



UET06
Electricity Supply Industry
Transmission, Distribution and Rail Sector
Training Package

Volume 2 — Part 2.1
Competency Standard Units
IS – Industry Specific

Volume 2 of 2

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UETTDNIS01A Install electrical equipment (network infrastructure)

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

	UETTDREL01A	Apply environment and sustainable energy procedures
and	UETTDREL02A	Operate plant and equipment near energised and exposed electrical conductors/apparatus
and	UETTDREL04A	Working safely near live electrical apparatus as a non-electrical worker
and	UEUNEEE001A	Apply OHS practices in the workplace
and	UEUNEEE002A	Dismantle, assemble and fabricate electrotechnology components
and	UEUNEEG002A	Solve problems in single and three phase low voltage circuits.
and	UEUNEEE008A	Lay wiring/cabling and terminate accessories for extra-low voltage circuits

Literacy and numeracy skills

2.2)

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

Reading 3 Writing 3 Numeracy 3

Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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.

- | | | | |
|---|----------------------------------------------------------------------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 | Apply Essential Knowledge and Associated Skills 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. |
| | | 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

6) 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).

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
- T2.1.1 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

RANGE STATEMENT

7) 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 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, 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

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

Range of tools/equipment/materials/procedures/workplaces/other variables		
Group	The minimum	Item List

No	number of items on which skill is to be demonstrated	
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
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3

How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1

6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8,3.1, 3.2
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UETTDRIS02A Maintain electrical equipment (network infrastructure)

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTDRIS01A	Install electrical equipment (network infrastructure)
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Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice 3.1)

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.

Competency Field 4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.

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|---|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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. |
| | | 2.3 | Apply Essential Knowledge and Associated Skills 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.
 - 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

6) 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).

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.

T2.7.3 Filtering and sampling oil and the environment

T2.1.10. Filtering and sampling of insulating oil

RANGE STATEMENT

7) 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 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
- MSDS
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the

application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and

- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 demonstrated competency working below ground, in limited spaces, with different structural/construction types and method and in a variety of environments.

Method of assessment

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies
8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRIS03A Perform LV field switching operation to a given schedule

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

- | | | |
|----|--------------|-----------------------------------------------------------------------------|
| | UETTDRCJ03A | Install and maintain de-energised HV underground paper insulated cables |
| or | UETTDRCJ07A | Install and maintain de-energised HV underground polymeric insulated cables |
| or | UETTDRIS02A | Maintain electrical equipment (network infrastructure) |
| or | UETTDRIS14A | Install and maintain overhead conductors and cables (poles and structures) |
| or | UETTDRTTP09A | Install and maintain overhead conductors and cables (towers) |

Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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.
 - 2.3 Apply Essential Knowledge and Associated Skills in the safe LV field 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 including paralleling is isolated and proved de-energised using appropriate devices and earthed where required according to requirements and established procedures. | |
| | 2.6 | Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are reported to the immediate authorised persons for directions according to established procedures. | |
| | 2.7 | Unplanned events occurring during 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. |
| | | 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

6) 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.

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

RANGE STATEMENT

7) 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

- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be

consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry’s preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3

How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application:	2
	1.1, 2.4, 2.8, 2.9, 3.1	
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1

6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8,3.1, 3.2
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UETTDRIS04A Perform high voltage field switching operation to a given schedule

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

	UETTDRCJ03A	Install and maintain de-energised HV underground paper insulated cables
or	UETTDRCJ07A	Install and maintain de-energised HV underground polymeric insulated cables
or	UETTDRIS02A	Maintain electrical equipment (network infrastructure)
or	UETTDRIS14A	Install and maintain overhead conductors and cables (poles and structures)
or	UETTDRTTP09A	Install and maintain overhead conductors and cables (towers)

Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit 3)

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

License to practice 3.1)

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.

Competency Field 4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

1 Prepare to undertake HV switching procedures to a given schedule

- 1.1 Switching and work schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analysed and confirmed, if necessary, by site inspection.
- 1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
- 1.3 OHS policies and procedures related to requirements and established procedures for HV switching are obtained and confirmed for the purposes of the work to be performed and communicated.

- | | | | |
|---|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 1.4 | Work is prioritised and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures. | |
| | 1.5 | Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures. | |
| | 1.6 | Relevant authority is obtained to perform work according to requirements and/or established procedures. | |
| | 1.7 | Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order. | |
| | 1.8 | Relevant personnel at worksite are confirmed current in First Aid and other related work procedures according to requirements. | |
| | 1.9 | Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved to carry out work where necessary. | |
| | 1.10 | Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures. | |
| | 1.11 | Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures. | |
| | 1.12 | Road signs, barriers and warning devices are positioned in accordance with requirements. | |
| 2 | Carry out HV switching procedures to a given schedule | 2.1 | OHS and Sustainable Energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and followed in accordance with requirements and/or established procedures. |
| | | 2.2 | Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed. |

- 2.3 Apply Essential Knowledge and Associated Skills for the safe undertaking of HV switching procedures to a given schedule to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
 - 2.4 Communications with Switching Control Officer are established and maintained throughout the isolation operation according to established procedures.
 - 2.5 Electrical equipment and associated circuits line/network or work site to be switched including paralleling is isolated and proved de-energised using appropriate devices and earthed where required according to requirements and established procedures.
 - 2.6 Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are reported to the immediate authorised persons for directions according to established procedures.
 - 2.7 Unplanned events occurring during HV switching 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 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

6) 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.

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

RANGE STATEMENT

7) 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 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
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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.

Context of and specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

assessment and relationship with other units

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRIS05A Perform substation switching operation to a given schedule

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

	UETTDRCJ03A	Install and maintain de-energised HV underground paper insulated cables
or	UETTDRCJ07A	Install and maintain de-energised HV underground polymeric insulated cables
or	UETTDRIS02A	Maintain electrical equipment (network infrastructure)
or	UETTDRIS14A	Install and maintain overhead conductors and cables (poles and structures)
or	UETTD RTP09A	Install and maintain overhead conductors and cables (towers)

Literacy and numeracy skills

2.2)

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

Reading 3 Writing 3 Numeracy 3

Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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. |

- | | | | |
|---|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 2.3 | Apply Essential Knowledge and Associated Skills in the 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. |
| | | 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

6) 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.

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
- 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

RANGE STATEMENT

7) 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 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, eg. 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
- Requirements
- Testing procedures

- Work clearance systems

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRIS06A Install and maintain network infrastructure electrical equipment

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

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

UETTDRIS02A Operate plant and equipment near energised and exposed electrical conductors/apparatus

and UETTDRIS22A Implement and monitor the organisational OHS polices, procedures and programs

and UETTDRIS23A Implement and monitor the environmental and sustainable energy management polices and procedures

Literacy and numeracy skills

2.2)

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

Application of the Unit

3)

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

License to practice

3.1)

The skills and knowledge described in this unit 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.

Competency Field

4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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. |
| | | 2.3 | Apply Essential Knowledge and Associated Skills 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.
- 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

6) 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).

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
- T2.1.10. 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

RANGE STATEMENT

7) 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 (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.

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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.8, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.6, 2.7, 2.11, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.6, 2.7, 2.11, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.9, 2.10, 3.1	2

How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.6, 2.7, 3.6	2
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Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.6, 2.7, 2.8, 2.9, 2.10, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.6, 2.10, 2.11, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.8, 2.9, 2.10, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.6, 2.7, 2.8, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.6, 2.7, 2.8, 2.9, 3.1, 3.2

UETTDRIS07A Sample, test, filter and reinstate insulating oil

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

Literacy and numeracy skills

2.2)

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

Reading	3	Writing	4	Numeracy	4
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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.

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| | 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 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 | Apply Essential Knowledge and Associated Skills for the safe sampling, testing, filtering and reinstating of insulating oil 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. |

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| | 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 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

6) 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.

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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| 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 |

T2.8.1	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

RANGE STATEMENT

7) 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.

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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

Range of tools/equipment/materials/procedures/workplaces/other variables		
Group No	The minimum number of items on which skill is to be	Item List

	demonstrated	
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 for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.9	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.8	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.11	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.10, 1.12	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 3.4	2

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application:
		2.3, 2.4, 2.5
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.6, 2.7, 2.8, 3.2
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 3.1, 3.2, 3.3, 3.6
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.9, 2.1, 2.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.6, 2.7

UETTDRIS08A Develop HV switching schedule

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

	UETTDRIS03A	Perform LV field switching to a given schedule
or	UETTDRIS04A	Perform HV field switching to a given schedule
or	UETTDRIS05A	Perform substation switching to a given schedule
or	UETTDRRT10A	Perform rail traction switching to a given schedule

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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.

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| | 1.8 | Clients/Customers are provided with possible solutions and/or options within the scope, 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 in the safe development of HV switching schedules is applied 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 to a community/industry standard. |

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| 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

6) 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.

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
- T2.3.1 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
- T2.4.8 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 - 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
T2.8.6	Enterprise specific - specialised tools

RANGE STATEMENT

7) 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or

less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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, eg genorators, UPS, etc. Implementing earthing procedures to reduce induced voltages. 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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**8.5)**

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

UETTDRIS09A Develop LV switching schedules

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6.	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3

How is use of technology applied?	Refer to the following Performance Criteria for examples of application:	3
	1.7, 2.2, 2.5, 2.6, 3.6	

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1.
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRIS09A Develop LV switching schedule

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

	UETTDRIS03A	Perform LV field switching to a given schedule
or	UETTDRIS04A	Perform HV field switching to a given schedule
or	UETTDRIS05A	Perform substation switching to a given schedule
or	UETTDRRT10A	Perform rail traction switching to a given schedule

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice 3.1)

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.

Competency Field 4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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.

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| | 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 | 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 in the safe development of LV switching schedules is applied 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. |

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| | 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 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

6) 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.

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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| T2.2.48 | Electrical equipment - HV and LV powerline |
| T2.3.1 | Powerline safety practices |
| 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
T2.8.6	Enterprise specific - specialised tools

RANGE STATEMENT

7) 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

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

assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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	<p>Planning of loading of network components, including standby generation.</p> <p>Evaluate load parameters and effects on system, including paralleling and off-loading.</p> <p>Identify unexpected sources of energisation, eg generators, UPS, solar, etc.</p> <p>Implementing earthing procedures to reduce induced voltages.</p> <p>Authorising issuance of work-permits.</p>
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Context of and specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

UETTDRIS08A Develop HV switching schedules

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application:	3
	1.2, 1.4, 1.8, 1.9, 2.7, 3.1, 3.2	
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6.	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRIS10A Coordinate permit procedures

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

	UETTDRIS03A	Perform LV field switching to a given schedule
or	UETTDRIS04A	Perform HV field switching to a given schedule
or	UETTDRIS05A	Perform substation switching to a given schedule
or	UETTDRRT10A	Perform rail traction switching to a given schedule

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice 3.1)

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.

Competency Field 4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 procedures.
- 1.5 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.

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| | 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 in the safe co-ordination of permit procedures is applied 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 to a community/industry standard. |

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|---|-------------------------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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

6) 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.

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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|---------|---------------------------------------------------------------|
| T2.2.49 | Coordinating permit procedures |
| 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 |
| T2.4.8 | 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
T2.8.6	Enterprise specific - specialised tools

RANGE STATEMENT

7) 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 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06". 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 skills enabling employment; 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 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

Context of and specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3

How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application:	3
	1.1, 1.7, 2.4, 2.6.	
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 2.3, 2.5, 2.6, 2.7, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 2.1, 2.2, 2.4, 2.7, 3.1.
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1

6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application:
		1.7, 2.4, 2.5, 2.6, 2.7, 3.1, 3.2

UETTDRIS11A Coordinate and direct switching schedules

Unit Descriptor 1)

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.

Prerequisite Unit(s) 2)

Competencies 2.1)

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

	UETTDRIS03A	Perform LV field switching to a given schedule
or	UETTDRIS04A	Perform HV field switching to a given schedule
or	UETTDRIS05A	Perform substation switching to a given schedule
or	UETTDRRT10A	Perform rail traction switching to a given schedule

Literacy and numeracy skills 2.2)

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
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Application of the Unit 3)

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

License to practice 3.1)

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.

Competency Field

4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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 in the safe the coordination and direction of switching schedules is applied 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 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

6) 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.

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
T2.3.1	Powerline safety practices
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	Coordinating and directing switching schedules.
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
T2.8.6	Enterprise specific - specialised tools

RANGE STATEMENT

7) 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where

summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination

legislation, regulations, policies and workplace procedures; and

- Demonstrated performance across a representative range of contexts from the prescribed items below:

Range of tools/equipment/materials/procedures/workplaces/other variables		
Group No	The minimum number of items on which skill is to be demonstrated	Item List
A	All of the following:	Approvals/clearances Access permits
B	All of the following:	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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6.	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRIS12A Install and maintain poles/structures and associated hardware

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

	UETTDREL01A	Apply environment and sustainable energy procedures
and	UETTDREL02A	Operate plant and equipment near energised and exposed electrical conductors/apparatus
and	UETTDREL04A	Working safely near live electrical apparatus as a non-electrical worker
and	UEUNEEE001A	Apply OHS practices in the workplace
and	UEUNEEE002A	Dismantle, assemble and fabricate electrotechnology components
and	UEUNEEG002A	Solve problems in single and three phase low voltage circuits
and	UEUNEEE008A	Lay wiring/cabling and terminate accessories for extra-low voltage circuits

Literacy and numeracy skills

2.2)

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

Reading 3 Writing 3 Numeracy 3

Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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.

