated evidence of specified Essential Knowledge

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	and Essential Skills identified in this competency unit Competence must be demonstrated working individually Currency of CPR knowledge and skills is to be demonstrated in line with State/Territory, ARC and industry guidelines
Context and resources required for assessment:	For assessment purposes, demonstration of skills in CPR procedures requires using a model of the human body (resuscitation manikin) in line with Australian Resuscitation Council Guidelines
Access and equity considerations:	All workers in the health industry should be aware of access and equity issues in relation to their own area of work All workers should develop their ability to work in a culturally diverse environment In recognition of particular health issues facing Aboriginal and Torres Strait Islander communities, workers should be aware of cultural, historical and current issues impacting on health of Aboriginal and Torres Strait Islander people Assessors and trainers must take into account relevant access and equity issues, in particular relating to factors impacting on health of Aboriginal and/or Torres Strait Islander clients and communities

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. Add any 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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regional contexts.

Condition of the casualty may include:	Signs of collapse Absence of signs of life: Unconscious Unresponsive Not moving Not breathing normally
Demonstrated CPR **procedure must**:	Include adult / child and infant casualties Conform to ARC guidelines, including: Recognition that 'any resuscitation is better than none' Demonstrate: . Appropriate rate, location and depth of compression . Correct ratio of compression to ventilation . Checking for signs of life . Appropriate duration and cessation of CPR Demonstrated CPR procedure may also include use of an AED if available
Access to equipment / resources includes:	Resuscitation mask Barrier device Manikin AED (if available)
A hazard is:	A source or situation with the potential for harm in terms of human injury or ill-health, damage to property, the environment, or a combination of these

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Unit Sector(s)

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ICTCBL2065A Splice and terminate optical fibre cable for carriers and service providers

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to splice and terminate optical fibre cable within an optical telecommunications transmission environment. This work is essential in provisioning of National Broadband Network (NBN) infrastructure for high speed and high bandwidth transmissions. Assessment by a TITAB registered assessor is recommended. All customer cabling work in the telecommunications, fire, security and data industries must be performed by a registered cabler. All cablers are required to register with an Australian Communications and Media Authority (ACMA)-accredited registrar.

Application of the Unit

Application of the unit	Technical staff who splice and terminate optical fibre cable for telecommunications projects apply the skills and knowledge in this unit. They may carry out new installations, upgrade an optical backbone or access network provisioning for greater bandwidth and capacity required by emerging technology convergence for Next Generation Networks (NGN).

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	This unit may be applied to commercial or industrial fibre to the premises (FTTP) installations.

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. Prepare for splicing	1.1. Select safety equipment to protect self and public according to enterprise guidelines and occupational

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ELEMENT	PERFORMANCE CRITERIA
	health and safety (***OHS***) ***practices*** 1.2. Confirm layout of job using installation according to ***physical conditions*** at site and ***relevant legislation***, ***codes***, ***regulations and standards*** 1.3. Inform appropriate personnel of identified ***hazards*** on worksite 1.4. Locate other services from ***relevant authorities*** according to enterprise guidelines and safe practices 1.5. Test for ***dangerous gases*** and place ***guards*** around open manholes following ***OHS and environmental requirements*** 1.6. Obtain approval for alterations to the design according to enterprise guidelines
2. Check existing optical fibre cable	2.1. Verify that cable was installed according to the installation plan and visually inspect ***cable*** for signs of sheath damage 2.2. Maintain minimum bend ratios according to manufacturer's specifications to prevent cable damage and signal degradation 2.3. Secure cable according to safe industry practice to avoid cable and sheath damage
3. Splice optical fibre cable	3.1. Verify fibre is not live using ***appropriate equipment*** to maintain safe working practice and ensure correct fibre has been identified 3.2. Prepare cable end to expose ***optical fibres*** according to splicing method and manufacturer's specifications 3.3. Prepare and ***splice fibres*** using safe industry practice according to enterprise specifications 3.4. Test the splice joint to manufacturer's and design requirements
4. Terminate optical fibre cable	4.1. Select connector unit to suit terminating frame according to design specifications 4.2. Terminate the cable using the ***type of termination*** specified in the plan and according to manufacturer's specifications 4.3. Test the termination for transmission loss and strength and re-terminate if the transmission loss exceeds the manufacturer's specifications 4.4. Install protection devices on connectors and fibres to protect from exposure and contaminants 4.5. Label and lay up cables in enclosure according to

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ELEMENT	PERFORMANCE CRITERIA
	manufacturer's instructions and enterprise guidelines
5. Finish job and report	5.1. Remove waste and reinstate site according to enterprise guidelines 5.2. Prepare reports including test results and alterations to plans according to enterprise policy 5.3. Notify client of work completion and obtain sign off

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to:
  - liaise with internal and external personnel on technical and operational matters
  - relate to work associates, supervisors, team members and clients
- literacy skills to interpret technical documentation such as equipment manuals, specifications and requirements for optical fibre cable installation
- numeracy skills to take and analyse measurements
- planning and organisational skills to organise and maintain equipment
- problem solving skills to solve equipment and logistics problems
- safety awareness skills to:
  - apply precautions and required action to minimise, control or eliminate hazards that may exist during work activities
  - apply work site OHS
  - select and use required personal protective equipment conforming to industry and OHS standards
  - work safely with optical fibre and lasers
  - work systematically with required attention to detail without injury to self or others, or damage to goods or equipment
- technical skills to:
  - install customer access network (CAN) cable
  - operate test equipment to perform measurements on optical fibre
  - perform fault clearance
  - use diagnostic equipment
  - use optical fibre jointing techniques

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REQUIRED SKILLS AND KNOWLEDGE
• use specialised tools and test equipment • use hand and power tools
Required knowledge

• causes of signal strength loss in optical fibre
• colour coding of fibres
• detailed knowledge of AS/NZS 2211:2006 Safety of laser products (parts 1 and 2)
• features and operating requirements of test equipment for optical fibre cable
• industry and organisational policy and procedures when splicing optical fibre cable
• information required to operate equipment according to a test specification
• manufacturer's requirements for safe operation of optical fibre equipment
• safety precautions when working with laser based systems
• specific OHS requirements relating to the activity and site conditions
• techniques for types of termination including:
  • direct termination
  • fusion splicing
  • mechanical splicing
• test methods and performance requirements
• types of optical cable and termination
• workplace and industry 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	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the ability to: • splice, terminate and test optical fibre cable applying safety precautions when working with laser -based systems • splice at least 12 fibres and house these in splicing cassettes and trays within industry recognised enclosures according to manufacturer's instructions • install a connector type for fusion, mechanical

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EVIDENCE GUIDE	
	splicing and direct terminations • complete relevant documentation to manufacturer's and design requirements • provide report documenting the installation and test results to client • comply with all related OHS requirements and work practices.
Context of and specific resources for assessment	Assessment must ensure: • sites where splicing and termination of optical fibre cable may be conducted • use of optical fibre testing equipment currently used in industry • relevant regulatory and equipment documentation that impact on optical fibre cable installation activities.
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: • review of a hands-on project completed by the candidate • review of an oral and written report, including installation and test results • direct observation of the candidate carrying out splicing of optical fibre within an optical communication system.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • ICTCBL3010A Install and terminate optical fibre cable on customer premises. Aboriginal people and other people from a non-English speaking background may have second language issues. Access must be provided to appropriate learning and assessment support when required. Assessment processes and techniques must be culturally appropriate, and appropriate to the oral communication

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EVIDENCE GUIDE	
	skill level, and language and literacy capacity of the candidate and the work being performed. In all cases where practical assessment is used it will be combined with targeted questioning to assess required knowledge. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. Where applicable, physical resources should include equipment modified for people with special needs.

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.	
OHS practices may relate to:	• determining that optical fibre cable is not live according to guidelines and standards • handling optical fibre cable in a safe manner to avoid risk of injury • labelling of fibre cable and laser devices • locating and identifying adjoining services according to enterprise guidelines and OHS practices • observing AS/NZS 2211:2006 Safety of laser products (parts 1 and 2) • testing for presence of dangerous gases according to enterprise guidelines.
Physical conditions may relate to:	• above ground • in cabinet • in joint enclosure.
Relevant legislation, ***codes***,	• Australian Communications Industry Forum

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RANGE STATEMENT	
regulations and standards may include:	(ACIF) standards and codes • AS Communications Cabling Manual (CCM) Volume 1 • AS/NZS 2211:2006 Safety of laser products (parts 1 and 2) • AS/NZS 3000:2007 • AS/NZS 3080:2003 • AS/NZS 3084:2003 • AS/NZS 3085.1:2004 • AS/NZS ISO/IEC 14763.3:2007 • AS/NZS ISO/IEC 15018:2005 • AS/NZS ISO/IEC 24702:2007 • cabling security codes and regulations • OHS • regulated or industry codes of practice including ACMA technical standards • technical standards AS/ACIF S008:2006 and AS/ACIF S009:2006.

Hazards may include:	• earth potential rise (EPR)
	• optical cable:
	  • bare fibres
	  • hazardous laser light
	• remote power feeding.

Relevant authorities may include:	• cable location services (Dial Before you Dig)
	• environment protection
	• local government
	• private owners
	• utility providers such as:
	  • electricity
	  • fire services
	  • gas
	  • other telecommunications providers
	  • water.

Dangerous gases may include:	• asphyxiating gas • carbon dioxide • carbon monoxide • combustible • natural gas • noxious gas.

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RANGE STATEMENT	
Guards may include:	• barricades • plates • temporary fencing.

