Australian Government

Department of Education, Employment and Workplace Relations

UETTDRDS46A Develop planned power systems outage strategies

Release: 1

UETTDRDS46A Develop planned power systems outage strategies

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

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 **2)**

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require a licence/registration to practice in the work place subject to regulations for undertaking of electrical work. 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.

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License to practice **3)**

Commonwealth, State/Territory or Local Government legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed plus all the competencies in one (1) of the identified Pathway Unit Group(s):

Common Unit Group

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEED104A	Use software for engineering applications
UETTDREL16A	Working safely near live electrical apparatus
UETTDRIS62A	Implement and monitor the power system organisational OHS policies, procedures and programs

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 “Literacy and Numeracy”

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Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for and coordinate 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 outage 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 outage 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

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ELEMENT	PERFORMANCE CRITERIA	
	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 established procedures
2 Carry out and coordinate the development of 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 incidence 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

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ELEMENT	PERFORMANCE CRITERIA	
		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 the development of 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.
	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 outage strategy documents are issued and records are updated in accordance with established procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) Essential Knowledge and Associated Skills (EKAS): This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of developing planned outage strategies.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-TDS46A Power systems outage strategies

Evidence shall show an understanding of developing planned power systems outage strategies to an extent indicated by the following aspects:

T1 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 encompassing:

- Risk management and assessment of risk - principle and purpose of risk management and processes for conducting a risk assessment
- 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.
- Risks and control measures associated with high-voltage - parts of an electrical system and equipment that operate at high-voltage, the terms ‘touch voltage’, ‘step voltage’, ‘induced voltage’ and ‘creepage’ as they relate to the hazards of high-voltage and control measures used for dealing with the hazards of high-voltage
- Optical fibre safety - coherent optical sources and joining procedures and Laser safety class 3a devices or their replacement
- Risks and control measures associated with low voltage - 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 and control measures for working live
- Risks and control measures associated with harmful dusts and airborne contaminants - thermal insulation, fibrous cement materials and asbestos and other fibre reinforced switchboard materials.
- Safety, selection, use, maintenance and care of test equipment - safety characteristics of electrical testing devices, safe use of electrical testing device and checks and storage methods for maintaining the safety of testing devices

T2 OHS enterprise responsibilities encompassing:

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REQUIRED SKILLS AND KNOWLEDGE

- Provisions of relevant health and safety legislation
- Principles and practice of effective occupational health and safety management
- Management arrangements relating to regulatory compliance
- Enterprise hazards and risks, control measures and relevant expertise required
- Characteristics and composition of workforce and their impact on occupational health and safety management
- Relevance of enterprise management systems to occupational health and safety management
- Analysis of working environment and design of appropriate occupational health and safety management systems
- Analysis of relevant data and evaluation of occupational health and safety system effectiveness
- Assess resources to establish and maintain occupational health and safety management systems.

T3 Co-ordinating access authority procedures encompassing:

- 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 information and ideas and 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 - 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 - 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

T4 Principles of safe design encompassing:

- Commonwealth/State/Territory legislation, standards, codes, supply authority

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REQUIRED SKILLS AND KNOWLEDGE

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 and Licensing rules
- Application of safe design principles - safe design duty related information, safe design process related information and safe design evaluations

T5 Installation of switchgear and associated equipment encompassing

- Types and function of various switchgear - 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 - transformers, reactors, regulators, capacitors, relays, surge arrestors, fault indicators and mobile generators
- Installation procedures for switchgear and equipment - standards, codes, legislation, supply authority regulations and or enterprise requirements, assembly and erecting procedures, earthing requirements and techniques and pole mounted locations
- Maintenance procedures for switchgear and equipment - diagnosing and rectifying faults according to electricity supply industry standards and procedures
- Testing and commissioning - electricity supply industry standards and procedures

T6 Low voltage switching principles encompassing:

- 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 - types, characteristics and capabilities of electrical apparatus, use, characteristics and capabilities of specialised tools and testing equipment and LV network interconnectors source of possible backfeed
- Low voltage switching techniques - identifying hazards, assessing and controlling risks associated with LV switching operations, electrical access permit(s), operational procedures, earthing procedures and personnel protective equipment (PPE) for LV switching

T7 High voltage switching principles encompassing:

- 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 - types, characteristics and capabilities of electrical apparatus, use, characteristics and capabilities of specialised tools and testing equipment and network interconnectors source of possible backfeed
- Role of the HV switching operator
- Operational forms, access authorities and permits associated with HV switching - types of operational forms, access authorities and permits and purpose and procedure for operational forms, access authorities and permits

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REQUIRED SKILLS AND KNOWLEDGE

- Use and operation of equipment associated with HV overhead and substation equipment - test instruments, sticks, interrupters and 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 - purposes of "Operational" and additional work part "on-site" earths, factors determining the location and effectiveness of "Operational" earthing, acceptable industry procedures and personal protective equipment
- High voltage switching techniques
- Operate switching apparatus - identifying hazards, assessing and controlling risks associated with HV switchgear operation, systematic and defensive techniques, mobile radio procedures and double isolation procedures

T8 HV overhead and substation switching principles encompassing:

- 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 - types, characteristics and capabilities of HV electrical equipment to be switched, use and 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 - types of operational forms, access authorities and permits hazard/risk assessments and purpose and procedure for operational forms, access authorities and hazard/risk assessments
- Use and operation of equipment associated with HV overhead and substation equipment - test instruments, sticks, interrupters and arc stranglers
- HV switchgear - types, categories, application and operating capabilities
- Operation of HV overhead switching or indicating devices - 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 - fault levels and settings; types and applications; protection systems and substation equipment fault levels and settings; types and applications
- Restrictions pertaining to HV switching equipment
- Procedures for the isolation of HV mains and working earths - earthing HV electrical apparatus practices and procedures for access authority issuing; HV switching techniques;
- Operate switching apparatus - identifying hazards, assessing and controlling risks associated with HV switchgear operation, systematic and defensive techniques, mobile radio procedures and double isolation procedures

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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

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instruments are included for Assessors in the Assessment Guidelines of this 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 – UET12UET12". 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	Writing of three (3) outage strategies including at least one of each of the following network types:	LV networks HV networks
B	Each of the above outage strategies to include the following:	Switching instructions laid out according to enterprise requirements A documented process to indicate methods used to check switching instructions Documentation of coordination process of switching schedules Documentation of plant loading calculation Initiation of customer notifications according to enterprise requirements 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.

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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 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.

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Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

This Competency Standard Unit shall be demonstrated in relation to the development of planned outage strategies and may include the following equipment:

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), computer based systems (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

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RANGE STATEMENT

- Permits and / or permits to work
- Personnel.
- Quality assurance systems.
- Requirements.
- Safe design principles
- Testing procedure
- Work clearance systems

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Design

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