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|---|-------------------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Carry out installation and maintenance of poles and/or structures 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 | 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 | Apply Essential Knowledge and Associated Skills 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 maintenance of poles | 3.1 | Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures. |

- and/or structures and associated hardware.
- 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

6) 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.

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 circuit principles
- 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

T2.3.1 Powerline safety practices

RANGE STATEMENT

7) 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; 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
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3

How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1

6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8,3.1, 3.2
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UETTDRIS13A Install and maintain public lighting systems

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

- | | | |
|----|--------------|-----------------------------------------------------------------------------|
| | UETTDRCJ03A | Install and maintain de-energised HV underground paper insulated cables |
| or | UETTDRCJ07A | Install and maintain de-energised HV underground polymeric insulated cables |
| or | UETTDRIS02A | Maintain electrical equipment (network infrastructure) |
| or | UETTDRIS14A | Install and maintain overhead conductors and cables (poles and structures) |
| or | UETTDRTTP09A | Install and maintain overhead conductors and cables (towers) |

Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit 3)

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

License to practice 3.1)

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.

Competency Field 4)

Industry Specific Cross-Discipline Units

ELEMENT**PERFORMANCE CRITERIA**

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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.
 - 2.3 Apply Essential Knowledge and Associated Skills 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.

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|---|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 |
| | | 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

6) 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.

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

RANGE STATEMENT

7) 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.
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where

summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, 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

8.2)

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 – UET06”. 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 skills enabling

- employment; 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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3

How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application:	1
	1.1, 1.7, 2.2, 2.4, 2.6, 2.9	
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application:	2
	1.1, 2.4, 2.8, 2.9, 3.1	
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1

4	Interacting and understanding of the context of the work task	<p>Refer to the following Performance Criteria for examples of application:</p> <p>1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6</p>
5	Planning and organising the meaningful work task	<p>Refer to the following Performance Criteria for examples of application:</p> <p>1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1</p>
6	Performing the work task in non-routine or contingent situations	<p>Refer to the following Performance Criteria for examples of application:</p> <p>1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2</p>

UETTDRIS14A Install and maintain overhead conductors and cables (poles and structures)

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTDRIS12A	Maintain poles/structures and associated hardware
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Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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.

- | | | | |
|---|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 | Apply Essential Knowledge and Associated Skills 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. |
| | | 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.
 - 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

6) 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).

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

RANGE STATEMENT

7) 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 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 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 following:	Dynamometer 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3

How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1

6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8,3.1, 3.2
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UETTDRIS15A Install and maintain low voltage services (underground)

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

	UETTDRCJ03A	Install and maintain de-energised HV underground paper insulated cables
or	UETTDRCJ07A	Install and maintain de-energised HV underground polymeric insulated cables
or	UETTDRIS02A	Maintain electrical equipment (network infrastructure)
or	UETTDRIS14A	Install and maintain overhead conductors and cables (poles and structures)
or	UETTDRTTP09A	Install and maintain overhead conductors and cables (towers)

Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit 3)

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

License to practice 3.1)

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.

Competency Field 4)

Industry Specific Cross-Discipline Units

ELEMENT

5) Elements: Elements describe the essential outcomes of a unit of competency

PERFORMANCE CRITERIA

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

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 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. |

- 2.3 Apply Essential Knowledge and Associated Skills 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 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

6) 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).

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
- T2.2.7 Low voltage electrical service installation
- T2.4.2 Low voltage switching principles

RANGE STATEMENT

7) 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 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
- Work clearance systems

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 spaces, with different structural/construction types and method and in a variety of environments.

Method of assessment

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application:
		1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRIS16A Install and maintain low voltage services (overhead)

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

- | | | |
|----|--------------|-----------------------------------------------------------------------------|
| | UETTDRCJ03A | Install and maintain de-energised HV underground paper insulated cables |
| or | UETTDRCJ07A | Install and maintain de-energised HV underground polymeric insulated cables |
| or | UETTDRIS02A | Maintain electrical equipment (network infrastructure) |
| or | UETTDRIS14A | Install and maintain overhead conductors and cables (poles and structures) |
| or | UETTDRTTP09A | Install and maintain overhead conductors and cables (towers) |

Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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. |

- | | |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.3 | Apply Essential Knowledge and Associated Skills 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 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

6) 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).

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
- T2.4.2 Low voltage switching principles

RANGE STATEMENT

7) 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 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 and in a variety of environments.

Method of assessment

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application:	2
	1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRIS17A Conduct visual checking and treatment of poles and structures

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTDRIS12A	Install and maintain poles/structures and associated hardware
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Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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.

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|---|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 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 | Apply Essential Knowledge and Associated Skills 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 | Perform visual checking by testing or examining pole and/or structures from approximately eye level to below ground according to the requirements and established procedures. |
| | | 2.6 | Defective or suspect poles are identified according to established procedures. |

- | | | | |
|---|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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. |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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

RANGE STATEMENT

7) 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

- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2

How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2
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Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTD RIS18A Locate faults in underground power cables

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

	UETTDRCJ03A	Install and maintain de-energised HV underground paper insulated cables
or	UETTDRCJ07A	Install and maintain de-energised HV underground polymeric insulated cables
or	UETTD RIS02A	Maintain electrical equipment (network infrastructure)
or	UETTD RIS14A	Install and maintain overhead conductors and cables (poles and structures)
or	UETTD RTP09A	Install and maintain overhead conductors and cables (towers)

Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit **3)**

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

License to practice **3.1)**

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.

Competency Field **4)**

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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.
- 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.

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|---|--------------------------------------------------------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Carry out the location of faults in underground power 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 | Apply Essential Knowledge and Associated Skills 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. |
| | | 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

6) 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.

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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|---------|---------------------------------------------------------|
| 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 |

RANGE STATEMENT

7) 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 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRIS19A **Conduct high potential testing of underground power cables**

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

	UETTDRCJ03A	Install and maintain de-energised HV underground paper insulated cables
or	UETTDRCJ07A	Install and maintain de-energised HV underground polymeric insulated cables
or	UETTDRIS02A	Maintain electrical equipment (network infrastructure)
or	UETTDRIS14A	Install and maintain overhead conductors and cables (poles and structures)
or	UETTDRTTP09A	Install and maintain overhead conductors and cables (towers)

Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit 3)

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

License to practice 3.1)

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.

Competency Field 4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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.

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| | 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 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. |
| 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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| 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 in the safe conduction of high potential testing is applied 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. |
| 3.1 | 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. |
| 3.4 | Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures. |
- Complete high potential testing

- 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

6) 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.

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
- 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

RANGE STATEMENT

7) 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:

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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a 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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

UETTDRIS18A Locate faults in underground power cables

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRIS20A **Install and replace energy meters and associated equipment**

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

- | | | |
|----|--------------|-----------------------------------------------------------------------------|
| | UETTDRCJ03A | Install and maintain de-energised HV underground paper insulated cables |
| or | UETTDRCJ07A | Install and maintain de-energised HV underground polymeric insulated cables |
| or | UETTDRIS02A | Maintain electrical equipment (network infrastructure) |
| or | UETTDRIS14A | Install and maintain overhead conductors and cables (poles and structures) |
| or | UETTD RTP09A | Install and maintain overhead conductors and cables (towers) |

Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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 Apply Essential Knowledge and Associated Skills in the safe installation and replacement of energy meters and associated equipment to ensure completion in an agreed timeframe and, to quality 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 appropriate personnel notified.

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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

RANGE STATEMENT

7) 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, 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

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRIS21A Install mobile generation set for synchronised genset LV

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

	UETTDRCJ03A	Install and maintain de-energised HV underground paper insulated cables
or	UETTDRCJ07A	Install and maintain de-energised HV underground polymeric insulated cables
or	UETTDRIS02A	Maintain electrical equipment (network infrastructure)
or	UETTDRIS14A	Install and maintain overhead conductors and cables (poles and structures)
or	UETTDRTTP09A	Install and maintain overhead conductors and cables (towers)

Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit **3)**

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

License to practice **3.1)**

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.

Competency Field **4)**

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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. |

- 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 in the safe installation of mobile generation set for synchronised genset LV is applied 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 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

6) 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.

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 mobile 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

RANGE STATEMENT

7) 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 maintenance 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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:	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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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.

Method of assessment

8.4)

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

8.5)

assessment and relationship with other units

There are no concurrent assessment recommendations for this unit.

Key competencies
8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRIS22A Implement and monitor the organisational OHS policies, procedures and programs

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UEUNEEE001A Apply OHS practices in the workplace

and UETTDREL04A Working safely near live electrical apparatus as a non-electrical worker

Literacy and numeracy skills

2.2)

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

Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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 plant operators and 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 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 in the safe implementation and monitoring of the participative arrangements for the management of organisational OHS policy procedures, programs and issues is applied 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.
 - 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

6) 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.

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

RANGE STATEMENT

7) 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, polices 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06". 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 skills enabling employment; and
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 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 incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

8.3)

This unit should be assessed as it 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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

UETTDRIS23A Implement and monitor environmental and sustainable energy management policies and procedures

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	2
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	1

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRIS23A Implement and monitor environmental and sustainable energy management policies and procedures

Unit Descriptor

1)

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 polices and plans and, development of modifications as part of the review process.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTDREL01A	Apply environment and sustainable energy procedures
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Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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 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 in the safe implementation and monitoring of environmental and sustainable energy management policies and procedures is applied 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 /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified. |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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
T2.8.4	Enterprise specific - sustainable energy principles

RANGE STATEMENT

7) 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 polices 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 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to

8.2)

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

**demonstrate
 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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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. 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.
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Context of and specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

UETTDRIS22A Implement and monitor environmental and sustainable energy management policies and procedures

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
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How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3

2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1.
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRIS24A Install mobile generation set for synchronised genset HV

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

	UETTDRIS03A	Perform LV field switching to a given schedule
or	UETTDRIS04A	Perform HV field switching to a given schedule
or	UETTDRIS05A	Perform substation switching to a given schedule
or	UETTDRRT10A	Perform rail traction switching to a given schedule
and	UETTDRIS21A	Install Mobile generation set for synchronised genset LV

Literacy and numeracy skills

2.2)

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

Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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.

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| | 1.4 | Relevant requirements and established procedures for the work are to all personnel and identified for all work sites. |
| | 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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|---|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 in the safe installation of mobile generation set for synchronised genset HV is applied 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 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

6) 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.

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

RANGE STATEMENT

7) 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 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in

Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06". 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 skills enabling employment; and
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures;
and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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:	<p>Autonomous installation of a mobile generator set for synchronised genset HV incorporating operation, connection and disconnection of the generator</p> <p>Evaluating load characteristics associated with netorking of generators.</p> <p>Synchronisation of the generator control systems onto and off the network without interruption to supply.</p> <p>Estimation of HV load and assessing the appropriateness of the generator</p> <p>Operating a generator in parallel to a single HV job</p>
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3

How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application:	3
	1.1, 1.7, 2.4, 2.6.	
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4

3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1.
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRIS25A Contribute to coordinated high voltage live line work

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

There are no prerequisite competencies to this unit.

Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field 4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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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| | 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. |
| | 2.5 | Essential Knowledge and Associated Skills in the safe contribution to coordinated High Voltage Live Line work is applied 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 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

6) 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.

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 |
| T2.3.3 | 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 |

RANGE STATEMENT

7) 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 polices 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.
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

- | | |
|-------------|------------------------------------------------------------------------------------|
| UETTDRDP04A | Maintain energised high voltage distribution overhead electrical apparatus (glove) |
| UETTDRRT13A | Maintain energised traction overhead electrical apparatus (glove and barrier) |
| UETTDRTP14A | Maintain energised lines (transmission) using bare |

hand technique

UETTDRTTP15A Maintain energised lines (transmission) using bare hand technique on a helicopter platform

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5, 1.9, 1.11, 2.1, 3.1, 3.2, 3.3, 3.7	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.6, 2.10, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.3, 1.8, 1.10, 1.12, 2.3, 3.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.4, 1.11, 2.2, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 2.7, 2.8, 2.9	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.1, 3.6	2

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.11, 2.2, 2.3, 2.4, 3.1
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 2.5, 2.6, 3.2
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 2.7
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.4, 1.9, 2.10
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.10, 2.10
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.8, 2.9

UETTDRIS26A Manage an electrical supply industry OHS management system

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

There are no prerequisite competencies to this unit.

Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

1	Plan to manage an ESI OHS management system	1.1	Purpose of the OHS management system is established after data is analysed and expected outcomes of the work are confirmed with the 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 is 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.
- 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 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.

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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

RANGE STATEMENT

7) 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will

contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 polices and procedures. Implement OHS polices and procedures.