OHS and environmental requirements may relate to:	• identifying other services, including power and gas
	• need to decommission and isolate worksite and lines prior to commencement
	• personal protective clothing:
	  • earmuffs
	  • gloves:
	  • leather
	  • plastic
	  • rubber
	  • head protection
	  • kneepads
	  • masks
	  • protective suits
	  • safety boots
	  • safety glasses
	• safe working practices, such as the safe use and handling of:
	  • asbestos
	  • chemicals
	  • materials
	  • tools and equipment
	  • work platforms
	• safety equipment:
	  • flashing lights
	  • gas and other hazard detection equipment
	  • safety barriers
	  • trench guards
	  • warning signs and tapes
	  • witches hats
	• suitable light and ventilation
	• special access requirements
	• environmental considerations:
	  • clean-up protection
	  • stormwater protection

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RANGE STATEMENT	
	• waste management.
Cable may include:	• air blown • armoured • external • internal • loose tube • tight buffered.
Appropriate equipment may include:	• hand-held optical power meter • OFI-fibre to the x (FTTx) active optical network terminal (ONT) detector • passive optical network (PON) meter • optical time domain reflectometer (OTDR).
Optical fibres may include:	• multi-mode • polymer • single mode.
Splice fibres may relate to:	• fusion splice • mechanical splice • preparing connection ends to a smooth flat surface to ensure no optical path redirection from joint • removing all coatings from exposed optical fibre and removing all possible contaminants.
Type of termination may include:	• direct termination • fusion splicing • mechanical splicing.

Unit Sector(s)

Unit sector	Telecommunications

Co-requisite units

Co-requisite units		

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Co-requisite units		

Competency field

Competency field	Cabling

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ICTCBL2068A Install a telecommunications service to a building

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to install a telecommunications service to a building. It involves bringing a telecommunications service from the broader network to a customer's premises using metallic or optical cable or wireless connection. Licensing, legislative, regulatory and certification requirements apply to working at heights. If an elevated work platform (EWP) is required, verify state or territory law requirements for a licence to operate an EWP. Users should confirm requirements with the relevant federal, state or territory authority. If working at heights, achievement of the unit 'CPCPCM2015A Work safely on roofs' from the CPC08 Construction and Plumbing Services Integrated framework training Package fulfils this requirement.

Application of the Unit

Application of the unit	Technical staff whose work involves installing telecommunications service to a building to provide a new service or an upgrade apply the skills and knowledge in this unit. Cable installers provide new services in emerging technologies, such as internet protocol TV (IPTV) and fast broadband for converging technology applications. A wireless access point or a world interoperability for microwave access (WiMAX) customer premises

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	equipment (CPE) unit could also be an installation to the building to provide the new services.

Licensing/Regulatory Information

Refer to Unit Descriptor

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. Prepare service installation	1.1. Arrange access to the site with the ***customer*** and obtain job specifications

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ELEMENT	PERFORMANCE CRITERIA
	1.2. Notify supervisor of identified ***safety hazards*** at the worksite according to occupational health and safety (***OHS***) ***and environmental requirements*** 1.3. Use ***installation specifications*** to determine type of services, network cables and equipment required for the installation 1.4. Select cables and equipment that comply with functionality and compatibility of existing installation 1.5. Select and obtain ***tools and equipment*** to carry out installation activity
2. Install cable and equipment to building	2.1. Locate, connect, and check cables at entry into network for transmission quality and continuity where service to building exists 2.2. Install cable and equipment and seal cable entry to the building in a safe manner according to installation plans and Australian Communications and Media Authority (ACMA) standards 2.3. Test overall functionality of the new service to meet installation specifications 2.4. Rectify faults if required and minimise interruption to existing service in agreement with customer 2.5. Install ***lightning protection***, where required, according to enterprise guidelines and industry practice
3. Complete records and clean up site	3.1. Label cable pairs clearly to provide an accurate identification according to manufacturer's, industry and client standards 3.2. Update records and plans with ***installation details*** to provide an accurate record according to industry codes of practice and AS/ACIF S009:2006 3.3. Remove installation waste and debris from worksite and dispose of according to environmental requirements to maintain safe worksite conditions 3.4. Complete telecommunications cabling advice (TCA) forms and notify customer to obtain sign off

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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

- communication skills to liaise with internal and external personnel on technical and operational matters
- literacy skills to interpret technical documentation such as equipment manuals and specifications
- numeracy skills to take and analyse measurements
- planning and organisational skills to organise and maintain equipment
- problem solving skills to solve equipment and logistics problems
- safety awareness skills to:
  - apply precautions and required action to minimise, control or eliminate hazards that may exist during work activities
  - select and use required personal protective equipment conforming to industry and OHS standards
  - work systematically with required attention to detail without injury to self or others, or damage to goods or equipment
- technical skills to:
  - perform fault clearance
  - read and interpret:
    - building plans
    - construction plans
    - site layout drawings
    - site plans
    - street plans
  - use diagnostic equipment
  - use hand and power tools

Required knowledge

- information required to operate equipment according to a test specification
- features and operating requirements of test equipment
- legislation, codes of practice and other formal agreements that impact on the work activity
- manufacturer's requirements for safe operation of equipment
- OHS requirements and work practices associated with cable provision including:
  - adequate warning signs
  - protective clothing and personal safety items
  - safety devices

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REQUIRED SKILLS AND KNOWLEDGE
• test methods and performance requirements • typical issues and challenges that occur on site

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 ability to: • prepare and install cable and equipment to a building complying with ACMA, enterprise and government regulations • conduct tests related to transmission quality and continuity of cables at network entry point • label and document installation work complying with industry codes of practice • comply with all related OHS requirements and work practices.
Context of, and specific resources for assessment	Assessment must ensure: • sites where telecommunications services may be installed • use of installation and testing equipment currently used in industry • relevant regulatory and equipment documentation that impact on installation activities.
Methods of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • review of an installation completed by the candidate • review of an oral and written report with completed documentation, including updated installation records and forms • direct observation of the candidate installing telecommunications equipment to a building

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EVIDENCE GUIDE	
	• oral or written questioning to assess required knowledge .
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • ICTCBL2134A Fix aerial cable. Aboriginal people and other people from a non-English speaking background may have second language issues. Access must be provided to appropriate learning and assessment support when required. Assessment processes and techniques must be culturally appropriate, and appropriate to the oral communication skill level, and language and literacy capacity of the candidate and the work being performed. In all cases where practical assessment is used it will be combined with targeted questioning to assess required knowledge. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. Where applicable, physical resources should include equipment modified for people with special needs.

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.	
Customer may include:	• nominated representative • project manager • site manager.

Safety hazards may refer to:	• access points that may contain:
	  • hazardous light or non-visible laser
	  • radio frequency (RF) emission
	• electrical supply and areas of earth potential rise (EPR) that require mandatory separation from communications cable
	• hazardous conduit as in conduit colours according to AS 1345:1995 associated with a hazardous service.

OHS and environmental requirements may relate to:	• identifying other services, including power and gas
	• need for decommissioning and isolating worksite and lines prior to commencement
	• personal protective clothing:
	  • earmuffs
	  • gloves:
	  • leather
	  • plastic
	  • rubber
	  • head protection
	  • kneepads
	  • masks
	  • protective suits
	  • safety boots
	  • safety glasses
	  • safety harness
	  • safety line
	• safe working practices, such as the safe use and handling of:
	  • asbestos
	  • chemicals
	  • materials
	  • tools and equipment
	  • work platforms
	• safety equipment:

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RANGE STATEMENT	
	• flashing lights • gas and other hazard detection equipment • safety barriers • trench guards • warning signs and tapes • witches hats • special access requirements • suitable light and ventilation • environmental considerations: • clean-up protection • stormwater protection • waste management.
Installation specifications may include:	• installation plan • project details: • contact personnel • costs • resource requirements • timelines • type of service • type of service: • aerial or underground structure • cable: • coaxial • multi-pair • optical fibre • structured (Category 5, 6, 6A, 7 or 7A) • wireless: • femtocell • wireless fidelity (WiFi) • WiMAX.
Tools and equipment may include:	• equipment: • cable testers • network tester • passive optical meter • RF meter • tools: • crimpers • jointers

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RANGE STATEMENT	

	• labellers
	• power tools:
	  • cutters
	  • drills
	• splicers
	• terminating tool
	• EWPs and ladders.

Lightning protection may include:	• arrester • bonding building and cable to power earthing system • building's own protection • earth stake • isolator.
Installation details may include:	• cable infrastructure pair locations • cable location and type • equipment details • interconnections • modified plan • pair numbering and labelling • test results.

Unit Sector(s)

Unit sector	Telecommunications

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Cabling

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RIIOHS202A Enter and work in confined spaces

Modification History

Not applicable.

Unit Descriptor

This unit covers the entering and working in confined spaces in resources and infrastructure industries. It includes planning and preparing for entry of confined spaces, entry and working in confined spaces, exiting confined spaces and cleaning up.

