



Australian Government

Department of Education, Employment and Workplace Relations

UETTDRDP15A Inspect, maintain and restore energised low voltage overhead distribution network infrastructure

Release: 1

UETTDRDP15A Inspect, maintain and restore energised low voltage overhead distribution network infrastructure

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

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 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 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)

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
UEENEEE102A	Fabricate, assemble and dismantle utilities industry components
UEENEEE104A	Solve problems in d.c. Circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications

Prerequisite Unit(s)

4)

UEENEEE137A	Document and apply measures to control OHS risks associated with electrotechnology work
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in electromagnetic devices and related circuits
UEENEEG103A	Install low voltage wiring and accessories
UEENEEG104A	Install appliances, switchgear and associated accessories for low voltage electrical installations
UEENEEG105A	Verify compliance and functionality of low voltage general electrical installations
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits
UEENEEG107A	Select wiring systems and cables for low voltage general electrical installations
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEG109A	Develop and connect electrical control circuits
UEENEEK142A	Apply environmentally and sustainable energy procedures in the

Prerequisite Unit(s)

4)

energy sector

UETTDREL16A

Working safely near live electrical apparatus

UETTDRI46A

Install and maintain ESI network infrastructure electrical equipment

UETTDRI62A

Implement and monitor the power system organisational OHS policies, procedures and programs

UETTDRI63A

Implement and monitor the power system environmental and sustainable energy management policies and procedures

UETTDRI67A

Solve problems in energy supply network equipment

Literacy and numeracy skills

4.2)

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

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills

5)

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

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit
Performance Criteria describe the required performance needed to demonstrate achievement of the element.
Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare 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 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

ELEMENT	PERFORMANCE CRITERIA
	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 restoration of overhead distribution 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 in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.

ELEMENT

PERFORMANCE CRITERIA

- 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.
- 2.10 Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
- 2.11 Ongoing checks of quality of the work are undertaken in accordance with instructions and

ELEMENT	PERFORMANCE CRITERIA
3 Complete the inspection, maintenance and restoration of overhead distribution network infrastructure	established procedures.
	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

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 inspecting, maintenance and restoration of overhead distribution network infrastructure.
All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-TDP15A Network infrastructure LV overhead distribution

Evidence shall show an understanding of the network infrastructure inspection, maintenance and restoration of energised low voltage overhead distribution to an extent indicated by the following aspects:

T1 Powerline safety practices encompassing:

- Protective apparatus and apparel for linework - 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 - 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 - 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 - 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 - 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 - 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 - 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 Low voltage - energised low voltage equipment working practices for substations encompassing:

REQUIRED SKILLS AND KNOWLEDGE

- 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 - 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 - 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.

T3 Poles and structures inspection principles encompassing:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements
- Characteristics of wood used for structures within the electrical distribution system - 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 - 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 - 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

T4 Powerline inspection principles encompassing:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements
- Ground line inspection procedures of electrical distribution structures - 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 - 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, methods of recording data
- Underground cable inspection procedures in the electrical distribution system - state industry policy and regulations, methods and requirements for line inspection on underground cable terminations

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

REQUIRED SKILLS AND KNOWLEDGE

- 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, 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, 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
- Personnel protective equipment (PPE) for LV switching

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 to
demonstrate
competency in
this unit** **9.2)**

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UET12". Evidence shall also comprise:

- A representative body of performance criteria demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
 - Implement Occupational Health and Safety workplace

procedures and practices including the use of risk control measures as specified in the performance criteria and 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	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)

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 two of the following:	Voltage detectors Polarities testers 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.
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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 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.

**Concurrent
assessment and
relationship with
other units**

9.5)

There are no recommended concurrencies for this unit.

Range Statement

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 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 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

RANGE STATEMENT

- 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
- Work clearance systems

Unit Sector(s)

Not applicable.

Competency Field

Competency Field	11)
	Distribution