		<p>Maintain OHS polices and procedures.</p> <p>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.</p>
B	All of the following:	<p>Management of system approach to OHS.</p> <p>Management of the organisation's procedure for maintaining OHS records.</p>
C	All of the following applications of risk management procedures	<p>Develop and implement organisation's procedures for identifying hazards and assessing risks.</p> <p>Develop and implement organisation's procedures for controlling risks.</p> <p>Develop and implement organisation's procedures for dealing with hazardous events.</p> <p>Analysis and manage risk assessment and risk control in accordance with the hierarchy of control in the workplace.</p> <p>Design and implement appropriate OHS management systems</p>
D	All of the following	<p>Investigation into OHS training requirements, incidents and accidents with recommendations on action plan.</p> <p>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.</p> <p>Develop and conduct two (2) information/training sessions on current OHS issues for the workforce.</p>
E	At least one occasion	<p>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.</p>

Context of and specific 8.3)

This unit should be assessed as it relates to normal work practice using

resources for assessment

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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

BSBMGT507A Manage environmental performance

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application:	3
	1.2; 1.5; 1.6; 1.7; 3.2; 3.3	

How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1; 2.5; 2.7; 2.8; 2.10; 3.3; 3.5	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4; 2.3; 2.6; 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.2; 1.6; 1.7; 2.3; 3.2; 3.5	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1	2
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1; 1.4; 1.6; 2.1; 2.4; 2.10	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 3.3; 3.7	2

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: All
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.6; 3.5

3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 3.2; 3.3
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.6; 3.7
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1; 1.4; 2.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.10; 3.5

UETTDRIS27A Install and maintain overhead distribution network infrastructure

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

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

	UETTDREL02A	Operate plant and equipment near energised and exposed electrical conductors/apparatus
and	UETTDRIS22A	Implement and monitor the organisational OHS polices, procedures and programs
and	UETTDRIS23A	Implement and monitor the environmental and sustainable energy management polices and procedures

Literacy and numeracy skills

2.2)

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

Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Industry Specific Cross-Discipline Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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 overhead 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 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 Apply Essential Knowledge and Associated Skills 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 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.

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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 circuit principles
- 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
T2.2.7	Low voltage electrical service installation
T2.3.1	Powerline safety practices

RANGE STATEMENT

7) 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.

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
- Requirements
- Testing procedures

- Work clearance systems

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to

8.2)

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

**demonstrate
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 – UET06”. 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 skills enabling employment; 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:	Wood pole/structure Steel pole/structure Concrete pole/structure Composite pole/structure
B	With regards to “A” incorporate at 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 conductors and cables:	Copper Aluminium Steel LV abc 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 Beat (wave sagging)

	the following:	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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

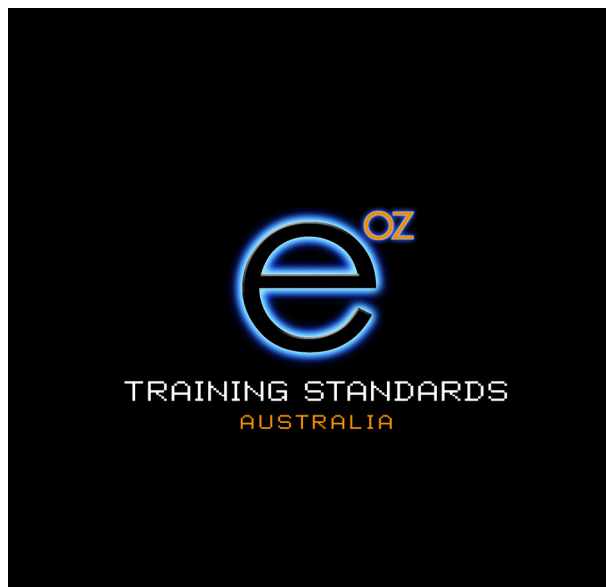
Key competencies	Example of Application	Performance Level
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How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.12, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application:	2
	1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10, 2.11, 3.1, 3.2, 3.3	
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.6, 2.7, 2.8, 2.9, 2.10, 2.11, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.5, 2.11, 2.12	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application:	2
	1.1, 2.4, 2.11, 2.12, 2.13, 3.1	
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 2.11, 3.6	2

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 2.5, 2.6, 2.7, 2.8, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2



UET06
Electricity Supply Industry
Transmission, Distribution and Rail Sector
Training Package

Volume 2 — Part 2.1
Competency Standard Units
RT– Rail Traction

Volume 2 of 2

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UETDRRT01A Install overhead traction wiring systems

Unit Descriptor

1)

This 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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETDRIS14A	Install and maintain overhead structures and electrical apparatus (poles/structures)
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Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice 3.1)

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.

Competency Field 4)

Rail Traction Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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 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. |
| 2.1 | 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. |
- Carry out the installation of overhead traction wiring systems

- | | |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.4 | Apply Essential Knowledge and Associated Skills 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. |
| 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. |
| 3.1 | 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. |
- Complete the installation of overhead traction wiring systems

- 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

6) 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.

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 wiring traction systems

RANGE STATEMENT

7) 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; 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
- Legislation
- MSDS
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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

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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 spaces, with different structural/construction types and method and in a variety of environments.

Method of assessment

8.4)

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
8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

UETDRRT07A Install overhead traction equipment and components

Key competencies
8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application:	2
	1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2

How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2
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Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETDRRT02A Maintain overhead traction wiring systems

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETDRRT01A Maintain overhead wiring systems

Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Rail Traction Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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 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 Apply Essential Knowledge and Associated Skills 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 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.
- 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

6) 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.

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 wiring traction systems

RANGE STATEMENT

7) 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 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, 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

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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.

Method of assessment

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

UETDRRT08A Maintain overhead traction equipment and components

UETDRRT09A Operate road rail traction height access equipment

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1

How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETDRRT03A Install traction bonds

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETDRIS14A	Install and maintain overhead conductors and cables (poles/structures)
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Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field 4)

Rail Traction Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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 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 Apply Essential Knowledge and Associated Skills 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 established procedures.

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|---|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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. |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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

RANGE STATEMENT

7) 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 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
- Legislation
- MSDS
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence

need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

Range of tools/equipment/materials/procedures/workplaces/other variables		
Group No	The minimum number of items on which skill is	Item List

	to be demonstrated	
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 for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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**8.5)**

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

UETDRRT01A Install overhead traction wiring systems

UETDRRT07A Install overhead traction equipment and components

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills	Refer to the following Performance Criteria for examples of application:	

applied?	1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETDRRT04A Maintain traction bonds

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETDRRT03A Install traction bonds

Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Rail Traction Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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.

- 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 Apply Essential Knowledge and Associated Skills 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 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. |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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

RANGE STATEMENT

7) 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 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
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to

consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
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How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3

2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETDRRT05A Install overhead traction configurations

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETDRRT02A Maintain overhead traction wiring systems

and UETDRRT08A Maintain overhead traction equipment and components

Literacy and numeracy skills

2.2)

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

Reading 3 Writing 3 Numeracy 3

Application of the Unit

3)

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

License to practice 3.1)

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.

Competency Field 4)

Rail Traction Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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.
 - 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 Apply Essential Knowledge and Associated Skills in the safe installation 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 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 appropriate personnel notified.

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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

RANGE STATEMENT

7) 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically

simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and

- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

UETDRRT09A Operate road rail traction height access equipment

UETDRRT10A Conduct rail traction switching operations

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2

How is team work used within this competency?	Refer to the following Performance Criteria for examples of application:	3
	2.3, 2.5, 2.6, 2.10, 3.4	
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6

5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application:
		1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application:
		1.7, 2.4, 2.5, 2.6, 2.7, 2.8,3.1, 3.2

UETDRRT06A Maintain overhead traction configurations

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETDRRT05A	Install overhead traction configurations
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Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Rail Traction Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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 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 | 2.1 | Carry out the maintenance of overhead traction configurations
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 Apply Essential Knowledge and Associated Skills 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 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.

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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

RANGE STATEMENT

7) 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 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of 8.1)

Assessment

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry’s preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, 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

8.2)

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 – UET06”. 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 skills enabling employment; and
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and	Refer to the following Performance Criteria for examples of application:	

organised?	1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4

3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8,3.1, 3.2

UETDRRT07A Install overhead traction equipment and components

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETDRIS14A	Install and maintain overhead conductors and cables (poles/structures)
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Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice 3.1)

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.

Competency Field 4)

Rail Traction Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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.
- 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 Apply Essential Knowledge and Associated Skills 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 | 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. |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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

RANGE STATEMENT

7) 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.

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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry’s preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to

8.2)

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

**demonstrate
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 – UET06”. 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 skills enabling employment; 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
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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.

Method of assessment

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

UETDRRT01A Install overhead traction wiring systems

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills	Refer to the following Performance Criteria for examples of application:	

applied?	1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETDRRT08A Maintain overhead traction equipment and components

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETDRRT07A	Install overhead traction equipment and components
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Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Rail Traction Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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. |
| | 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 | 2.1 | Carry out the maintenance of overhead traction equipment/components
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 Apply Essential Knowledge and Associated Skills 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.
 - 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.

- 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

6) 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.

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

RANGE STATEMENT

7) 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, 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

UETDRRT02A Maintain overhead traction wiring systems

UETDRRT07A Install overhead traction equipment and components

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2

How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4

3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8,3.1, 3.2

UETTDRRRT09A Operate road rail traction height access equipment

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

	UETTDRRRT02A	Maintain overhead traction wiring systems
and	UETTDRRRT08A	Maintain overhead traction equipment and components

Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Rail Traction Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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. | |
| | 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 | Apply Essential Knowledge and Associated Skills 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 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. |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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

RANGE STATEMENT

7) 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 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
- Requirements
- Testing procedures
- Work clearance systems

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety

and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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.

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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

- UETDRRT02A Maintain overhead traction wiring systems
- UETDRRT08A Maintain overhead traction equipment and components

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETDRRT10A Perform rail traction switching operations to a given schedule

Unit Descriptor

1)

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

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETDRRT02A Maintain overhead traction wiring systems

and UETDRRT08A Maintain overhead traction equipment and components

Literacy and numeracy skills

2.2)

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

Reading 3 Writing 3 Numeracy 3

Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Rail Traction Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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.

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|---|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 | 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 | Apply Essential Knowledge and Associated Skills 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. |

- 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.
 - 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

6) 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.

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

RANGE STATEMENT

7) 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 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and,

Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and

- Demonstrated performance across a representative range of contexts from the prescribed items below:

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
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

UETDRRT09A Operate road rail traction height access equipment

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application:	2
	1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2

How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1

4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETDRRT11A Maintain energised direct current traction overhead wiring systems

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

BSBFLM412A	Promote team effectiveness
UETDRIS25A	Contribute to coordinated HV live line work
UETDRRT06A	Maintain overhead traction configuration
UETDRRT09A	Operate road rail traction height access equipment

Literacy and numeracy skills

2.2)

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
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Application of the Unit 3)

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

License to practice 3.1)

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.

Competency Field 4)

Rail Traction Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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.

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|---|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 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 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 in the safe maintenance of energised direct current traction overhead wiring systems is applied 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 systems
 - 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 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

6) 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.

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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|---------|------------------------------------------------------------|
| 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 |
| 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 |

RANGE STATEMENT

7) 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 – 90⁰ 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, 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

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6, 2.9	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 2.8, 2.9, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETDRRT12A Maintain energised traction overhead electrical apparatus (stick)

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETDRRT11A Maintain energised DC traction overhead wiring system

Literacy and numeracy skills

2.2)

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

Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Rail Traction Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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 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 accordance with enterprise requirements.

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|---|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 2.5 | Apply the essential knowledge and associated skills 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. |
| | | 3.5 | Relevant work documentation are 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

6) 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).

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

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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; 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:	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 for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

UETDRRT13A Maintain energised DC traction overhead electrical apparatus (Glove)

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6, 2.9	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 2.8, 2.9, 3.1	3

How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3
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Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETDRRT13A Maintain energised traction overhead electrical apparatus (glove)

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETDRRT11A	Maintain energised DC traction overhead wiring system
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Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Rail Traction Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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 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.

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|---|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 | 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 accordance with enterprise requirements. |

- 2.5 Apply the essential knowledge and associated skills 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, checked and returned to storage in accordance with established procedures.
 - 3.5 Relevant work documentation are 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

6) 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).

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
- 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

RANGE STATEMENT

7) 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 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, 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

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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).

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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

UETTDTRDP12A Maintain energised DC traction overhead electrical apparatus (stick)

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6, 2.9	3

How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 2.8, 2.9, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1

6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2
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UETDRRT14A Install and maintain traction network wiring systems

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETDRIS27A	Install and maintain overhead distribution network infrastructure
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Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice 3.1)

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.

Competency Field 4)

Rail Traction Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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 control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.

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| 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 |
| 2.1 | 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. |
- Carry out the installation and maintenance of traction network wiring systems

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| 2.4 | Apply Essential Knowledge and Associated Skills 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. |
| 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. |
- Complete the installation and maintenance of traction network wiring systems

- 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

6) 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.

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 wiring traction systems

RANGE STATEMENT

7) 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.

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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on

the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 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)
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no recommended concurrencies for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.8, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.7, 2.11, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.7, 2.11, 3.4	3
How are mathematical ideas	Refer to the following Performance Criteria for examples of application:	

and techniques used?	1.1, 1.7, 2.2, 2.4, 2.7, 2.10	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.9, 2.10, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.7, 3.6	2

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.7, 2.8, 2.9, 2.10, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.10, 2.11, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.8, 2.9, 2.10, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.7, 2.8, 3.1

6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application:
		1.7, 2.4, 2.5, 2.7, 2.8, 2.8,3.1, 3.2

UETDRRT15A Install and maintain traction network equipment and components

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETDRRT14A	Install and maintain traction network wiring systems
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Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Rail Traction Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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 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 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 | Apply Essential Knowledge and Associated Skills 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 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

6) 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.

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

RANGE STATEMENT

7) 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.