Application of the Unit

This unit is appropriate for those working in confined spaces (enclosed or partially enclosed) for the purpose of carrying out work or inspections and also is appropriate for those performing sentry or stand-by person roles, at worksites within:

- Civil construction
- Coal mining
- Drilling
- Extractive industries
- Metalliferous mining
- General 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

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	statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan and prepare for entering and working in confined spaces	1.1. Access, interpret and apply ***compliance documentation*** relevant to entering and working in confined spaces 1.2. Obtain, confirm and apply ***work instructions*** relevant to the allotted task 1.3. Obtain, confirm and apply ***safety requirements*** relevant to the allotted task 1.4. Obtained authorisation (***entry permit***) to enter the ***confined space*** is in accordance with regulatory requirements 1.5. Confirm the emergency response procedure is with the stand-by person 1.6. Identify, obtain and implement ***signage*** and barrier requirements as required by the project plan 1.7. Select tools and equipment to carry out tasks that are consistent with the requirements of the job and check them for serviceability and rectify or report any faults 1.8. Identify, confirm and apply to the allotted task the ***environmental protection requirements*** from the project environmental management plan 1.9. Position rescue equipment as required by the entry permit close to the point of entry
2. Enter and work in the confined space	2.1. ***Gain access*** to the confined space 2.2. Ensure that the atmosphere is tested and monitored for harmful elements in accordance with procedures 2.3. Apply tagging and lock-out procedures as required 2.4. Enter the confined space according to agreed procedure 2.5. Maintain ***communication*** with the stand-by

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	person 2.6. Comply with entry permit requirements while carrying out designated work in confined space 2.7. Monitor and adhere to allocated entry time
3. Exit confined space	3.1. Exit confined space according to agreed procedure 3.2. Recover tools, equipment and materials from the confined space 3.3. Conduct inspection of the confined space 3.4. ***Secure access*** according to site procedures 3.5. Remove tagging and lock-out according to site procedures 3.6. Complete confined space entry permit
4. Clean up	4.1. Clear work area and dispose of or recycle materials in accordance with project environmental management plan 4.2. Clean, check, maintain and store ***tools and equipment*** in accordance recommendations and standard work practices 4.3. Remove, clean and store barriers and signs

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 enter and work in confined spaces: • apply legislative, organisation and site requirements and procedures • apply operational, maintenance and basic diagnostic procedures • apply materials handling methods • use atmospheric monitoring devices • interpret JSAs/Safe work method statements
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.

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This includes knowledge of the following as required to enter and work in confined spaces:

- site and equipment safety requirements
- confined space entry and exit procedures, risks and regulations
- air contaminants and toxic gases
- breathing apparatus limitations
- equipment types, characteristics, technical capabilities and limitations
- site isolation and site control responsibilities and authorities
- materials safety data sheets (MSDS)
- project quality requirements
- industry terminology
- state and territory interpretations of a confined space

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 entering and working in confined spaces • implementation of requirements, procedures and techniques for the safe, effective and efficient completion for entering and working in confined spaces • working with others to undertake and complete the entering and working in confined spaces that meet all of the required outcomes • consistent timely completion of entering and working in confined spaces that safely, effectively and efficiently meets the required outcomes
Context of and specific	• This unit must be assessed in the context of the work environment. Where personal safety or

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resources for assessment	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 language issues. • Assessment of this competency requires typical resources normally used in the work environment. Selection and use of resources for particular work sites 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

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	• first hand testimonial evidence of the candidate's: • working with others to undertake and complete the entering and working in confined spaces
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 • code of practice • Employment and Workplace Relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
Work instructions may include:	• plans • specifications • quality requirements • operational details

Safety requirements may be included in:	• site safety plans
	• organisational policies and procedures
	• statutory/regulatory authorities which may include:
	  • federal
	  • state and
	  • local authorities
	• verbal or written and graphical instructions
	• signage
	• work schedules/plans/specifications
	• work bulletins

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	• charts and hand drawings • memos • maps • materials safety data sheets (MSDS) • diagrams or sketches • safe work procedures or equivalent related to working in confined spaces • regulatory/legislative requirements pertaining to working in confined spaces • manufacturer's specifications and instructions • organisation's work specifications and requirements • instructions issued by authorised organisational or external personnel • relevant Australian standards
Safety requirements may include:	• OHS requirements • personal protective clothing and equipment as prescribed under legislation, regulation and workplace policies and practices • 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 • safe operating procedures including recognising and preventing hazards associated with working in confined spaces, working in proximity to others, worksite visitors and the public • hazards and risks may include but not be limited to fires, underground services, excavations, traffic, hazardous materials, contaminated atmosphere and toxic gases • risks associated with confined spaces may include but not be limited to restricted means of entry and exit, atmosphere which contains potentially harmful levels of contaminant, unsafe oxygen levels or engulfment • respiratory protection devices are to include but not be limited to air purifying respirators and may include self contained compressed air breathing apparatus, supplied airline breathing apparatus and escape breathing apparatus and

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	atmospheric monitoring devices
Confined space **entry permit**, or work permits, may include:	• location of work • duration of work • size of work crew • atmospheric testing requirements • personal protective equipment • hot work • stand-by personnel • rescue arrangements • other precautions (signs, barriers) • authorisation
Confined spaces may include:	• 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)
Signage may include:	• site safety signage • temporary signage for the benefit of motorists • pedestrians and barricades
Environmental protection requirements may include:	• organisational/project environmental management plan • waste management • water quality protection • noise • vibration • dust • clean-up management
Gain access may include:	• removing access cover • installing and securing ladder
Communications may include:	• verbal instructions • fault reporting • 2-way radio • hand signals • mobile phone • site specific instructions • written instructions

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	• instructions related to job/task
Secure access may include:	• replacing or closing off access cover
Tools and equipment may include:	• harness and lifeline • respirator apparatus • atmospheric testing equipment • signs • barricades • communication devices • tools and equipment relevant to the work to be performed

Unit Sector(s)

Occupational Health and Safety

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.

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RIIOHS204A Work safely at heights

Modification History

Not applicable.

Unit Descriptor

This unit covers working safely at heights in resources and infrastructure industries. It includes: identifying the work requirements, work procedures and instructions for the task; accessing and installing equipment; performing work at heights; and cleaning up the work area.

Application of the Unit

This unit specifies the competency required to undertake safe working practices when working at heights or depths.

This unit is appropriate for those working in a operational roles, 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 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. Identify work requirements	1.1. Access, interpret and apply ***compliance documentation*** relevant to working safely at heights 1.2. Identify the scope of the task 1.3. Adhere to ***OHS requirements*** associated with working safely at heights, and the workplace environment throughout the work 1.4. Inspect site to determine layout and physical condition, condition of structures, prevailing weather conditions, equipment requirements and potential hazards 1.5. Identify and document scope of the task and proposed work practices/activities 1.6. Identify, select and check safety equipment for serviceability 1.7. Identify, manage and report potential risks and hazards
2. Identify work procedures and instructions for the task	2.1. Select materials, ***tools and equipment***, including personal safety equipment, and check for serviceability 2.2. Inspect/install fall protection and perimeter protection equipment ensuring adequacy for work and conformance to regulatory requirements 2.3. Identify approved methods of moving tools and equipment to work area and minimise potential hazards associated with tools at heights 2.4. Install ***safety system*** in accordance with requirements 2.5. Select and install appropriate signs and barricades
3. Access and install equipment	3.1. Correctly fit, adjust and anchor fall protection and associated equipment

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	3.2. Make appropriate arrangements to install required equipment 3.3. Use recommended methods to access work area for people, tools and equipment 3.4. Place tools and materials to eliminate or minimise the risk of items being knocked down
4. Perform work at heights	4.1. Check access from ground to work area to ensure it is safe and in accordance with requirements 4.2. Keep fall equipment in place and adjusted appropriately to all for movement during work 4.3. Undertake manual handling of materials and equipment in accordance with requirements 4.4. Locate materials and equipment ensuring that they are safely secured and distributed 4.5. Check safety system periodically for compliance with requirements and procedures 4.6. Monitor risk control measures to ensure that they are effective and appropriate to the task and work environment 4.7. Reassess risk control measures, as required, in accordance with changed work practices and/or site conditions and undertake alterations
5. Clean up work area	5.1. Dismantle safety system in accordance with sequence and remove from worksite 5.2. Clear work area and dispose of or recycle materials 5.3. Clean, check, maintain and store 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 work safely at heights: • apply legislative, organisation and site requirements and procedures • access, interpret and apply technical and safety information • apply diagnostic/faultfinding techniques • apply environmental requirements • apply isolation procedures • work in varying weather conditions
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 work safely at heights: • the names and functions of equipment, components and materials • equipment manufacturer's instructions and specifications • safe shifting and handling of tools and materials • statutory and regulatory authority requirements • the nature of work undertaken at heights • heights safety systems • the processes of providing for safe working practices • safety equipment/systems and considerations to facilitate working safely at heights • safe work methods

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 working safely at heights • implementation of requirements, procedures and techniques for safe, effective and efficient working at heights

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	• working with others to undertake and complete work safely at heights that meets all of the required outcomes • consistent timely completion of work at heights 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 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

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	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 work safely at heights

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 • code of practice • Employment and workplace relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
OHS requirements may include those associated with:	• 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

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	• hazardous materials and substances
Hazards may include:	• falling objects • removal of scaffold components • inappropriate carrying of materials on ladders • excessive bending or twisting in different work situations
Tools and equipment may include:	• fall protection • perimeter protection • signage and barricades • ladders • lifting/load shifting equipment including: • hand trolleys • rollers • forklifts • chain blocks • hoists • jacks • scaffolds • elevated work platforms • lifting equipment (such as cranes)
Safety systems may include:	• scaffolds • handrails • foot walks • kickboards • safety harness • harness fixing points

Unit Sector(s)

Occupational Health and Safety

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.

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RIIOHS205A Control traffic with stop-slow bat

Modification History

Not applicable.

Unit Descriptor

This unit covers controlling of traffic with a stop-slow bat in resources and infrastructure industries. It includes: planning and preparing; coordinating traffic; operating radios; and cleaning up.