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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 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	Cantilever hardware Head span

	least five of the following:	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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no recommended concurrencies for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

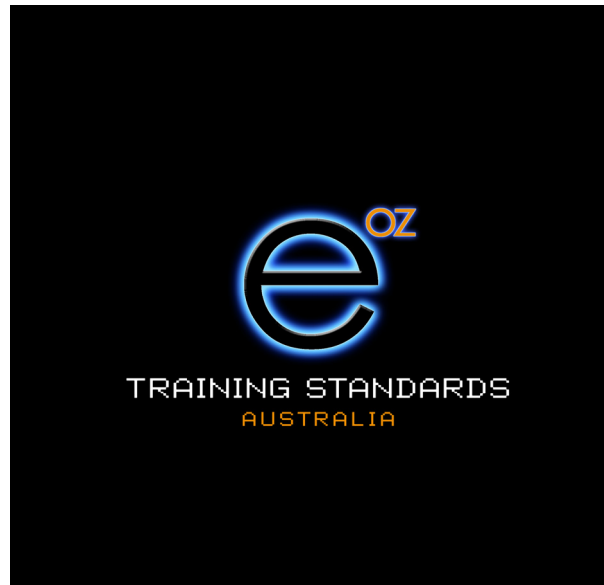
Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.7, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1

How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.7, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application:
		1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2



UET06
Electricity Supply Industry
Transmission, Distribution and Rail Sector
Training Package

Volume 2 — Part 2.1
Competency Standard Units
SB – Substation

Volume 2 of 2

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UETTDRSB01A Diagnose and rectify faults in power system substation environment

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field **4)**

Substation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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. |
| 2 | Carry out fault finding within the substation environment | <p>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.</p> <p>2.2 CPR, Rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.</p> <p>2.3 Safe working documentation is acquired and requirements completed in accordance with established procedures.</p> <p>2.4 Lifting, climbing and working aloft, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.</p> <p>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.</p> <p>2.6 Essential Knowledge and Associated Skills for the safe diagnose and rectification of faults in power system substation is applied to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.</p> <p>2.7 Faults are located, identified and affected circuits isolated in accordance with the work schedule and requirements and/or established procedures.</p> <p>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.</p> <p>2.9 Faults are diagnosed, analysed and recommendations made to prevent a reoccurrence.</p> <p>2.10 Solutions to non-routine problems are identified and actioned using acquired Essential Knowledge and Associated Skills according to requirements.</p> |

	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

6) 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 faults in power system substation environment.

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
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

RANGE STATEMENT

7) 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 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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:	AC circuit breaker system fault Transformer system fault DC supply systems fault DC switchgear and equipment fault
B	At least three of the	Multimeters

	following:	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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6.	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRSB02A Carry out substation inspection

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Substation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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.
- 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. |
| | | 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 | 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. |

- 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

6) 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.

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
- T2.10.8 Typical fault conditions and symptoms
- T2.10.9 Analyse and interpret results and measurements - substations
- T2.10.10 Equipment components and materials - substations
- T2.10.11 Substation safety practices

RANGE STATEMENT

7) 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 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.

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

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.

The Evidence Guide forms an integral part of this Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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
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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 and in a variety of environments.

Method of assessment

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3

How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6.	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application:	3
	1.1, 2.4, 2.5, 3.1	
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4

3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1.
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRSB03A Install and maintain substation DC systems

Unit Descriptor

1)

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, uninterruptured 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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field 4)

Substation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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.
- 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 for the safe installation and maintenance substation DC systems is applied 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 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 | <p>3.1 Work undertaken is checked against work schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.</p> <p>3.2 Safe working documentation is surrendered and equipment made ready for service.</p> <p>3.3 Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.</p> <p>3.4 Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.</p> <p>3.5 Required works completion records, reports and/or documentation and information are completed, processed and appropriate personnel notified in accordance with established procedures.</p> |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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 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
- T2.2.13 Low Voltage - energised work practices for substations
- T2.10.7 Substation tools and equipment
- T2.10.8 Typical fault conditions and symptoms
- 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

RANGE STATEMENT

7) 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, pilot isolation batteries and uninterrupt 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 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; 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 Sealed/unsealed lead acid batteries
B	At least one of the following:	Main batteries Communication batteries Pilot isolation 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application:	3
	2.1, 2.2, 2.3, 2.5, 2.6, 3.4	
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRSB04A Maintain HV power system breakers

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Substation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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.

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| | 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 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 for the safe maintenance of HV power system circuit breaker is applied to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. |

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| | 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. | |
| | 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

6) 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.

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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|---------|--------------------------------------------------------|
| 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
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
T2.10.14	Hydraulic and pneumatic system principles – Substations
T2.10.19	Substation switching practices
T2.10.21	Circuit breaker construction principles - substations
T2.10.22	Circuit breaker operating principles - substations

RANGE STATEMENT

7) 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.

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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, 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

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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:	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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

assessment and relationship with other units

There are no concurrent assessment recommendations for this unit.

Key competencies
8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application:	3
	1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application:	3
	1.1, 1.7, 2.4, 2.6	
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRSB05A Maintain HV power system transformers and instrument transformers

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Substation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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. | |
| 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 for the safe maintenance of HV power system transformers and instrument transformers is applied 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. |

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|---|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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. |
| 3 | Complete the maintenance of transformers and instrument transformers | <p>3.1 Work undertaken is checked against work schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.</p> <p>3.2 Safe working documentation is surrendered and transformer/instrument transformer made ready for service.</p> <p>3.3 Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.</p> <p>3.4 Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.</p> <p>3.5 Required works completion records, reports and/or documentation and information are completed, processed and appropriate personnel notified in accordance with established procedures.</p> |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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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|---------|------------------------------------------------------------|
| 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 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
- 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

RANGE STATEMENT

7) 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 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry’s preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to

8.2)

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

**demonstrate
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 – UET06”. 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 skills enabling employment; 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:	Power transformer High voltage reactor (series or parallel)
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training

Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application:	3
	1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRSB06A Install high current DC switchgear and equipment

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Substation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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.

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|---|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 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 for the safe installation of high current DC switchgear and equipment is applied 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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|---|-------------------------------------------------------------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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. |
| | | 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

6) 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.

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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|---------|--------------------------------------------------------------|
| 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 |
| T2.8.6 | Enterprise specific - specialised tools |
| T2.8.7 | Enterprise specific - equipment installation procedures |

- T2.10.4 Substation DC circuit breaker principles
- T2.10.5 Substation DC circuit breaker maintenance
- T2.10.6 Substation DC circuit breaker installation
- T2.10.7 Substation tools and equipment

RANGE STATEMENT

7) 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

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
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and,

Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; 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 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	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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 3.1
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRSB07A Maintain high current DC switchgear and equipment

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Substation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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 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 | <p>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.</p> <p>2.2 CPR, Rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.</p> <p>2.3 Safe working documentation is acquired and requirements completed in accordance with established procedures.</p> <p>2.4 Lifting, climbing and working aloft, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.</p> <p>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.</p> <p>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.</p> <p>2.7 Essential Knowledge and Associated Skills for the safe maintenance of high current DC switchgear and equipment is applied to ensure completion in an agreed timeframe and to quality standards with a minimum of waste according to requirements.</p> <p>2.8 Unplanned events or conditions are responded to in accordance with established procedures.</p> |
| 3 | Complete the maintenance of high current DC switchgear and equipment | <p>3.1 Work undertaken is checked against work schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.</p> <p>3.2 Safe working documentation is surrendered and equipment made ready for service.</p> <p>3.3 Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.</p> |

- | | |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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

6) 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.

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 |
| T2.8.6 | Enterprise specific - specialised tools |
| T2.8.7 | Enterprise specific - equipment installation procedures |
| T2.10.4 | Substation DC circuit breaker principles |
| T2.10.5 | Substation DC circuit breaker maintenance |
| T2.10.6 | Substation DC circuit breaker installation |
| T2.10.7 | Substation tools and equipment |

RANGE STATEMENT

7) 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 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.

Protection systems may include Buchholz, frame leakage, overcurrent, earth leakage, reverse current, Delta I, 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
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so

as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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

		<p>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</p>
B	At least six of the following:	<p>Direct current circuit breakers Rectifier transformers Rectifiers Isolators and links Harmonic filters Negative reactors Energy dissipation resistors</p>
C	At least ten of the following:	<p>DC feeders Surge arresters Isolating links Busbar Cables Cable supports Pits and enclosures Protection/alarm systems Control wiring Metering Supervisory interface Cabinets REC</p>
D	At least three of the following:	<p>Buchholz Frame leakage Overcurrent Earth leakage Reverse current Delta i Diode protection</p>
E	All of the following:	<p>Cable terminations Busbar termination/joint Alignment of electrical contacts of withdrawable equipment</p>
F	At least one occasion	<p>Dealing with an unplanned event by drawing on essential knowledge and associated skills to provide appropriate solutions incorporated in the holistic assessment with the</p>

		above listed items.
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Context of and specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3

How are activities planned and organised?	Refer to the following Performance Criteria for examples of application:	3
	1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 3.4

3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 3.1
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRSB08A Reserved

UETTDRSB09A Maintain voltage regulating equipment - capacitor banks

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field 4)

Substation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

- | | | | |
|---|-------------------------------------------------------------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 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 | 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

6) 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.

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 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
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

RANGE STATEMENT

7) 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 regulating equipment, 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most

effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 assessment

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application:	3
	1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application:	3
	1.1, 1.3, 3.1, 3.5, 3.6	
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application:	3
	1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application:	3
	2.1, 2.2, 2.3, 2.5, 2.6, 3.4	
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application:	3
	1.1, 1.7, 2.4, 2.6	

How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 3.1
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRSB10A Maintain HV power system static VAR compensators

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice 3.1)

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.

Competency Field 4)

Substation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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 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 out, applying Essential Knowledge and Associated Skills, and in accordance with the work schedule and requirements and/or established procedures.
 - 2.7 Maintenance and repair of high voltage power system static VAR compensators is completed 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 static VAR compensators	<p>3.1 Work undertaken is checked against work schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.</p> <p>3.2 Safe working documentation is surrendered and high voltage static VAR compensator is made ready for service.</p> <p>3.3 Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.</p> <p>3.4 Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established procedures.</p> <p>3.5 Required works completion records, reports and/or documentation and information are completed, processed and appropriate personnel notified in accordance with established procedures.</p>

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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 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
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

RANGE STATEMENT

7) 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in

Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06". 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 skills enabling

- employment; 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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3

How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3
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Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 3.1
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRSB11A Maintain HV power system synchronous condensers

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Substation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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. | |
| 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, applying Essential Knowledge and Associated Skills, in accordance with the work schedule and requirements and/or established procedures. |
| | | 2.7 | Maintenance of high voltage power system synchronous condensers is completed 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 condensers | 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 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

6) 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.

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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|---------|----------------------------------------------------------|
| 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
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

RANGE STATEMENT

7) 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and,

Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; 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
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application:	

	3
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Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 3.1.
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRSB12A Maintain voltage regulating equipment - on load tapchangers

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field 4)

Substation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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.
- 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 Unplanned events or conditions are responded to in accordance with established procedures.

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|---|------------------------------------------------------------------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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

6) 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.

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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|---------|----------------------------------------------------------|
| 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
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

RANGE STATEMENT

7) 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)
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application

of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination

legislation, regulations, polices and workplace procedures; and

- Demonstrated performance across a representative range of contexts from the prescribed items below:

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:	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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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:

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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas	Refer to the following Performance Criteria for examples of application:	

and techniques used?	1.1, 1.7, 2.4, 2.6.	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 3.1
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-	Refer to the following Performance Criteria for examples of application:

routine or contingent situations	1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2
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UETTDRSB13A Install HV plant and equipment

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field 4)

Substation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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.

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|---|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 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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|---|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 2.11 | Work undertaken is checked against works schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures. | |
| | 2.12 | 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. |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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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| 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
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 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

RANGE STATEMENT

7) 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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:	Disconnectors Fault throwing switch Earth switch Earth grid connections Surge arrestor 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application:	3
	1.1, 1.3, 3.1, 3.5, 3.6	
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6	3
How are problem solving skills	Refer to the following Performance Criteria for examples of application:	

applied?	1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 3.1
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRSB14A Carry out thermovision surveys

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field 4)

Substation Units

ELEMENT**PERFORMANCE CRITERIA**

5) Elements: Elements describe the essential outcomes of a competency 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.

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 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 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 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

6) 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.

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 |
| T2.8.3 | 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
- 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

RANGE STATEMENT

7) 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:

- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where

summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; 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:	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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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:

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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3

How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 3.1

5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRSB15A Maintain discrete protection and control systems

Unit Descriptor

1)

This Competency Standard Unit covers the isolation, inspection, monitoring, testing, adjustment, and repair, refurbishment and/or overhaul and functional checks of discrete protection and control systems. It includes the requirements to prove the functionality of discrete systems such as over-current, overload, earth fault, alarms and controls.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Substation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

1 Plan for the maintenance 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 established procedures. |
| 2 | Carry out the maintenance of discrete protection and control systems | <p>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.</p> <p>2.2 CPR, Rescue from live electrical apparatus and other related safety procedures are in place according to requirements and established procedures.</p> <p>2.3 Safe working documentation is acquired and requirements completed in accordance with established procedures.</p> <p>2.4 Lifting, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.</p> <p>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.</p> <p>2.6 Maintenance of discrete protection and control systems is undertaken according to requirements and established procedures.</p> <p>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.</p> <p>2.8 Unplanned events or conditions are responded to in accordance with established procedures.</p> |
| 3 | Complete the maintenance of discrete protection and control systems | 3.1 Final inspections of discrete protection and control systems are undertaken and checked against the work schedule to ensure they comply with all requirements including all required documentation. |

- 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

6) 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 systems.

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 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

RANGE STATEMENT

7) 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 systems and may include the following:

Overcurrent, Frame leakage, Cooling, Buchholz, DC Supplies, Restricted Earth, Sensitive Earth Fault, CB Fail, Reclose, DC Frame leakage, CEL Fail, Under Frequency load shed, 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on

the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 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 Restricted earth fault CB fail CB reclose DC frame leakage CEL fail Under frequency load shed 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3

How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 3.4

3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 3.1
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRSB16A Commission discrete protection and control systems

Unit Descriptor

1)

This Competency Standard Unit covers the commissioning 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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

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

UTETDRSB15A	Maintain discrete protection and control systems
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Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Substation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

1 Plan for the commissioning 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 established procedures. |
| 2 | Carry out the commissioning 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 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 of the discrete system is completed within an agreed timeframe and according to requirements. |
| | 2.8 | Unplanned events or conditions are responded to in accordance with established procedures. |
| 3 | Complete the commissioning of discrete protection and control systems | 3.1 Final inspections and functional testing of the discrete protection and control systems are completed and checked to ensure compliance with 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

6) 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 discrete protection and control systems.

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 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 and control systems - 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

RANGE STATEMENT

7) 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 discrete protection and control systems and may include the following:

Overcurrent, frame leakage, cooling, buchholz, DC supplies, restricted earth, sensitive earth fault, CB fail, reclose, DC frame leakage, CEL fail, under frequency load shed, 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence

need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

Range of tools/equipment/materials/procedures/workplaces/other variables		
Group No	The minimum number of items on which skill is	Item List

	to be demonstrated	
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 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 Bucholz/surge protection Dc supplies control Restricted earth fault CB fail CB reclose DC frame leakage CEL fail Under frequency load shed 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application:	3
	1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3

How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application:	3
	1.1, 1.7, 2.4, 2.6	
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 3.4

3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 3.1.
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRSB17A Maintain distribution field devices

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field 4)

Substation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

1 Plan for the maintenance of distribution field 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. |
| 2 | Carry out the maintenance 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 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 for the safe maintenance of distribution field devices is applied 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 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

6) 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.

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 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

RANGE STATEMENT

7) 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 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

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

for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; 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 specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 3.1
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRSB18A Commission distribution field devices

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field 4)

Substation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

1 Plan for the commissioning of distribution field 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 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 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 | 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. |
| | | 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

6) 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.

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 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
- T2.10.25 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

RANGE STATEMENT

7) 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
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the

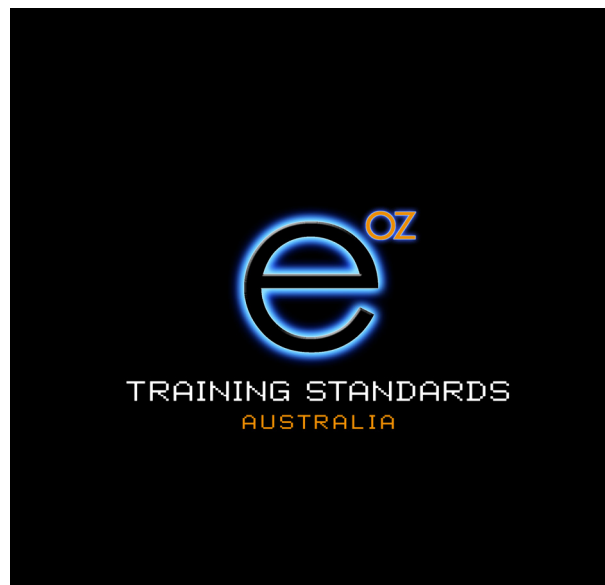
following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 3.1.
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2



UET06
Electricity Supply Industry
Transmission, Distribution and Rail Sector
Training Package

Volume 2 — Part 2.1
Competency Standard Units
SO – System Operations

Volume 2 of 2

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UETTDRS01A Reserved

UETTDRSO02A Manage network faults

Unit Descriptor

1)

This 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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

	UETTDRSO05A	Manage HV distribution and sub transmission network demand
or	UETTDRSO12A	Manage transmission network demand
or	UETTDRSO13A	Coordinate LV distribution network demand

Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

System Operation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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 organizational 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.
 - 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 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 is 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 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

6) 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.

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 |
| T2.8.13 | Enterprise specific — procedures and work practices relating to fault restorations |

T2.11.56 Analysis protection targeting

RANGE STATEMENT

7) 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 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-faceted 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; synchrosopes; 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment**8.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit**8.2)**

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 – UET06". 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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, 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and	Refer to the following Performance Criteria for examples of application:	

organised?	1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of	Refer to the following Performance Criteria for examples of application:

	the context of the work task	3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRSO03A Manage critical events

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTDRSO02A Manage network faults

Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field 4)

System Operation Units

ELEMENT**PERFORMANCE CRITERIA**

5) Elements: Elements describe the essential outcomes of a competency 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.

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.

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|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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. |
| 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 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 is 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. |
| 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

6) 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.

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
- T2.8.14 Enterprise specific — procedures and work practices relating to critical events

RANGE STATEMENT

7) 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 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3

How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5

3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRSO04A Control generating plant

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

BSBMGT507A	Manage environmental performance
UEUNEEED002A	Assembly, set-up and test personal computers
UEUNEEED004A	Use engineering application software
UEUNEEED017A	Install and configure internetworking systems
UEUNEEED027A	Develop structured programs for control sub systems to access external devices
UEUNEEED028A	Develop and test basic specification for microcontroller equipment devices
UEUNEEEEE002A	Dismantle, assemble and fabricate electrotechnology components
UEUNEEEEE007A	Use drawings, diagrams, schedules and manuals

UEUNEEG049A	Solve problems in complex polyphase power circuits
UEUNEEH011A	Solve problems in D.C power supplies with single phase input
UEUNEEH012A	Find and repair faults in the digital components in electronic apparatus
UEUNEEH039A	Solve problems in basic amplifier circuits
UEUNEEH070A	Terminate and connect components, conductors, wiring and cables for electronic circuits.
UETTDRIS26A	Manage an electricity supply industry OHS management system

Literacy and numeracy skills

2.2)

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 5 Writing 5 Numeracy 5

Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field 4)

System Operation Units

ELEMENT**PERFORMANCE CRITERIA**

5) Elements: Elements describe the essential outcomes of a competency 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.

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 polices 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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|---|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 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 is 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. |
| | | 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

6) 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.

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

RANGE STATEMENT

7) 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, 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

8.2)

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 – UET06”. 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 skills enabling employment; 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 incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3

How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2

5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRSO05A Manage HV distribution and sub transmission network demand

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

BSBMGT507A	Manage environmental performance
UEUNEEED002A	Assembly, set-up and test personal computers
UEUNEEED004A	Use engineering application software
UEUNEEED017A	Install and configure internetworking systems
UEUNEEED027A	Develop structured programs for control sub systems to access external devices
UEUNEEED028A	Develop and test basic specification for microcontroller equipment devices
UEUNEEEEE002A	Dismantle, assemble and fabricate electrotechnology components
UEUNEEEEE007A	Use drawings, diagrams, schedules and manuals
UEUNEEEG049A	Solve problems in complex polyphase power circuits
UEUNEEEH011A	Solve problems in D.C power supplies with single phase input

UEUNEEH012A	Find and repair faults in the digital components in electronic apparatus
UEUNEEH039A	Solve problems in basic amplifier circuits
UEUNEEH070A	Terminate and connect components, conductors, wiring and cables for electronic circuits.
UETTDRIS26A	Manage an electricity supply industry OHS management system
UETTDRSO10A	Coordinate HV distribution and sub transmission networks

Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

System Operation Units

ELEMENT**PERFORMANCE CRITERIA**

5) Elements: Elements describe the essential outcomes of a competency 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.

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 polices 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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| | 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 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 is 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 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. |

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| | 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 | <p>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.</p> <p>3.2 Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.</p> <p>3.3 Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.</p> <p>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.</p> |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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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| 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 - writing management reports |

RANGE STATEMENT

7) 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:

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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

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

for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; 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

		<p>HV Busbars</p> <p>HV Isolators</p> <p>HV Switchgear (applicable to enterprise equipment)</p>
B	Do all of the following:	<p>Writing switching instructions</p> <p>Analysis and review switching instructions</p> <p>Manage multiple switching instructions</p> <p>Coordinate the status of all access permits/authorities on HV network equipment relevant to the scope</p> <p>Ensure network plant operates within design and regulatory requirements on a real time basis</p> <p>Calculation of line loading</p> <p>Preparation and authorisation of HV distribution switching programs</p> <p>Demonstrate application and administration of SCADA or equivalent.</p> <p>Analysis, diagnosis and reporting of system failure</p> <p>Calculation and analysis of paralleling conditions on the interconnected HV system</p>
C	Prepare, write and check switching sheets to undertake all of the following:	<p>Manage load</p> <p>Manage Voltage</p> <p>Minimise loss</p> <p>Maximise system reliability</p> <p>Allow safe network access for maintenance activities</p> <p>Allow safe network access for construction activities</p> <p>Validating fault reports arising from system disturbances</p>
D	At least one occasion	<p>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.</p>

Context of and specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3

How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application:	3
	1.3, 1.10, 2.2	
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1

4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRSO06A Develop LV distribution switching programs

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

BSBMGT507A	Manage environmental performance
UEUNEE002A	Assembly, set-up and test personal computers
UEUNEE004A	Use engineering application software
UEUNEE027A	Develop structured programs for control sub systems to access external devices
UEUNEE002A	Dismantle, assemble and fabricate electrotechnology components
UEUNEE007A	Use drawings, diagrams, schedules and manuals
UEUNEE049A	Solve problems in complex polyphase power circuits
UEUNEE011A	Solve problems in D.C power supplies with single phase input
UEUNEE012A	Find and repair faults in the digital components in electronic

apparatus

UEUNEEH039A Solve problems in basic amplifier circuits

UEUNEEH070A Terminate and connect components, conductors, wiring and cables for electronic circuits

UETTDRIS26A Manage an electricity supply industry OHS management system

Literacy and numeracy skills

2.2)

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 5 Writing 5 Numeracy 5

Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

System Operation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.
1 Plan for the preparation of LV Distribution switching programs	<p>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.</p> <p>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.</p> <p>1.3 Organisational established procedures on policies and specifications for the LV Distribution Switching systems are obtained or established with the appropriate personnel.</p> <p>1.4 Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.</p> <p>1.5 Testing parameters are established from organisational established procedures on polices and specifications.</p> <p>1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.</p> <p>1.7 Work roles and tasks are allocated according to requirements and individuals' competencies.</p> <p>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.</p> <p>1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.</p> <p>1.10 Risk control measures are identified, prioritised and evaluated against the work schedule.</p> <p>1.11 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.</p>

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| 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 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 is 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. |

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|---|----------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 issued and records are updated in accordance with established procedures. |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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

- 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 — 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

RANGE STATEMENT

7) 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:

- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with units:

- UETTDRSO07A Develop HV Distribution and sub transmission switching programs
- UETTDRSO08A Develop and evaluate Transmission switching programs

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application:
		2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRSO07A Develop HV distribution and sub transmission switching programs

Unit Descriptor 1)

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.

Prerequisite Unit(s) 2)

Competencies 2.1)

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

BSBMGT507A	Manage environmental performance
UEUNEEED002A	Assembly, set-up and test personal computers
UEUNEEED004A	Use engineering application software
UEUNEEED027A	Develop structured programs for control sub systems to access external devices
UEUNEEEEE002A	Dismantle, assemble and fabricate electrotechnology components
UEUNEEEEE007A	Use drawings, diagrams, schedules and manuals
UEUNEEEG049A	Solve problems in complex polyphase power circuits
UEUNEEEH011A	Solve problems in D.C power supplies with single phase input
UEUNEEEH012A	Find and repair faults in the

digital components in electronic apparatus

UEUNEEH039A Solve problems in basic amplifier circuits

UEUNEEH070A Terminate and connect components, conductors, wiring and cables for electronic circuits

UETTDRIS26A Manage an electricity supply industry OHS management system

Literacy and numeracy skills

2.2)

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 5 Writing 5 Numeracy 5

Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

System Operation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.
1 Plan for the preparation of HV Distribution and Sub transmission Switching programs	<p>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.</p> <p>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.</p> <p>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.</p> <p>1.4 Testing/switching procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.</p> <p>1.5 Testing/switching parameters are established from organisational established procedures on polices and specifications.</p> <p>1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.</p> <p>1.7 Work roles and tasks are allocated according to requirements and individuals' competencies.</p> <p>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.</p> <p>1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.</p> <p>1.10 Risk control measures are identified, prioritised and evaluated against the work schedule.</p>

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| | 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 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 is 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. |

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| | 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 | <p>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.</p> <p>3.2 Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.</p> <p>3.3 Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.</p> <p>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.</p> |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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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|---------|-----------------------------------------------------|
| 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 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 — 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 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
- 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

RANGE STATEMENT

7) 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 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 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 radial 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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with units:

UETTDRSO06A Develop LV distribution switching programs

UETTDRSO08A Develop and evaluate Transmission switching programs

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3

How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1

4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRSO08A Develop and evaluate transmission switching programs

Unit Descriptor 1)

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.