Application of the Unit

This unit is appropriate for those working in a operational roles, 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 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 controlling of traffic with a stop-slow bat 1.2. Obtain, confirm and apply ***work instructions*** relevant to the allotted task 1.3. Obtain, confirm and apply ***safety requirements*** from the site safety plan and organisational policies and procedures for the allotted task 1.4. Identify, obtain and implement ***signage and devices*** requirements from the project traffic management plan 1.5. Select ***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
2. Coordinate traffic	2.1. Position or confirm temporary traffic signs and barriers in accordance with regulations 2.2. Direct traffic in accordance with site traffic plan and away from services or areas of potential damage or danger 2.3. Control vehicles and pedestrian traffic within the worksite to ensure safety of workers 2.4. Monitor traffic, and make adjustments for changing ***conditions***, and position waiting vehicles to allow for smooth traffic flow 2.5. Use hand held stop/slow bats in accordance with regulatory authority approved procedures 2.6. Use hand signals in accordance with regulatory authority approved procedures 2.7. Report traffic offenders in accordance with regulatory authority approved procedures

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3. Operate radio	3.1. Adjust ***radio*** controls for optimum reception/transmission results 3.2. Transmit messages concisely and in accordance with operating procedures or best practice 3.3. Maintain radio power supply 3.4. Check radio contact after nominated period of non contact
4. Clean up	4.1. Remove or cover signs and devices sequentially to provide warning to motorists during shutdown 4.2. Clean, check, maintain and store tools and equipment in accordance with recommendations and standard work practices

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 control traffic with a stop-slow bat:

- apply legislative, organisation and site requirements and procedures

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 control traffic with a stop-slow bat:

- site and equipment safety requirements
- traffic controlling
- traffic management plans
- traffic control signage and barricades
- radio operations
- equipment types, characteristics, technical capabilities and limitations
- operational and maintenance procedures for equipment
- site isolation and traffic control responsibilities and authorities

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• affects of travel speed and vehicle mass on stopping distances • quality requirements • JSAs/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 controlling traffic with a stop-slow bat • implementation of requirements, procedures and techniques for the safe, effective and efficient control of traffic with a stop-slow bat • working with others to control traffic with a stop-slow bat that meets all of the required outcomes • consistent timely control of traffic with a stop-slow bat 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. • Evidence for assessment is best gathered using the outcomes of products and processes of the workplace context. • 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 control traffic with a stop-slow bat

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 • code of practice • Employment and workplace relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
Work instructions may be received via verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, charts and hand drawings, memos, maps, materials safety data sheets (MSDS) and diagrams or sketches and may include:	• plans • specifications • quality requirements • operational details • safe work procedures or equivalent • regulatory/legislative requirements • manufacturers' specifications and instructions • organisation work specifications and requirements • instructions issued by authorised organisational or external personnel • relevant Australian Standards

Safety requirements may include:	• those included in compliance documentation
	• personal protective equipment
	• safe operating procedures, including recognising and preventing hazards associated with:
	  • uneven/unstable terrain
	  • trees
	  • pits
	  • poles
	  • trip hazards

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	• dirt mounds
	• overhead services
	• underground services
	• bridges
	• surrounding buildings
	• obstructions
	• structures
	• facilities
	• fires
	• excavations
	• traffic
	• embankments
	• cuttings
	• hazardous materials
	• recently filled trenches
	• other machines
	• personnel
	• restricted access barriers
	• traffic control
	• working in proximity to others
	• worksite visitors and the public
	• safe parking practices, including:
	  • ensuring access ways are clear
	  • equipment/machinery is away from overhangs and refuelling sites
	  • safe distance from excavations
	  • secured from unauthorised access or movement

Signage and devices are to include:	• temporary warning signs • regulatory and traffic cones
Signage and devices may include:	• vehicle mounted signs and flashing lights • guide signs • warning signs • barriers • hazard markers • bollards • arrow boards
Tools and equipment are to include:	• radio • stop-slow bat • high visibility vest

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	• traffic cones • signage
Tools and equipment may include:	• warning lights and beacons • arrow boards
Environmental include the requirements of the organisational/ project environmental management plan, and may include:	• waste management • water quality protection • noise, vibration and dust management • clean-up management
Trafficconditions may include	• congested urban environments • low traffic rural areas • off-road un-trafficked areas • buildings • parking sites • pedestrian areas
Radios may include:	• VHF and UHF

Unit Sector(s)

Occupational Health and Safety

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.

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TLID3507C Operate a boom type elevating work platform

Modification History

Not applicable.

Unit Descriptor

This unit involves the skills and knowledge required to operate a boom type elevating work platform, including inspecting and testing the elevating work platform, assessing job requirements and work, planning work and setting up for lift, carrying out the elevation, implementing planned hazard control and strategies, and packing up the work platform after operations.

Application of the Unit

Work must be carried out in compliance with the licence/permit requirements and regulations of the relevant state/territory authorities pertaining to boom type elevating work platform operations.

Work is performed with limited or minimum supervision, and with limited accountability and responsibility for self and others in achieving the prescribed outcomes. It involves the application of routine principles and procedures to the operation of a boom type elevating work platform in a variety of operational contexts.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this competency is packaged will assist in identifying employability skill requirements.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

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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

Elements and Performance Criteria

Element	Performance Criteria
1 **Inspect and test elevating work platform**	1.1 Work platform is visually inspected prior to operation for any evidence of damage, structural weakness or interference according to pre-operational safety check procedures
	1.2 Routine pre-operational equipment checks are carried out in accordance with available checklists
	1.3 Work platform log book is checked, service requirements are noted and maintenance personnel advised of any requirements
	1.4 Elevating work platform is started in accordance with manufacturers guidelines and start-up procedures for operations and any abnormal noise or movement reported to an authorised person for corrective action
	1.5 Start-up checks are conducted according to manufacturers specifications and company procedures to ensure work platform and equipment are operating correctly
	1.6 Faults are corrected or are reported to an authorised person for corrective action according to company procedures
	1.7 The operating and emergency controls are checked for correct operation in accordance with manufacturers specifications including use of the emergency decent device
	1.8 Boom is lowered under simulated emergency conditions to check for operational effectiveness
	1.9 Gear and accessories are checked and damaged or worn gear is segregated and reported to an authorised person for testing/repair/destruction
	1.1 Results of inspections are recorded and reported

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		0	according to company procedures
2	**Assess job requirements and work**	2.1	Briefing, hand-over details, authorisations and clearances are received, interpreted and clarified in accordance with company and site procedures and legislative requirements
		2.2	Work area is inspected and potential hazards are identified and appropriate elimination or control measures selected
		2.3	Weight of load including personnel and equipment is correctly estimated to ensure job is within limits of work platform capacity
3	**Plan work and set up for lift**	3.1	A work plan is developed and agreed with relevant workplace personnel to include hazard prevention/control measures and safety and emergency procedures in line with applicable Australian standards
		3.2	A suitable firm and level standing is chosen and prepared for the location of the elevating work platform
		3.3	Outriggers and stabilisers are correctly deployed and positioned in accordance with manufacturers instructions and appropriate Australian standards
		3.4	Appropriate plates or packing are correctly used under the footplates as required to adequately distribute the loading
		3.5	Ground is checked before and after packing is installed to ensure it is firm enough to bear the load
		3.6	The job plan is developed to include hazard prevention/control measures and safety procedures in line with applicable Australian standards and to equipment manufacturers specifications
		3.7	Work platform load chart is located and information on permissible loads, radii and heights taken into account in planning the job
		3.8	The job plan takes into account job requirements and workplace rules and procedures
		3.9	Job plan is discussed and confirmed with relevant

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			personnel
		3.10	Work gear and tools are properly stowed in the elevating work platform in accordance with Australian standards, company procedures and guides
4	**Carry out elevation**	4.1	Configuration and operation of elevating work platform are checked as necessary to ensure safe lift
		4.2	Operation of work platform is carried out in accordance with the job plan, the appropriate Australian standard and manufacturers specifications
5	**Planned hazard control and strategies are implemented**	5.1	Load is constantly monitored to ensure safety of personnel, load and structural stability
		5.2	Unplanned situations are responded to in line with company procedures in a manner that minimises risk to personnel and equipment
		5.3	Required signals are correctly given, interpreted and followed in accordance with appropriate Australian standards
6	**Pack up work platform**	6.1	The elevating work platform is shut down using the correct sequence of procedures in accordance with manufacturers instructions
		6.2	Routine post-operational equipment checks are carried out in accordance with manufacturers instructions and available checklists and defects recorded and reported in line with company procedures
		6.3	The elevating work platform is dismantled in accordance with the job plan, manufacturers instructions and relevant statutory regulations
		6.4	The outriggers and stabilisers are secured and stowed in accordance with manufacturers instructions
		6.5	The elevating work platform is correctly stowed and secured in accordance with manufacturers instructions and company procedures

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Required Skills and Knowledge

REQUIRED KNOWLEDGE AND SKILLS

This describes the essential knowledge and skills and their level required for this unit.

Required knowledge:

Relevant road rules, regulations, permit and licence requirements pertaining to boom type elevating work platform operation

Relevant OH&S and environmental procedures and regulations

Boom type elevating work platform applications, capacities, configurations, safety hazards and control mechanisms

Workplace procedures concerning the operation of a boom type elevating work platform at a worksite

Problems that may arise when operating a boom type elevating work platform and actions that should be taken to prevent or solve them

Risks and hazards involved in the operation of a boom type elevating work platform and the associated action that can be taken to eliminate or minimise the risk/hazards concerned

Focus of operation of work systems and equipment

Required skills:

Communicate effectively with others when operating a boom type elevating work platform

Read and interpret instructions, procedures, regulations, codes of practice and manuals relevant to the operation of a boom type elevating work platform

Interpret and follow operational instructions

Complete documentation related to the operation of a boom type elevating work platform

Operate electronic communication equipment to required protocol

Work collaboratively with others when operating a boom type elevating work platform

Adapt appropriately to cultural differences in the workplace, including modes of behaviour and interactions with others

Promptly report and/or rectify any identified problems, faults or malfunctions that may occur when operating a boom type elevating work platform in accordance with regulatory

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requirements and workplace procedures

Plan own work including predicting consequences and identifying improvements

Prioritise and multi-task work

Implement contingency plans for unanticipated situations that may arise when operating a boom type elevating work platform

Apply precautions and required action to minimise, control or eliminate hazards that may exist during the operation of a boom type elevating work platform

Monitor work activities in terms of planned schedule

Modify activities depending on differing operational contingencies, risk situations and environments

Apply fatigue management knowledge and techniques

Identify and correctly use equipment, processes and procedures

Work systematically with required attention to detail without injury to self or others, or damage to goods or equipment

Operate and adapt to differences in equipment in accordance with standard operating procedures

Select and use required personal protective equipment conforming to industry and OH&S standards

Monitor performance of equipment

Service equipment in terms of maintenance schedule and standard operating procedures

Check and replenish fluids and carry out lubrication processes in the course of work activities

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills, the range statement and the assessment guidelines for this Training Package.

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 and satisfy all of the requirements of the elements and performance criteria of this unit

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	and include demonstration of applying: the underpinning knowledge and skills relevant legislation and workplace procedures other relevant aspects of the range statement
Context of and specific resources for assessment	Performance is demonstrated consistently over a period of time and in a suitable range of contexts Resources for assessment include: a range of relevant exercises, case studies and other simulated practical and knowledge assessment, and/or access to an appropriate range of relevant operational situations in the workplace In both real and simulated environments, access is required to: relevant and appropriate materials and/or equipment, and/or applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
Method of assessment	Assessment of this unit must be undertaken by a registered training organisation As a minimum, assessment of knowledge must be conducted through appropriate written/oral tests Practical assessment must occur: through appropriately simulated activities at the registered training organisation, and/or in an appropriate range of situations in the workplace

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different

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work environments and situations that may affect performance.

Operations may be conducted:	by day or night in a variety of weather conditions
Environment may include movement of:	equipment goods materials vehicular traffic
Customers may be:	internal or external
Boom type elevating work platform may be involved in work in a range of industry sectors including:	construction and demolition manufacturing waterfront mining primary industry utilities (electricity, gas, water) arboricultural swimming pool quarrying
Hazards may include:	power lines noise, light, energy sources overhead service lines surrounding buildings, structures, facilities underground services obstructions uneven or unstable ground and recently filled trenches stationary and moving machinery and equipment hazardous or dangerous materials traffic hazards and congestion
Hazard management is consistent with:	the principle of hierarchy of control with elimination, substitution, isolation and engineering control measures being selected before safe working practices and personal

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	protective equipment
Consultative processes may involve:	other employees and supervisors management union representatives clients industrial relations and OH&S specialists other professional or technical staff
Requirements for access and/or lift may include:	site restrictions and procedures authorities and permits hours of operation induction slings, chains, nets, brackets and other specialised lifting equipment noise restrictions personal protective equipment support trucks additional gear and equipment communications equipment
Personal protective equipment may include:	gloves safety headwear and footwear sunscreen, sunglasses and safety glasses two-way radios high visibility clothing
Elevating platforms may include:	mechanically operated equipment hydraulically operated equipment electrically operated equipment
Depending on the type of organisation concerned and the local terminology used, workplace procedures may include:	company procedures enterprise procedures organisational procedures established procedures site procedures
Documentation/records may include:	operations manuals

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	Safe Working Load (SWL) and Working Load Limit (WLL)
	site plans
	induction documentation
	competency standards and training materials
	job specifications and procedures
	manufacturers specifications
	workplace operating procedures and policies
	supplier and/or client instructions
	communications technology equipment, oral, aural or signed communications
	personal and work area work procedures and practices
	conditions of service, legislation and industrial agreements including:
	workplace agreements and awards
	occupational health and safety procedures
	standards and certification requirements
	quality assurance procedures
	emergency procedures
Applicable procedures and codes may include:	relevant state/territory regulations and licence/permit requirements pertaining to the operation of boom type elevating work platforms
	relevant state/territory road rules
	relevant state/territory OH&S legislation
	relevant state/territory fatigue management regulations
	relevant state/territory environmental protection legislation

Unit Sector(s)

Not applicable.

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Competency Field

D - Load Handling

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TLILIC508A Licence to operate a boom-type elevating work platform (boom length 11 meters or more)

Modification History

Not applicable.

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

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.

Licensing/Regulatory Information

Refer to Application of the Unit

Pre-Requisites

Not applicable.

Employability Skills Information

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 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

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**
	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**

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		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

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5.4 Egress from **elevated work platform** is conducted according to **procedures**

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

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

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response procedures

Required knowledge:

Appropriate mathematical procedures for estimation of loads, to ensure that the elevating work platform is not overloaded

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

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

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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 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

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	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. 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)

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	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 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

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	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: 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:

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	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 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

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	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)

Unit Sector(s)

Not applicable.

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UEENEEC001B Maintain documentation

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1)**

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 **4)**

This unit is intended for competency development entry-level employment-based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

1.2) License to practice

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) **2)**

2.1) Competencies

There are no prerequisite competencies for this unit.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

Elements and Performance Criteria

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

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ELEMENT	PERFORMANCE CRITERIA	
		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

7) 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 documentation.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.2.1	Enterprise communication methods
2.2.2	Enterprise work activities records

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REQUIRED SKILLS AND KNOWLEDGE

2.2.20 Computer use basics

2.18.1 Occupational Health and Safety principles

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, 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:
  - Maintain documentation in any electrotechnology enterprise information system, including:

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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:

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

9.5)

For optimisation of training and assessment effort, competence

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relationship with other units	in this unit may be assessed concurrently with any unit or units that require formal documentation.

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 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.

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**)

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Competency Field **5)**

Commercial

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UEENEEC008B Receive and store materials and equipment for electrotechnology work

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This unit covers the receiving and storing of materials and equipment for a construction site or workshop store. It encompasses receiving materials and equipment, checking consignment notes, storing materials and equipment and completing the necessary documentation.

Application of the Unit

Application of the Unit **4**)

This unit is intended for competency development entry-level employment-based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

1.2) **License to practice**

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.

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

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1.2) License to practice

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) **2)**

2.1) Competencies

There are no prerequisite competencies for this unit.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

Elements and Performance Criteria

ELEMENT **PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA
1 Receive materials and equipment.	1.1 OHS procedures for a given work area are identified, obtained and understood.
	1.2 OHS risk control work measures and procedures are followed.
	1.3 Documentation on pending material and equipment deliveries is read, and content and time of the delivery is understood.
	1.4 Deliveries are checked against consignment documentation before they are received.
	1.5 Discrepancies in deliveries are notified to work supervisor and supplier in accordance with established routines.
	1.6 Materials and equipment are handled in strict accordance with OHS risk control work preparation measures and procedures.
2 Store materials and equipment.	2.1 OHS risk control work measures and procedures are followed.
	2.2 Material and equipment are stored to prevent damage or loss in accordance with established routines.
	2.3 Security of the stored materials and equipment is maintained in accordance with established routines.
	2.4 Material and equipment documentation is forwarded to an appropriate person in accordance with established routine/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 must show that knowledge has been acquired of safe working practices and

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REQUIRED SKILLS AND KNOWLEDGE

of receiving and storing materials 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.2.1	Enterprise communication methods
2.2.2	Enterprise work activities records
2.2.9	Enterprise stock control methods
2.2.20	Computer use basics
2.18.1	Occupational Health and Safety principles

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, assessment in part or full can occur outside the workplace. However, it must be in accordance 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. 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. 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:
  - Receive and store materials and equipment for electrotechnology work as described in 8) including:

    A Determining content and time of pending deliveries from relevant documentation.

    B Dealing with discrepancies in deliveries.

    C Storing and securing materials and equipment to prevent damage or loss.

    D Forwarding documentation appropriately.

    E 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 simulation policy.

The resources used for assessment should reflect current industry practices in relation to receiving and storing materials

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	and equipment for electrotechnology work.
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

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 must be demonstrated in relation to receiving and storing materials and equipment for a construction site or workshop store.

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)**

Commercial

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UEENEEC010B Deliver a service to customers

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

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 **4**)

This unit is intended for competency development entry-level employment-based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

1.2) **License to practice**

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) **2)**

2.1) Competencies

There are no prerequisite competencies for this unit.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

Elements and Performance Criteria

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.

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ELEMENT	PERFORMANCE CRITERIA	
	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 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

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ELEMENT	PERFORMANCE CRITERIA
	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

7) 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.

The extent of the essential knowledge and associated skills (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.2.1 Enterprise communication methods

2.2.2 Enterprise work activities records

2.2.4 Problem solving techniques

2.2.5 Enterprise customer relations protocols

2.2.6 Enterprise quality management system, basics

2.2.13 User instruction techniques

2.18.1 Occupational Health and Safety principles

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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, 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 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:
  - 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.

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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 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.