Prerequisite Unit(s) 2)

Competencies 2.1)

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

BSBMGT507A	Manage environmental performance
UEUNEEED002A	Assembly, set-up and test personal computers
UEUNEEED004A	Use engineering application software
UEUNEEED027A	Develop structured programs for control sub systems to access external devices
UEUNEEEEE002A	Dismantle, assemble and fabricate electrotechnology components
UEUNEEEEE007A	Use drawings, diagrams, schedules and manuals
UEUNEEEG049A	Solve problems in complex polyphase power circuits
UEUNEEEH011A	Solve problems in D.C power supplies with single phase input
UEUNEEEH012A	Find and repair faults in the digital components in electronic

	apparatus
UEUNEEH039A	Solve problems in basic amplifier circuits
UEUNEEH070A	Terminate and connect components, conductors, wiring and cables for electronic circuits
UETTDRIS26A	Manage an electricity supply industry OHS management system

Literacy and numeracy skills

2.2)

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 5 Writing 5 Numeracy 5

Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

System Operation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.
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.
	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	2.1	Circuit/systems modelling is used to evaluate alternative proposals as per established procedures.

preparation of HV Transmission switching programs	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 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	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.

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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
- 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 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
- 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 System load calculation principles

RANGE STATEMENT

7) 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:

- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence

need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

Range of tools/equipment/materials/procedures/workplaces/other variables		
Group No	The minimum number of items on which skill is to be	Item List

	demonstrated	
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 following:	Check switching 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with units:

UETTDRSO06A Develop LV distribution switching programs

UETTDRSO07A Develop HV distribution and sub transmission switching programs

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this	Refer to the following Performance Criteria for examples of application:	

competency?	1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the	Refer to the following Performance Criteria for examples of application:

	meaningful work task	3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRSO09A Coordinate LV distribution networks

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTDRSO06A Develop LV distribution switching programs

Literacy and numeracy skills

2.2)

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 5 Writing 5 Numeracy 5

Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field 4)

System Operation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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 polices 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 polices 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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- | | | |
|---|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 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 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 is 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. |

- | | | |
|---|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 | <p>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.</p> <p>3.2 Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.</p> <p>3.3 Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.</p> <p>3.4 Approved copies of the managed LV distribution network documents are issued and records are updated in accordance with established procedures.</p> |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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
- T2.4.9 Systems switching operations and authorisation procedures — LV
- T2.4.10 Coordinating and directing switching schedules
- T2.4.12 Low voltage overhead and substation switching principles
- T2.4.14 Low voltage switching instruction preparation

RANGE STATEMENT

7) 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

- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; 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

		<p>Coordinate switching instructions</p> <p>Calculate plant loading</p> <p>Prepare and authorise LV distribution switching programs</p> <p>Monitor switching progress</p> <p>Monitor the status of access permits/authorities on LV network equipment</p> <p>Ensure network plant operates within design and regulatory requirements on a real time basis</p> <p>Dispatch and communicate with field crews to respond/rectify system abnormalities</p> <p>Application and administration of SCADA (if applicable to enterprise equipment)</p> <p>Analyse and diagnose system failures</p> <p>Calculate and analyse paralleling conditions on the interconnected LV system</p>
C	Monitor and manage switching to:	<p>Manage load</p> <p>Manage voltage</p> <p>Minimise loss</p> <p>Maximise system reliability</p> <p>Allow safe network access for maintenance activities</p> <p>Allow safe network access for construction activities</p> <p>Validating fault reports arising from system disturbances</p>
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with units:

- UETTDRSO10A Coordinate HV distribution and sub transmission networks
- UETTDRSO11A Manage Transmission networks

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3

How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5

3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRSO10A Coordinate HV distribution and sub transmission networks

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTDRSO07A	Develop HV distribution and sub transmission switching programs
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Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

System Operation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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 polices 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 polices 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 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 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 is 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 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 | <p>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.</p> <p>3.2 Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.</p> <p>3.3 Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.</p> <p>3.4 Approved copies of coordination documents are issued and records are updated in accordance with established procedures.</p> |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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 schedules |
| T2.4.11 | High voltage overhead and substation switching principles |

T2.4.13 High voltage switching instruction preparation

RANGE STATEMENT

7) 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, 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

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

assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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	HV sub transmission and distribution network HV sub transmission and distribution network manipulation to control loading on equipment

	that encompass:	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 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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with units:

UETTDRSO09A Coordinate LV distribution networks

UETTDRSO11A Manage transmission networks

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application:	3
	1.1	
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application:
		2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRSO11A Manage transmission networks

Unit Descriptor 1)

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.

Prerequisite Unit(s) 2)

Competencies 2.1)

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

BSBMGT507A	Manage environmental performance
UEUNEEED002A	Assembly, set-up and test personal computers
UEUNEEED004A	Use engineering application software
UEUNEEED017A	Install and configure internetworking systems
UEUNEEED027A	Develop structured programs for control sub systems to access external devices
UEUNEEED028A	Develop and test basic specification for microcontroller equipment devices
UEUNEEEEE002A	Dismantle, assemble and fabricate electrotechnology components
UEUNEEEEE007A	Use drawings, diagrams, schedules and manuals
UEUNEEEG049A	Solve problems in complex polyphase power circuits
UEUNEEEH011A	Solve problems in D.C power

	supplies with single phase input
UEUNEEH012A	Find and repair faults in the digital components in electronic apparatus
UEUNEEH039A	Solve problems in basic amplifier circuits
UEUNEEH070A	Terminate and connect components, conductors, wiring and cables for electronic circuits
UETTDRIS26A	Manage an electricity supply industry OHS management system
UETTDRSO08A	Develop and evaluate transmission switching programs

Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field **4)**

System Operation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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 polices 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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| | 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 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 is 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. |
| | 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

6) 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.

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 schedules
T2.4.11	High voltage overhead and substation switching principles
T2.4.13	High voltage switching instruction preparation

RANGE STATEMENT

7) 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
- Notification

- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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:	<p>Write switching instructions</p> <p>Check switching instructions</p> <p>Coordinate switching instructions</p> <p>Calculate plant loading</p> <p>Prepare and authorise EHV switching programs</p> <p>Monitor switching progress</p> <p>Monitor the status of access permits/authorities on EHV network equipment</p> <p>Ensure network plant operates within design and regulatory requirements on a real time basis</p> <p>Dispatch and communicate with field crews to respond/rectify system abnormalities</p> <p>Application and administration of SCADA (if applicable to enterprise equipment)</p> <p>Analyse and diagnose system failures</p> <p>Calculate and analyse network conditions on the interconnected EHV system.</p>
C	Monitor and manage switching to:	<p>Manage load</p> <p>Manage voltage</p> <p>Minimise loss</p> <p>Maximise system reliability</p> <p>Allow safe network access for maintenance activities</p> <p>Allow safe network access for construction activities</p> <p>Validating fault reports arising from system disturbances</p>
D	At least one occasion	<p>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.</p>

Context of and specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with units:

- UETTDRSO09A Coordinate LV distribution networks
- UETTDRSO10A Coordinate HV distribution and sub transmission networks

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3

How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

**Skills
Enabling
Employment**

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1

4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRSO12A Manage transmission network demand

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTDRSO11A Manage transmission networks

Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field 4)

System Operation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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 polices 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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| | 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 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 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 is 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. |

- | | | | |
|---|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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

6) 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.

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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| 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 of people |
| T2.8.18 | Enterprise specific — writing management reports |

RANGE STATEMENT

7) 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 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

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

assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; 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:	EHV transmission network Transmission network manipulation to control loading on equipment Transformers with EHV windings

		<p>EHV busbars</p> <p>EHV isolators</p> <p>EHV switchgear (applicable to enterprise equipment)</p> <p>Dispatch of Static/Synchronous VAR compensation (if applicable to enterprise)</p> <p>Dispatch of generation (if applicable to enterprise).</p>
B	All of the following:	<p>Writing switching instructions</p> <p>Analysis and review switching instructions</p> <p>Manage multiple switching instructions</p> <p>Calculating line loading</p> <p>Preparing and authorising EHV transmission switching programs</p> <p>Demonstrate application and administration of SCADA or equivalent.</p> <p>Analysis and diagnosis of system failure</p> <p>Calculate and analyse transmission line conditions on the interconnected EHV system.</p>
C	Prepare, write and check switching sheets to:	<p>Manage load</p> <p>Manage voltage</p> <p>Minimise loss</p> <p>Maximise system reliability</p> <p>Allow safe network access for maintenance activities</p> <p>Allow safe network access for construction activities</p> <p>Validating fault reports arising from system disturbances</p> <p>Dispatch static/synchronous VAR compensation (if applicable to enterprise)</p> <p>Dispatch generation (if applicable to enterprise)</p>
D	At least one occasion	<p>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.</p>

Context of and specific resources for assessment**8.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 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**8.4)**

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**8.5)**

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRSO13A Coordinate LV distribution network demand

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTDRS09A	Coordinate LV distribution networks
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Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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

License to practice 3.1)

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.

Competency Field 4)

System Operation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.

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 polices 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 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 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 is 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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|---|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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. | |
| | 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

6) 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.

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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|---------|-------------------------------------------|
| 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 of people
- T2.8.18 Enterprise specific — writing management reports

RANGE STATEMENT

7) 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 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
- Work clearance systems

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 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.
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Context of and specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information	Refer to the following Performance Criteria for examples of application:	

communicated within this competency?	1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application:	3
	1.3, 1.10, 2.2	
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application:

		2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRSO14A Develop crisis management plans

Unit Descriptor 1)

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.

Prerequisite Unit(s) 2)

Competencies 2.1)

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

BSBMGT507A	Manage environmental performance
UEUNEEED002A	Assembly, set-up and test personal computers
UEUNEEED004A	Use engineering application software
UEUNEEED017A	Install and configure internetworking systems
UEUNEEED027A	Develop structured programs for control sub systems to access external devices
UEUNEEED028A	Develop and test basic specification for microcontroller equipment devices
UEUNEEEEE002A	Dismantle, assemble and fabricate electrotechnology components
UEUNEEEEE007A	Use drawings, diagrams, schedules and manuals
UEUNEEEG049A	Solve problems in complex polyphase power circuits
UEUNEEEH011A	Solve problems in D.C power supplies with single phase input

UEUNEEH012A	Find and repair faults in the digital components in electronic apparatus
UEUNEEH039A	Solve problems in basic amplifier circuits
UEUNEEH070A	Terminate and connect components, conductors, wiring and cables for electronic circuits
UETTDRIS26A	Manage an electricity supply industry OHS management system

Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

System Operation Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a competency 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.
1 Plan for the development of crisis management plans	<p>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.</p> <p>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.</p> <p>1.3 Organisational established procedures on polices and specifications for the development of crisis management plans are obtained or established with the appropriate personnel.</p> <p>1.4 Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.</p> <p>1.5 Testing parameters are established from organisational established procedures on polices and specifications.</p> <p>1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.</p> <p>1.7 Work roles and tasks are allocated according to requirements and individuals' competencies.</p> <p>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.</p> <p>1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.</p> <p>1.10 Risk control measures are identified, prioritised and evaluated against the work schedule.</p> <p>1.11 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.</p>

- | | | | |
|---|------------------------------------------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 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 is 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 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

6) 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.

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 |
| T2.8.14 | Enterprise specific — procedures and work practices relating to critical events |
| T2.11.61 | Analysis network event records |
| T2.11.62 | Preparing polices and procedures |

RANGE STATEMENT

7) 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 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-faceted 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
- 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

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.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, 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

8.2)

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 – UET06”. 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 skills enabling employment; 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:	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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

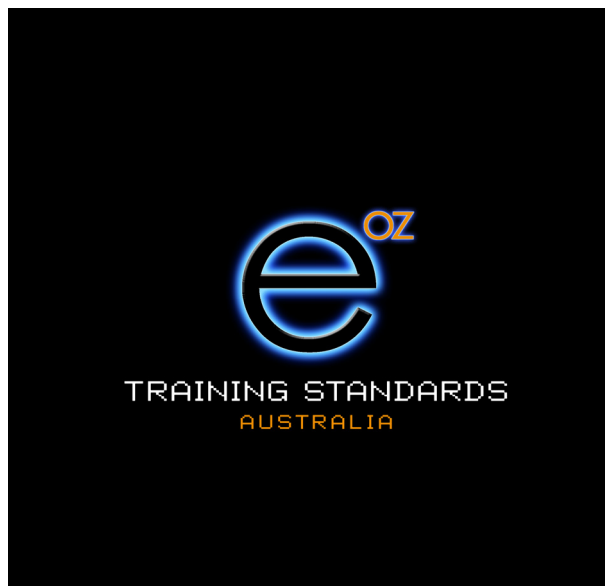
Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3

How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1



UET06
Electricity Supply Industry
Transmission, Distribution and Rail Sector
Training Package

Volume 2 — Part 2.1
Competency Standard Units
TP – Transmission

Volume 2 of 2

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UETTD RTP01A Reserved

UETTD RTP02A Establish and reinstate a transmission tower work site

Unit Descriptor

1)

This Unit covers the operation of support plant and equipment and tools for excavation work associated with construction of 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. This competency standard requires the use of relevant support plant and equipment associated with basic excavation work. It also includes minor plant and equipment maintenance limited to visual inspection; lubrication; gland nipping; draining of water taps; degreasing; replacing gaskets. Use of relevant personal protective equipment is required.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETNEEE001 A Apply OHS practices in the workplace

UETTDREL03A Comply with environmental and incident response procedures

Literacy and numeracy skills

2.2)

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

Reading 3 Writing 3 Numeracy 3

Application of the Unit

3)

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

License to practice 3.1)

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.