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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 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.

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**)

Commercial

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UEENEED004B Use engineering applications software

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

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, LabView

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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) **2**)

2.1) **Competencies**

There are no prerequisite competencies for this unit.

Employability Skills Information

Employability Skills **3**)

The required outcomes described in this unit of competency contain applicable facets of 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

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.

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ELEMENT		PERFORMANCE CRITERIA	
		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.

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 using engineering application software.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.4.16	Personal computers, engineering applications software basic
2.18.1	Occupational Health and Safety principles

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 assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material

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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 - 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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- 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.

  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.

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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

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 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

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	3	Writing	3	Numeracy	3

2.2) Literacy and numeracy skills

Competency Field **5)**

Computer Systems

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UEENEEE001B Apply OHS 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.

Note:
Components of this unit are included in the critical aspects of evidence of each applicable unit to ensure that OHS practices are demonstrated as they apply to specific work functions and situation.

Application of the Unit

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. 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

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Application of the Unit **4**)

duty of care in relation to OHS that ensures their health and safety and that of others in the workplace. The relevant jurisdictional OHS legislation should always be consulted to ascertain the exact duties set down for employers and employees.

Licensing/Regulatory Information

1.**2**) **License to practice**

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.

Note
Some workplace equipment requires an operative to hold a current user permit e.g. scaffolding and elevated platforms above certain heights, excavation equipment. Competencies for receipt of such permits are not included in this unit.

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

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identifying Employability Skill requirements.

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 work area	1.1 Instruction in hazards and risk control measures for specific work functions and work areas are identified and obtained.
	1.2 Work area access permits are obtained from appropriate personnel according to established procedures.
	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 Workplace procedures and work instructions 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.

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ELEMENT	PERFORMANCE CRITERIA
	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.

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.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.18.1 Occupational Health and Safety principles

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. 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

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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 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 Applying work procedures and instructions as they apply to risk control measures.

    C Dealing with accidents and emergencies within the scope of responsibility.

    D Participation in consultation processes, identifying hazards and implementing and monitoring control measures.

    E 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, and

Note:

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EVIDENCE GUIDE

Ability to implement these Occupation Health and Safety 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:

(a) Relevant Occupational Health and Safety legislation, regulations and codes of practice related to hazards present in the industry and particular workplace

(b) 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

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Custom Content Section

Competency Field **5**)

Electrotechnology

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UEENEEE002B Dismantle, assemble and fabricate electrotechnology 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 electrotechnology 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 diagrams.

Application of the Unit

Application of the Unit **4**)

This unit shall apply to persons entering work in electrotechnology and may be used in school-based vocational programs.

Licensing/Regulatory Information

1.2) **License to practice**

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) **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.

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

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ELEMENT	PERFORMANCE CRITERIA	
		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 electrotechnology 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.
	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

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ELEMENT		PERFORMANCE CRITERIA	
			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.
3	Fabricate electrotechnology 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 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.
4	Complete work and report.	4.1	OHS risk control work completion measures and procedures are followed.
		4.2	Work site is cleaned and made safe in accordance with established procedures.
		4.3	Work supervisor is notified of the completion of the work 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 dismantling, assembling and fabricating electrotechnology 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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.11.1	Hand tools
2.11.2.1	Power tools
2.11.4	Dismantling and assembling techniques
2.18.1	Occupational Health and Safety principles
2.20.1	Sustainable energy principles

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

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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 to:
    - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk

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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:
  - Dismantle, assemble and fabricate electrotechnology components as described in 8) and including:

    A Dismantle and assemble an apparatus relevant to the discipline in which competency is sought and that requires selection and safe use of a variety of dismantling/assembling tools.

    B Sharpening a drill bit for at least two different types of material.

    C Fabricating a component that requires the selection and safe use of a variety of fabrication tools.

    D 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

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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 dismantling, assembling and fabricating electrotechnology 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 relationship with other units

9.5)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals

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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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

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

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2.2) Literacy and numeracy skills

Competency Field **5)**

Electrotechnology

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UEENEEE003B Solve problems in extra-low voltage single path circuits

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This unit covers providing known solutions to predictable problems in single path circuits operated at extra-low voltage as they apply to various electrotechnology work functions. It encompasses working safely, problem solving procedures, including the use of basic voltage, current and resistance measuring devices, providing known solutions to predictable circuit problems.

Application of the Unit

Application of the Unit **4**)

This unit shall apply to persons entering work in electrotechnology and may be used in school-based vocational programs.

Licensing/Regulatory Information

1.2) **License to practice**

The skills and knowledge described in this unit do not require a license to practice in the workplace. However they are 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) **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.

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 extra-low voltage single path 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(s) problem is obtained from documentation or from work supervisor to establish the scope of work to be undertaken.

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ELEMENT	PERFORMANCE CRITERIA	
	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 problem in extra-low voltage single path electrical circuits.	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 routines are used to solve circuit problems using measured and calculated values as they apply to single path, single source circuits.
	2.5	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 routine 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 extra-low voltage single path circuits.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.8.1.2 Fundamental electrical principles

2.18.1 Occupational Health and Safety principles

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,

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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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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 extra-low voltage single path circuits as described in 8) and including:

    A Determining the operating parameters of an existing circuit.

    B Altering an existing circuit to comply with specified operating parameters.

    C Developing circuits to comply with a specified function and operating parameters.

    D Identifying loss of supply.

    E 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

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consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to solve problems in extra-low voltage single path 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.

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.

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 single path circuits as they apply to problems related to installation, fault finding, maintenance or development work functions in any of the following disciplines:
    - Computers
    - Data Communications

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RANGE STATEMENT

- Electrical
- Electronics
- Fire protection
- Instrumentation
- Refrigeration and Air Conditioning,
- Renewable and sustainable energy systems, and
- Security technology

- In relation to at least three of the following types of circuit problems and on at least two occasions:
  - Determining the operating parameters of an existing circuit
  - Identifying and locating open-circuits
  - Identifying and locating short-circuits
  - Identifying loss of supply

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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UEENEEE004B Solve problems in multiple path 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. 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 multiple path circuit.

Application of the Unit

Application of the Unit **4)**

This unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit requires a license to practice in the workplace where plant and equipment is directly connected to installation wiring that operates 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

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1.2) License to practice

apprenticeships.

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.

UEENEEE003B Solve problems in extra-low voltage single path circuits

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.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to work on multiple path 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(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 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 multiple path 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 methods are used to solve d.c. circuit problems from measure and calculated values as they apply to multiple path electrical 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.

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ELEMENT	PERFORMANCE CRITERIA
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 multiple path d.c. circuits.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.8.2.1 Direct current circuit principles

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.

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EVIDENCE GUIDE

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 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

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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:
  - Solving problems in multiple path d.c. circuits as described in 8) and including:

    A Determining the operating parameters of an existing circuit.

    B Altering an existing circuit to comply with specified operating parameters.

    C Developing circuits to comply with a specified function and operating parameters.

    D 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

9.3)

This unit should be assessed as it relates to normal work

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for assessment

practice using procedures, information and resources typical of a 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 solving problems in multiple path 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.

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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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 parallel and series-parallel d.c. circuits as they apply to problems related to installation, fault finding, maintenance or development work functions in any of the following disciplines:
    - Computers
    - Data Communications
    - Electrical
    - Electronics
    - Fire protection
    - Instrumentation
    - Refrigeration and Air Conditioning, and
- In relation to at least two of the following types of circuit problems and 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

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

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2.2) Literacy and numeracy skills

Competency Field **5)**

Electrotechnology

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UEENEEE005B Fix and secure 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

Application of the Unit **4)**

This unit shall apply to persons entering work in electrotechnology and may be used in school-based vocational programs.

Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit may require a license to practice in the workplace where they are applied to electrical work intended for voltage above 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, 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.

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.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT **PERFORMANCE CRITERIA**

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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.
	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

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ELEMENT	PERFORMANCE CRITERIA	
		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.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.11.1	Hand tools
2.11.2.1	Power tools
2.11.3.1	Fixing and support devices and techniques
2.18.1	Occupational Health and Safety principles
2.20.2	Environmental and building regulation

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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 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:
  - Fix and secure 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.

    B Fixing to a hollow wall, brick, concrete and steel.

    C Fixing support accessories/equipment relevant the discipline in which competency is sought.

    D Dealing with unplanned events by drawing on essential knowledge and skills to provide

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EVIDENCE GUIDE

	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 fixing and securing 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 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 other installation competencies. 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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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

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'

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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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UEENEEE007B Use drawings, diagrams, schedules and manuals

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This unit covers the use of drawings, diagrams, equipment and cable schedules and manuals 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.

Application of the Unit

Application of the Unit **4**)

This unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

1.2) License to practice

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) **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.

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.

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ELEMENT	PERFORMANCE CRITERIA
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 convey information and ideas.	3.1 Drawing conventions are used in neat freehand drawings to convey information and ideas to others involved in the work to be undertaken.
	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.

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, schedules and manuals.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.5.1.2 Drawings and diagrams

2.18.1 Occupational Health and Safety principles

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

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EVIDENCE GUIDE

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. 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

- Use drawings, diagrams, schedules and manuals 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 Dealing with unplanned events and 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 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

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EVIDENCE GUIDE

	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 or manuals 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:

- 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.

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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	3	Writing	3	Numeracy	3

2.2) Literacy and numeracy skills

Competency Field **5)**

Electrotechnology

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UEENEEE024B Compile and produce an electrotechnology report

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	1) This unit covers complying and producing an electrotechnology 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	This unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

	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

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apprenticeships.

Pre-Requisites

There are no prerequisite competencies for this unit.

Employability Skills Information

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

Not applicable.

Elements and Performance Criteria

Elements and Performance Criteria

Element	Performance Criteria
1 Prepare to develop a 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 organisation policies.
	1.3 The scope of the report is evaluated and report parameters established using a formal

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		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 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 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

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 compiling and producing an electrotechnology report.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

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The extent of the essential knowledge and associated skills (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.2.1	Enterprise communication methods
2.2.2	Enterprise work activities records
2.2.20	Computer use basics
2.2.21	Engineering analysis, decision making and reporting
2.2.25	Research concepts
2.2.33	Working in a team
2.2.35	Data collection techniques
2.2.36	Data analysis and presentation
2.18.8.2	Occupational Health and Safety, enterprise responsibilities

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 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 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 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

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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	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.
G	Appropriate computer application.
H	Identifying competencies required for the report.
I	Documenting report proposal.
J	Negotiating alterations to the

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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 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

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 of competency describes work conducted by technical personnel who contribute to the conduct of 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

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.

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5)

Competency Field

empty	Electrotechnology

2.2) Literacy and numeracy skills

empty	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'

empty	Reading	5	Writing	5	Numeracy

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UEENEEE037B Document occupational hazards and risks in electrotechnology

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This unit primarily deals with the process involved in completing documentation and/or making appropriate modifications to pre-prepared documents. It covers i) occupational work hazard identification, ii) identifying health and safety risks to workers, iii) classification of risks, iv) documenting control measures intended to eliminate or reduce the risk that could potentially arise during the conduct of work activities, and v) consultation processes with those involved with electrotechnology work.

Application of the Unit

Application of the Unit **4**)

This unit cannot be used in the workplace without the achievement of competence in other relevant technical units that are associated with other vocational disciplines at the same AQF level or in the same vocational discipline at another AQF level.

Licensing/Regulatory Information

1.2) **License to practice**

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

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1.2) License to practice

to occupational health and safety and where applicable contracts of training such as apprenticeships.

Notes:
1. In addition to OHS compliance there may be additional requirements to be licensed or obtain permits to work. Additionally, this may vary between jurisdictions but typically will relate to the operation of plant, machinery and equipment such as elevating work platforms, power operated fixing tools, and power operated tools, vehicles, road signage and traffic control, lifting equipment. They may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.
2. Competency in applying safety practices for working in close proximity to electrical power systems and equipment is covered by other specific safety-related units.

The skills and knowledge described in this unit should not be practised in the workplace until units relevant to a work function have been achieved.

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.

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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 Identify and document hazards and risks.	1.1 Hazards are identified using appropriate processes with involvement of others, where appropriate. 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, where appropriate, and documented in accordance with regulations and following established procedures.
	1.3 Provision is made to accommodate changes to documentation should unforseen hazards be identified.
2 Determine risk class and document control measures.	2.1 Risk class is determined for the risks involved in accordance with the regulations and following established procedures.
	2.2 Control measures are developed on the basis of the determined risk(s) and risk class to eliminate and/or mitigate the risk to health and safety in accordance with regulations and following established procedures.
	2.3 Risk class and control measures are agreed to

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ELEMENT	PERFORMANCE CRITERIA	
		and documented in consultation with all involved, where appropriate, in accordance with regulations and established 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 established procedures.
	3.3	Documentation associated with the risk assessment process are filed 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 documenting occupational hazards and risks in electrotechnology.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.2.1	Enterprise communication methods
2.2.2	Enterprise work activities records
2.18.1	Occupational Health and Safety principles
2.18.16	Documenting hazards and identifying risks

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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.

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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 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:
  - Document occupational hazards and risks in electrotechnology as described in 8) and including:

    A Identifying and noting hazards.

    B Assessing the risks and developing and documenting control measures.

    C Reviewing and documenting variations to prior arranged documents.

    D Recording activities.

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Critical aspects of evidence required to demonstrate competency in this

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

E Dealing with unplanned activities 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 documenting occupational hazards and risks in electrotechnology.

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

9.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with other related

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Critical aspects of evidence required to demonstrate competency in this other units	**9**.**2**) Before the critical aspects of evidence are considered all prerequisites must be met. 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.

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:

- Relevant occupational health and safety legislation, regulations and codes of practice related to electrical devices and systems and hazards present in domestic, commercial and industrial buildings
- Accepted industry work procedures and the specific safety procedures and work instructions for a 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

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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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UEENEEE051B Transport apparatus and materials

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This unit covers transport apparatus, plant accessories and materials. It encompasses safe working practices and following work processes that satisfy electrical principles for transporting apparatus and materials.

Application of the Unit

Application of the Unit **4**)

This unit shall apply to persons entering work in electrotechnology and may be used in school-based vocational programs.

Licensing/Regulatory Information

1.2) License to practice

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.

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1.2) License to practice

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

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.

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 Plan and prepare for	1.1 Transport of apparatus and materials is planned

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ELEMENT	PERFORMANCE CRITERIA	
the transport of apparatus and materials.		and prepared to ensure OHS policies and procedures are followed, the work is appropriately sequenced in accordance with requirements.
	1.2	Appropriate personnel are consulted to ensure apparatus, accessories, plant, equipment and/or materials are appropriately identified, and checked against manufacturer transport instructions and requirements.
	1.3	Transport details of apparatus and materials are checked against job requirements.
	1.4	Plant needed to carry out the work is obtained in accordance with established procedures and checked for correct operation and safety.
	1.5	Where appropriate, team and individual work roles and responsibilities within the team are identified.
	1.6	Preparatory work is checked to ensure no damage has occurred and complies with requirements.
2 Transport apparatus and materials.	2.1	OHS policies and procedures for the transport of apparatus plant and materials are followed.
	2.2	Apparatus, plant and materials are transported in accordance with requirements, and manufacturer transport instructions without damage or distortion to the surrounding environment or services.
	2.3	Unplanned events or conditions are responded to in accordance with established procedure.
	2.4	Approval is obtained in accordance with established procedures from appropriate personnel before any contingencies are implemented.
	2.5	Ongoing checks of the work quality are undertaken in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA
3 Check and notify completion of work.	3.1 Final inspections are undertaken to ensure the transported apparatus and materials conforms to requirements.
	3.2 Work completion is 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 transporting apparatus and materials.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.2.1 Enterprise communication methods

2.2.2 Enterprise work activities records

2.2.4 Problem solving techniques

2.2.5 Enterprise customer relations protocols

2.2.9 Enterprise stock control methods

2.18.1 Occupational Health and Safety principles

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

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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 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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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:
  - Transport apparatus and materials as described in 8) and including:

    A Transporting apparatus.

    B Transporting equipment.

    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.

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

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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 transporting apparatus and materials.

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

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 transporting apparatus and equipment 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
- 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

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Custom Content Section

Competency Field **5)**

Electrotechnology

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UEENEEF006B Solve problems in data and voice communications circuits

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This unit covers providing known solutions to predictable problems in single and multiple path circuits operated at extra-low voltage as they apply to various data and voice communications work functions. It encompasses working safely, problem solving procedures, including the use of basic voltage, current and resistance measuring devices, providing known solutions to predictable communication circuit problems.

Application of the Unit

Application of the Unit **4**)

This unit shall apply to persons entering work in electrotechnology and may be used in school based vocational programs.

Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit do not require a license to practice in the workplace. However they are 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) **2)**

2.1) Competencies

There are no prerequisite competencies for this unit.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to work on extra-low voltage data and voice communications 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(s) problem is obtained from documentation or from work supervisor to establish the scope of work to be undertaken.

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ELEMENT	PERFORMANCE CRITERIA	
	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 problems in extra-low voltage data and voice communications circuits	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 routines are used to solve circuit problems using measured and calculated values as they apply to single path, single source circuits.
	2.5	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

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3 Complete work and document problem solving activities	3.1	OHS work completion risk control measures and procedures are followed. routine 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 extra-low voltage data and voice communications circuits.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.10.31 Electrotechnology communications principles

2.18.1 Occupational Health and Safety principles

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

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model for 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 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

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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 solving problems in extra-low voltage data and voice communications circuits as described in 8) and including:

    A Determining the operating parameters of an existing circuit.

    B Determining the frequency response of existing circuits

    C Altering an existing circuit to comply with specified operating parameters.

    D Developing circuits to comply with a specified function and operating parameters.

    E Identifying earth faults.

    F Identifying loss of supply.

    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:

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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 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 solve problems in extra-low voltage data and voice communications 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 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.

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.

Range Statement

RANGE STATEMENT

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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 single and multiple path communication circuits as they apply to problems related to installation, fault finding, maintenance or development work functions in any of the following disciplines:
    - Data Communications
    - Electronics
    - Fire protection
    - Renewable and sustainable energy systems, and
    - Security technology
- In relation to at least three of the following types of communication circuit problems and on at least two occasions:
    - Determining the operating parameters of an existing circuits
    - Determining the frequency response of an existing circuits
    - Identifying and locating open-circuits
    - Identifying and locating short-circuits
    - Identifying earth faults
    - Identifying loss of supply

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

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2.2) Literacy and numeracy skills

Competency Field **5**)

Data and Voice Communications

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UEENEEF007B Set up the wireless capabilities of communications and data storage devices

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

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 **4**)

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

1.2) **License to practice**

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 subject to regulations directly related

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1.2) License to practice

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) **2)**

2.1) Competencies

There are no prerequisite competencies for this unit.