Competency Field 4)

Transmission Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

- | | | | |
|---|-------------------------------------------------------------------------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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. |

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|---|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 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. |

- 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.

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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
- T2.1.7 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

RANGE STATEMENT

7) 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
- Personnel
- Quality assurance systems
- Requirements
- Work clearance systems.

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate

8.2)

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

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 – UET06”. 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 skills enabling employment; 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, indicating OHS and environmental issues/hazards. Verify qualifications to operate machinery and perform machinery daily log checks. Submit Dial Before You dig

		<p>application form.</p> <p>Verify understanding of material safety data sheets (MSDS) and work permits.</p> <p>Undertake appropriate traffic control management</p> <p>Verify an understanding of working safely with hazardous materials and equipment, safe manual handling techniques and correct use of personal protective equipment.</p>
B	Operate at least 6 of the following	<p>Small generator sets</p> <p>Welding units</p> <p>Air Compressors and hoses</p> <p>Pneumatic and/or electric hammers</p> <p>Rollers and compactors</p> <p>Concrete and ceramic cutters</p> <p>Pumps</p> <p>Post hole diggers</p> <p>Drills</p>
C	Operate at least one of the following	<p>Back hoes</p> <p>Earth drilling rigs</p> <p>Trench excavators</p> <p>Heavy vehicles</p>
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

UETTD RTP03A Erect transmission towers

UETTD RTP04A Erect transmission tower hardware

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4; 2.6; 3.5	1
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.5; 1.6, 2.5; 3.1; 3.6	1
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.6	1
How is team work used within this	Refer to the following Performance Criteria for examples of application:	

competency?	1.2; 1.4	1
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.2, 2.3	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 2.7, 2.8, 2.9	1
How is use of technology applied?	Refer to the following Performance Criteria for examples of application:	1
	2.4, 3.3	

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: All
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.1; 1.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 3.1; 3.6
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2; 2.5; 2.8; 3.3
5	Planning and organising the	Refer to the following Performance Criteria for examples of application:

	meaningful work task	1.4; 1.5; 1.7
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.6; 2.7

UETTD RTP03A Erect transmission towers

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETNEEE001A	Apply OHS practices in the workplace
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UETTDREL03A	Comply with environmental and incident response procedures
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Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Transmission Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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 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, 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 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 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 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.

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|---|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 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

6) 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.

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
- T2.2.1 Generation power systems
- T2.2.2 Transmission, distribution and rail power systems
- T2.2.10 Transmission structures and hardware
- T2.8.3 Enterprise specific - technical drawings and documents

RANGE STATEMENT

7) 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 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
- 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
- Personnel
- Quality assurance systems
- Requirements
- Work clearance systems

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and,

Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; 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 specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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**8.4)**

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**8.5)**

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

UETTD RTP02A Establish and reinstate a transmission tower work site

UETTD RTP04A Erect transmission tower hardware

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2; 1.4; 2.6	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1; 1.3; 1.6; 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2; 1.7	3
How is team work used within this	Refer to the following Performance Criteria for examples of application:	

competency?	1.5; 1.4; 1.11	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application:	3
	1.7; 1.10; 2.3	
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 2.1; 2.2; 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 2.4	3

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: All
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.1; 1.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 3.1; 3.6
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2; 2.5; 2.8; 3.3
5	Planning and organising the	Refer to the following Performance Criteria for examples of application:

	meaningful work task	1.4; 1.5; 1.7
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.6; 2.7

UETTD RTP04A Erect transmission tower hardware

Unit Descriptor

1)

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 positioning of road signs, barriers and or warning devices, 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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTD RTP03A Erect transmission towers

Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Transmission Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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 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, 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 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 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

6) 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.

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
- E2.11.1 Hand tools
 - E2.11.2.1 Power tools
- T2.1.7 Enterprise vehicles
- T2.3.1 Powerline safety practices
- T2.8.1 Enterprises specific - policies and procedure instructions
- T2.8.2 Enterprises specific - OHS instructions

RANGE STATEMENT

7) 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 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
- 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
- Personnel
- Quality assurance systems
- Requirements
- Work clearance systems

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence

need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

Range of tools/equipment/materials/procedures/workplaces/other variables		
Group No	The minimum number of items on	Item List

	which skill is to be demonstrated	
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:	Mass concrete Caisson or pile-based Screw-anchor Bored
D	At least one of the following:	Crane Gin pole
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

UETTD RTP02A Establish and reinstate a transmission tower work site

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2; 1.4; 2.6	1
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1; 1.3; 1.6; 3.6	1

How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2; 1.7	1
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.5; 1.4; 1.11	1
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.7; 1.10; 2.3	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 2.1; 2.2; 2.7	1
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 2.4	1

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: All
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.1; 1.5
3	Reflecting on the outcome and	Refer to the following Performance Criteria for examples of application:

	process of work task	3.1; 3.6
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2; 2.5; 2.8; 3.3
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.4; 1.5; 1.7
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.6; 2.7

UETTD RTP05A Pre-tension stringing transmission overhead conductors and cables

Unit Descriptor

1)

This Competency Standard Unit covers the stringing of overhead conductors and cables with no electrical connections being made. It includes the correct positioning of road signs, barriers and or warning devices, 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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTD RTP04A	Erect transmission tower hardware
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Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice 3.1)

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.

Competency Field 4)

Transmission Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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|---|-------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 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 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. |

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|---|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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, 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 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 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 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 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

6) 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.

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
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions
T2.2.32	Stringing transmission overhead conductors and cables

RANGE STATEMENT

7) 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, low voltage aerial bundled cable (LVABC), high voltage aerial bundled cable (HVABC), high voltage insulated unscreened conductor (IUC) or "covered conductor" and service cables.

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
- 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
- Personnel
- Quality assurance systems
- Requirements
- Work clearance systems

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in

Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06". 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 skills enabling employment; and
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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:	Copper Aluminium Steel LV ABC 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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2; 1.4; 2.6	1

How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1; 1.3; 1.6; 3.6	1
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2; 1.7	1
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.5; 1.4; 1.11	1
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.7; 1.10; 2.3	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 2.1; 2.2; 2.7	1
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 2.4	1

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: All
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.1; 1.5

3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 3.1; 3.6
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2; 2.5; 2.8; 3.3
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.4; 1.5; 1.7
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.6; 2.7

UETTD RTP06A Erect transmission towers and associated hardware

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

	UETTDREL01A	Apply environment and sustainable energy procedures
and	UETTDREL02A	Operate plant and equipment near energised and exposed electrical conductors/apparatus
and	UETTDREL04A	Working safely near live electrical apparatus as a non-electrical worker
and	UEUNEEE001A	Apply OHS practices
and	UEUNEEE002A	Dismantle, assemble and fabricate electrotechnology components
and	UEUNEEE008A	Lay wiring/cabling and terminate accessories for extra-low voltage circuits
and	UEUNEEG002A	Solve problems in single and three phase low voltage circuits

Literacy and numeracy skills

2.2)

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

Reading 3 Writing 3 Numeracy 3

Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Transmission Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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, 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 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 | Lifting, climbing, working \ aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed. | |
| | 2.3 | Apply Essential Knowledge and Associated Skills 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. |
| | | 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

6) 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.

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
- T2.2.10 Transmission structures and hardware
- T2.3.1 Powerline safety practices

RANGE STATEMENT

7) 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 assessment

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application:	2
	1.1, 1.3, 3.1, 3.5, 3.6	
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application:
		1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTD RTP07A Maintain transmission towers and associated hardware

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTD RTP06A	Erect transmission towers and associated hardware
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Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Transmission Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 Top Rescue and other related work procedures according to requirements.

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|---|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 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 | Apply Essential Knowledge and Associated Skills 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. |
| | 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 | <p>3.1 Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures.</p> <p>3.2 Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable.</p> <p>3.3 Work site is rehabilitated, cleaned up and made safe in accordance with established procedures.</p> <p>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.</p> <p>3.5 Relevant work permit(s) are signed off and, towers and associated hardware are returned to service in accordance with requirements.</p> <p>3.6 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.</p> |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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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|----------|------------------------------------------------|
| 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

RANGE STATEMENT

7) 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.

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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and,

Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; 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 for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3

How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application:	1
	1.1, 1.7, 2.2, 2.4, 2.6, 2.9	
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1

4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8,3.1, 3.2

UETTD RTP08A Transmission tower stub setting

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

There are no prerequisite competencies to this unit.

Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field 4)

Transmission Units

ELEMENT**PERFORMANCE CRITERIA**

5) Elements: Elements describe the essential outcomes of a unit of competency

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

- | | | | |
|---|------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Prepare for the setting of a transmission tower stub | 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 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 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 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 excavations, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
 - 2.4 Apply Essential Knowledge and Associated Skills 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 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

6) 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.

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 |
| 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

RANGE STATEMENT

7) 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and

- Demonstrated performance across a representative range of contexts from the prescribed items below:

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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1

How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1

6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8,3.1, 3.2
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UETTD RTP09A Install and maintain overhead conductors and cables (towers)

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTD RTP07A	Maintain transmission towers and associated hardware
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Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Transmission Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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. | |
| | 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 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 | Apply Essential Knowledge and Associated Skills 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 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.
 - 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

6) 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).

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

RANGE STATEMENT

7) 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **8.2)**

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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

		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)
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information	Refer to the following Performance Criteria for examples of application:	

communicated within this competency?	1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3

2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application:
		1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTD RTP10A Inspect overhead structures and electrical apparatus (towers)

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTD RTP07A	Maintain transmission towers and associated hardware
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Literacy and numeracy skills

2.2)

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

Reading	3	Writing	3	Numeracy	3
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Transmission Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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, Pole Top Rescue and other related work procedures according to requirements.

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| | 1.9 | Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved 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 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 | Apply Essential Knowledge and Associated Skills 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. |

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|------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 2.7 | 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 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

6) 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).

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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|---------|----------------------------------------------|
| T2.2.10 | Transmission structures and hardware |
| T2.2.29 | Transmission powerline inspection principles |
| T2.2.28 | Towers and structures inspection principles |

RANGE STATEMENT

7) 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 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; 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:	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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.10, 3.4	3

How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.6, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application:	2
	1.1, 2.4, 2.8, 2.9, 3.1	
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1

6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8,3.1, 3.2
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UETTD RTP11A Maintain energised lines (transmission) using live line stick technique

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

BSBFLM412A	Promote team effectiveness
UETTD RIS25A	Contribute to coordinated HV live line work
UETTD RTP09A	Install and maintain electrical conductors and cables (towers)

Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice 3.1)

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.

Competency Field 4)

Transmission Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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.
 - 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 in confined spaces and 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.
 - 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.

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|---|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 2.7 | Essential Knowledge and Associated Skills in the safe maintenance of energised high voltage overhead electrical transmission apparatus is applied 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. |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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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|---------|-----------------------------------------------------------------------------|
| 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

RANGE STATEMENT

7) 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; 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 EWB access Structure access
B	All of the following:	Electrical integrity of insulators Replace strain insulators Replace suspension insulators
C	At least three of	Replace/install vibration dampers

	the following:	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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies
8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6, 2.9	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 2.8, 2.9, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTD RTP12A Maintain energised lines (transmission) using Bare Hand technique

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTD RTP11A	Maintain energised lines (transmission) using live line stick technique
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Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Transmission Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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.

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| | 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 | 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 in confined spaces and 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.
 - 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 in the safe maintenance of energised high voltage overhead electrical transmission apparatus is applied 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 appropriate personnel notified

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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

RANGE STATEMENT

7) 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate

8.2)

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

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 – UET06”. 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 skills enabling employment; 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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.4, 2.6, 2.9	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 2.8, 2.9, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment	Example of Application

1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8,3.1, 3.2

UETTD RTP13A Maintain energised lines (transmission) using Bare Hand technique on a helicopter platform

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTD RTP12A	Maintain energised lines (transmission) using live Bare Hand technique
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Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice 3.1)

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.

Competency Field 4)

Transmission Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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.

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| | 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 | 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 | 2.1 | Carry out the maintenance of energised lines (transmission) using Bare Hand technique from a helicopter platform
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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|---|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 in the safe maintenance of energised high voltage overhead electrical transmission apparatus is applied 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. |
| | 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

6) 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.

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

RANGE STATEMENT

7) 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be

consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06". 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 skills enabling employment; 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 Application of helical splice
B	At least one of the following:	Replace/connect bridge/bonding connections Replace vibration damper Repair/replace conductor spacers Repair/replace conductor joint Repair conductor
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.8, 1.9, 1.11, 2.7, 3.1, 3.2	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.1, 2.2, 2.3, 2.5, 2.6, 3.4	3
How are mathematical ideas	Refer to the following Performance Criteria for examples of application:	

and techniques used?	1.1, 1.7, 2.4, 2.6, 2.9	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.5, 2.8, 2.9, 3.1	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	3

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2

UETTDRTTP14A Install and maintain overhead transmission network infrastructure

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

Entry into this unit requires at a minimum that an individual possesses an AQF level 3 qualification that meets electrical licensing requirements as per the relevant State/Territory licensing/regulations. An example is the CIII in Electrotechnology System Electrician.