Employability Skills Information

Employability Skills **3)**

The required outcomes described in this unit of competency contain applicable facets of 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

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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.
	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

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ELEMENT	PERFORMANCE CRITERIA	
		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

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 set up 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.

The extent of the essential knowledge and associated skills (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.10.30 Wireless devices

2.18.1 Occupational Health and Safety principles

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 - 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:
  - 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.

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Critical aspects of evidence required to demonstrate competency in this

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

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)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a 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

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Critical aspects of evidence required to demonstrate competency in this	**9.2**) Before the critical aspects of evidence are considered all prerequisites shall be met. which is primarily intended for 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 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

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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)**

Data and Voice Communications

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UEENEEG001B Solve problems in electromagnetic circuits

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This unit covers determining correct operation of electromagnetic 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 circuits.

Application of the Unit

Application of the Unit **4**)

This unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

1.2) License to practice

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) **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.

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 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.

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ELEMENT	PERFORMANCE CRITERIA	
	1.3	The nature of the circuit(s) problem is obtained from documentation or from work supervisor to establish the scope of work to be undertaken.
	1.4	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 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 circuits.
	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

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ELEMENT	PERFORMANCE CRITERIA
	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 circuits.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.8.6 Electromagnetic principles

2.11.1 Hand tools

2.18.1 Occupational health and safety principles

2.18.2 Electrical safe working practice

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 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

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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 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 electromagnetic circuits as described as described in 8) and including:

    A Determining the operating parameters of an existing electromagnetic circuit.

    B Providing practical uses in electromagnets.

    C Listing control measures that apply to electrical devices and machines operating at low voltage

    D Correctly and safely using voltage, current and resistance measuring devices and providing solutions derived from measurements and calculations to predictable problems in electromagnetic circuits.

    E Altering an existing electromagnetic circuit to comply with specified operating parameters,

    F Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic

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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 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 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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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 circuits by:

- determining correct operation of electromagnetic circuits
- providing solutions as they apply to electrical installations and equipment

In relation to the following electromagnetic circuit problems on at least two occasions:

- solving electromagnetic circuit problems,
- using voltage, current and resistance measuring devices,
- providing practical uses in electromagnets,
- providing solutions derived from measurements and calculations to predictable problems in electromagnetic circuits,
- determining the operating parameters of an existing electromagnetic circuit,
- altering an existing electromagnetic circuit to comply with specified operating parameters,
- listing control measures that apply to electrical devices and machines operating at low voltage
- 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

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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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UEENEEG002B Solve problems in single and three phase low voltage circuits

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This unit covers ascertaining correct operation of single and three phase 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

Application of the Unit **4**)

This unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

1.2) License to practice

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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1.2) License to practice

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) **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.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to solve single and three phase low voltage 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 single and three phase low voltage 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.
	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 Established methods for dealing with unexpected situations are discussed with appropriate person

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ELEMENT	PERFORMANCE CRITERIA	
		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 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.

The extent of the essential knowledge and associated skills (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.8.2.2	Alternating current principles - power
2.18.1	Occupational health and safety principles
2.18.2	Electrical safe working practice

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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

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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 Determining the operating parameters of existing circuits.

    B Altering an existing circuit to comply with specified operating parameters.

    C Developing circuits to comply with a specified

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function and operating parameters.

D Determining the cause of low power factor in an existing circuit.

E Determining conditions causing an existing circuit to be unsafe.

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 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.

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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: 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.

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 for both single and three-phase circuit.

- 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

Note:
Operating parameters include 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.

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

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RANGE STATEMENT

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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UEENEEG047B Provide computational solutions to power engineering problems

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This unit covers the application of computational processes to solving problems encountered in power engineering. It encompasses working safely, applying problem solving techniques, using a range of mathematical processes, providing solutions to power engineering problems and justifying such solutions.

Note.
Typical engineering problems are those encountered in meeting requirements in a design brief, meeting performance requirements and compliance standards, revising a systems operating parameters and dealing with system malfunctions.

Application of the Unit

Application of the Unit **4**)

This unit applies to any recognised development program that leads to the acquisition of a formal award at AQF level 4 or higher.

Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit do not require a license to practice in

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEG002B Solve problems in single and three phase low voltage circuits

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.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Provide computational solutions to engineering problems	1.1 OHS procedures for a given work area are obtained and understood
	1.2 The nature of the problems are obtained from documentation or from work supervisor to establish the scope of work to be undertaken
	1.3 Power engineering problems are clearly stated in writing and/or diagrammatic form to ensure they are understood and appropriate methods used to resolve them.
	1.4 Known constants and variable related to the problem are obtained from measured values or problem documentation.
	1.5 Alternative methods for resolving the problem are considered and where necessary discussed with appropriate person(s).
	1.6 Problems are solved using appropriate mathematical processes and within the realistic accuracy.
2 Complete work and document problem solving activities	2.1 Justification for solutions used to solve engineering problems is documented for inclusion in work/project development records in accordance with professional standards.
	2.2 Work completion is documented and an appropriate person or persons notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) 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 providing computational solutions to power engineering problems.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.8.11 Power engineering computations

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

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- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Provide computational solutions to power engineering problems as described in 8) and including:
    - A Clearly stating problems in written and diagrammatic form.
    - B Obtaining known constants and variable from an appropriate source.
    - C Solving problems using appropriate mathematical processes.
    - D Documenting justification of solutions provided in accordance with professional standards.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a 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 providing computational solutions to power engineering 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

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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: UEENEEG002B Solve problems in single and three phase low voltage 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 problems that apply to power engineering diagnosis and development work functions in any of the following disciplines:

- Electrical
- Electronics
- Renewable energy
- Control

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	5	Writing	5	Numeracy	5

Custom Content Section

Competency Field **5)**

Electrical

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UEENEEG048B Solve problems in complex multiple path power circuits

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This unit covers the determining correct operation of complex series-parallel power circuits and providing solutions as they apply to electrical power engineering work functions. It encompasses working safely, problem solving procedures, including electrical measuring devices, applying appropriate circuit theorems and providing solutions derive from measurements and calculations and providing justification for such solutions.

Note.
Typical engineering problems are those encountered in meeting requirements in a design brief, meeting performance requirements and compliance standards, revising a systems operating parameters and dealing with system malfunctions.

Application of the Unit

Application of the Unit **4**)

This unit applies to any recognised development program that leads to the acquisition of a formal award at AQF level 4 or higher.

Licensing/Regulatory Information

1.2) License to practice

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1.2) License to practice

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) **2)**

2.1) Competencies

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEG047B Provide computational solutions to power engineering problems

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.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a

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unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Provide computational solutions to engineering problems	1.1	OHS procedures for a given work area are obtained and understood
	1.2	The nature of the problems are obtained from documentation or from work supervisor to establish the scope of work to be undertaken
	1.3	Power engineering problems are clearly stated in writing and/or diagrammatic form to ensure they are understood and appropriate methods used to resolve them.
	1.4	Known constants and variable related to the problem are obtained from measured values or problem documentation.
	1.5	Alternative methods for resolving the problem are considered and where necessary discussed with appropriate person(s).
	1.6	Problems are solved using appropriate mathematical processes and within the realistic accuracy.
2 Complete work and document problem solving activities	2.1	Justification for solutions used to solve engineering problems is documented for inclusion in work/project development records in accordance with professional standards.
	2.2	Work completion is documented and an appropriate person or persons notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) 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 solving problems in complex multiple path power circuits.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the essential knowledge and skills required is given Volume 2 Part 2, Section 2 Clauses:

2.8.9.2 Electrical power circuit analysis

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

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being assessed.

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

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workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Solve problems in complex multiple path power circuits as described in 8) and including:

    A Clearly stating problems in written and diagrammatic form.

    B Obtaining known constants and variable from an appropriate source.

    C Solving problems using appropriate mathematical processes.

    D Documenting justification of solutions provided in accordance with professional standards.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a 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 complex multiple path power 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

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	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: UEENEEG002B Solve problems in single and three phase low voltage 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 problems that apply to power engineering diagnosis and development work functions in any of the following 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

2.2) 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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UEENEEG049B Solve problems in complex polyphase power circuits

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This unit covers determining correct operation of complex polyphase power circuits and providing solutions as they apply to electrical power engineering work functions. It encompasses working safely, problem solving procedures, including using electrical measuring devices, applying appropriate circuit theorems and providing solutions derived from measurements and calculations and justification for such solutions.

Application of the Unit

Application of the Unit **4**)

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

1.2) License to practice

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

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1.2) License to practice

contracts of training such as apprenticeships.

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.

UEENEEG048B Solve problems in complex multiple path power circuits

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.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to solve problems in complex polyphase power 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(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 problems in complex polyphase power circuits. \	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 complex multiple path 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.

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ELEMENT	PERFORMANCE CRITERIA
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 complex polyphase power circuits.

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 (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

2.8.9.3 Polyphase power circuit analysis

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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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 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

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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 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 complex polyphase power circuits as described in 8) and including:

    A Determining the operating parameters of existing circuit.

    B Using established problem solving methods.

    C Taking relevant measurements accurately.

    D Interpreting measured values appropriately.

    E Providing effective solutions to circuit problems from measurements and calculations.

    F Giving written justification of solutions provided.

    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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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 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 complex polyphase power 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.

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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 complex polyphase power circuits as they apply to problems related to electrical power engineering diagnosis and development work functions in any of the following types of circuit problems:

- Determining the operating parameters of an existing circuit
- Alternating 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	5	Writing	5	Numeracy	5

2.2) Literacy and numeracy skills

Competency Field **5**)

Electrical

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