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

	UETTDREL02A	Operate plant and equipment near energised and exposed electrical conductors/apparatus
and	UETTDRLS22A	Implement and monitor the organisational OHS polices, procedures and programs
and	UETTDRLS23A	Implement and monitor the environmental and sustainable energy management polices and procedures

Literacy and numeracy skills

2.2)

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

Application of the Unit

3)

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

License to practice

3.1)

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.

Competency Field

4)

Transmission Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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, 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.

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|---|-----------------------------------------------------------------------------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 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 | Apply Essential Knowledge and Associated Skills 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.
 - 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.

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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
- 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
- T2.2.30 Powerline transmission installation safety
- T2.3.1 Powerline safety practices

RANGE STATEMENT

7) 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 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

- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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	Wood pole/structure Steel pole/structure Concrete pole/structure Composite pole/structure

B	With regards to “A” incorporate at least three of the following:	<ul style="list-style-type: none"> 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:	<ul style="list-style-type: none"> Baulking Stays Concreting including foundation
D	With regards to “A” incorporate at least one of the following:	<ul style="list-style-type: none"> Crane Auger/erector ‘A’ frame Lifting beam Pole pikes Helicopter lift
E	Erect any one of the following towers:	<ul style="list-style-type: none"> Pyramid Delta pi Enterprise specific type
F	With regards to “E” incorporate at least two of the following:	<ul style="list-style-type: none"> Insulators Clamps Bolts Structural components
G	With regards to “E” incorporate at least one of the following:	<ul style="list-style-type: none"> Welding Cleaning
H	Install and maintain at least one of the following	<ul style="list-style-type: none"> Copper Aluminium Steel Composite Aluminium/steel reinforced Pilot
I	With regards to “H” incorporate at least two of	<ul style="list-style-type: none"> Elevated work platform Portable platform Gondola

	the following	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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 assessment

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.13, 2.17, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10, 3.1, 3.2, 3.3	2

How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10, 3.4	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.16, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.15, 2.16, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6

5	Planning and organising the meaningful work task	<p>Refer to the following Performance Criteria for examples of application:</p> <p>1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1</p>
6	Performing the work task in non-routine or contingent situations	<p>Refer to the following Performance Criteria for examples of application:</p> <p>1.7, 2.4, 2.5, 2.6, 2.7, 2.8,3.1, 3.2</p>

UETTD RTP15A Install and maintain transmission network infrastructure electrical equipment

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTD RTP14A	Install and maintain overhead transmission network infrastructure
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Literacy and numeracy skills

2.2)

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
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Application of the Unit

3)

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

License to practice 3.1)

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.

Competency Field 4)

Transmission Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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 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 safely followed and, currency according to requirements confirmed. |
| | 2.4 | Apply Essential Knowledge and Associated Skills 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 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

6) 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.

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 circuit principles
- 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

RANGE STATEMENT

7) 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 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, 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

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 one of the following types of towers:	Pyramid 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.

Context of and specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.2, 1.8, 1.9, 1.11, 2.8, 3.1, 3.2	2
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 3.1, 3.5, 3.6	2
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.5, 2.7, 2.10, 3.1, 3.2, 3.3	2
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application:	3
	2.3, 2.5, 2.7, 2.10, 3.4	

How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 1.1, 1.7, 2.2, 2.4, 2.7, 2.9	1
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.1, 2.4, 2.8, 2.9, 3.1	2
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.7, 2.2, 2.5, 2.6, 3.6	2

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 1.1, 1.3, 1.5, 1.6, 1.7, 1.8, 1.11, 2.2, 3.1, 3.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 1.2, 1.4, 1.7, 1.10, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 3.4
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.1, 2.5, 2.9, 2.10, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 1.2, 1.3, 1.4, 1.7, 1.8, 1.10, 2.1, 2.2, 2.4, 2.7, 2.8, 2.9, 3.1, 3.6
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 1.1, 1.2, 1.3, 1.4, 1.10, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1

6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 1.7, 2.4, 2.5, 2.6, 2.7, 2.8,3.1, 3.2
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UET06
Electricity Supply Industry
Transmission, Distribution and Rail Sector
Training Package

UET06
Volume 2 — Part 2.1
Competency Standard Units
TS – Testing

Volume 2 of 2

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UETTDRTS01A Maintain network protection and control systems (interdependent)

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTDRTS09A	Develop secondary isolation instructional documents
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Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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.

License to practice

3.1)

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.

Competency Field

4)

Testing Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 polices 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 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 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 is 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.
 - 2.8 Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.

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|---|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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

6) 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 (interdependent).

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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| E2.18.1 | Occupational Health and Safety principles |
| E2.18.2 | Electrical safe working practices |
| E2.18.8.2 | Occupational Health and Safety principles - 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
- T2.10.17 Voltage regulation scheme principles - substations
- T2.10.23 Infrared imaging principles - substations
- T2.10.25 Commissioning of distribution protection and control systems - substations
- 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 fundamentals
- T2.11.38 Disconnect and reconnect fixed wiring electrical equipment principles
- T2.11.40 Harmonics

RANGE STATEMENT

7) 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 Section 5 Range Statement of this unit must be included. Calibrate interdependent

		<p>protection and control relays from at least 5 of the protection groups as stated in the Section 5 Range Statement of this unit;</p> <p>Carry out function tests (trips, alarms etc.) on interdependent protection and control schemes. Five of the protection groups as stated in the Section 5 Range Statement of this unit must be included.</p> <p>Write reports on performance of interdependent protection and control schemes. Five of the protection groups as stated in the Section 5 Range Statement of this unit must be included</p> <p>Isolate ‘in service’ current transformers</p>
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application:	

	1.8	3
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Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRTS02A Commission network protection and control systems (interdependent)

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTDRTS01A	Maintain network protection and control systems (interdependent)
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Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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.

License to practice

3.1)

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.

Competency Field

4)

Testing Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 polices 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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| | 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 (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 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 is 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. |
| | 2.8 | Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures. |

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| | 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

6) 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 network protection and control systems (interdependent).

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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| E2.18.1 | Occupational Health and Safety principles |
| E2.18.2 | Electrical safe working practices |
| E2.18.8.2 | Occupational Health and Safety principles - 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
T2.11.19	Interdependent protection systems

RANGE STATEMENT

7) 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, 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06". 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 skills enabling employment; and
- Conduct work observing the relevant Anti discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 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.
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3

How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2

5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRTS03A Conduct evaluation of power system faults within a substation

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

BSBMGT507A	Manage environmental performance
UEUNEEED002A	Assembly, set-up and test personal computers
UEUNEEED004A	Use engineering application software
UEUNEEED017A	Install and configure internetworking systems
UEUNEEED027A	Develop structured programs for control sub systems to access external devices
UEUNEEED028A	Develop and test basic specification for microcontroller equipment devices
UEUNEEEEE002A	Dismantle, assemble and fabricate electrotechnology components
UEUNEEEEE007A	Use drawings, diagrams, schedules and manuals
UEUNEEEG049A	Solve problems in complex polyphase power circuits

UEUNEEH011A	Solve problems in D.C power supplies with single phase input
UEUNEEH012A	Find and repair faults in the digital components in electronic apparatus
UEUNEEH039A	Solve problems in basic amplifier circuits
UEUNEEH070A	Terminate and connect components, conductors, wiring and cables for electronic circuits.
UETTDRIS26A	Manage an electricity supply industry OHS management system

Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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.

License to practice

3.1)

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.

Competency Field 4)

Testing Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

- | | | | |
|---|------------------------------------------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 polices 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 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 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 is 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 procedures. |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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 principles - 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

RANGE STATEMENT

7) 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or

less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 protection relays	Relay panel Remote location

	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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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.

Method of assessment

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRTS04A Design testing and commissioning procedures for substation and field devices

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTDRTS06A	Commission metering schemes
UETTDRTS08A	Test, repair and calibrate protection relays and meters
UETTDRTS12A	Conduct evaluation of primary plant
UETTDRTS15A	Maintain network protection and control systems (complex)

Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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.

License to practice 3.1)

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.

Competency Field 4)

Testing Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 polices 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 polices 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 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 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 is 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 updated in accordance with established procedures.

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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 principles - 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 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
- 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

RANGE STATEMENT

7) 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 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
- Inspect
- Legislation
- MSDS
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence

need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
- Conduct work observing the relevant Anti discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

Range of tools/equipment/materials/procedures/workplaces/other variables		
Group No	The minimum number of items on which skill is	Item List

	to be demonstrated	
A	Develop testing and commission procedures for at least three (3) of the following substation equipment:	Bus protection Feeder/line protection 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

**Skills Enabling
Employment**

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRTS05A Test and maintain metering schemes

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTDRTS09A	Develop secondary isolation instructional documents
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Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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.

License to practice

3.1)

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.

Competency Field 4)

Testing Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 polices 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 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 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 is 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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|---|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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

6) 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.

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 principles - 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 fundamentals
- T2.11.38 Disconnect and reconnect fixed wiring electrical equipment principles
- T2.11.40 Harmonics
- T2.11.41 Fault finding and diagnostic techniques

RANGE STATEMENT

7) 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 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence

need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

Range of tools/equipment/materials/procedures/workplaces/other variables		
Group No	The minimum number of items on which skill is	Item List

	to be demonstrated	
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.

Context of and specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

assessment and relationship with other units

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRTS06A Commission metering schemes

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTDRTS05A	Test and maintain metering schemes
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Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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.

License to practice

3.1)

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.

Competency Field 4)

Testing Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 polices 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 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 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 is 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 and actioned, using acquired Essential Knowledge and Associated Skills, according to requirements.

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|---|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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

6) 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.

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 principles - 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

RANGE STATEMENT

7) 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 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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.
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Context of and specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application:
		2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRTS07A Perform accuracy checks on instrument transformers

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

BSBMGT507A	Manage environmental performance
UEUNEEED002A	Assembly, set-up and test personal computers
UEUNEEED004A	Use engineering application software
UEUNEEED027A	Develop structured programs for control sub systems to access external devices
UEUNEEEEE002A	Dismantle, assemble and fabricate Electrotechnology components
UEUNEEEEE007A	Use drawings, diagrams, schedules and manuals
UEUNEEEG049A	Solve problems in complex polyphase power circuits
UEUNEEEH011A	Solve problems in D.C power supplies with single phase input
UEUNEEEH012A	Find and repair faults in the

digital components in electronic apparatus

UEUNEEH039A Solve problems in basic amplifier circuits

UEUNEEH070A Terminate and connect components, conductors, wiring and cables for electronic circuits.

UETTDRIS26A Manage an electricity supply industry OHS management system

Literacy and numeracy skills

2.2)

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 5 Writing 5 Numeracy 5

Application of the Unit

3)

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.

License to practice

3.1)

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.

Competency Field

4)

Testing Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency		Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
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.
	1.5	Testing parameters are established from organisational established procedures on polices 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.

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|---|------------------------------------------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 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 is 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. |

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| | 2.11 | Strategic plans are developed incorporating organisation initiatives as per established procedures. |
| 3 | Complete the performance of accuracy checks on instrument transformers | <p>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.</p> <p>3.2 Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.</p> <p>3.3 Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.</p> <p>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.</p> |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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 principles - 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
- T2.3.3 Statutory and safety considerations
- 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
- T2.11.22 Instrument transformers
- T2.11.53 Protection schemes
- T2.11.59 Generator control systems - EHV

RANGE STATEMENT

7) 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety

and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 five (5) accuracy	Isolation from other secondary circuits

	checks on instrument transformers and incorporate all of the following:	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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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 demonstrated competency working in realistic environment and a variety of conditions.

Method of assessment

8.4)

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**8.5)**

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRTS08A Test, repair and calibrate protection relays and meters

Unit Descriptor 1)

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.

Prerequisite Unit(s) 2)

Competencies 2.1)

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

BSBMGT507A	Manage environmental performance
UEUNEEED002A	Assembly, set-up and test personal computers
UEUNEEED004A	Use engineering application software
UEUNEEED027A	Develop structured programs for control sub systems to access external devices
UEUNEEEEE002A	Dismantle, assemble and fabricate electrotechnology components
UEUNEEEEE007A	Use drawings, diagrams, schedules and manuals
UEUNEEEG049A	Solve problems in complex polyphase power circuits
UEUNEEEH011A	Solve problems in D.C power supplies with single phase input
UEUNEEEH012A	Find and repair faults in the digital components in electronic apparatus
UEUNEEEH039A	Solve problems in basic amplifier circuits

UEUNEEH070A Terminate and connect components, conductors, wiring and cables for electronic circuits.

UETTDRIS26A Manage an electricity supply industry OHS management system

Literacy and numeracy skills

2.2)

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 5 Writing 5 Numeracy 5

Application of the Unit

3)

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.

License to practice

3.1)

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.

Competency Field

4)

Testing Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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.

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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|---|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 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 is 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. |

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|---|------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | Complete the testing, repair and calibration of protection relays and meters | 2.11 | Strategic plans are developed incorporating organisation initiatives as per established procedures. |
| | | 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. |
| | | 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

6) 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.

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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| E2.18.1 | Occupational Health and Safety principles |
| E2.18.2 | Electrical safe working practices |
| E2.18.8.2 | Occupational Health and Safety principles - 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
T2.11.53	Protection schemes
T2.11.59	Generator control systems - EHV

RANGE STATEMENT

7) 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
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some

circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti

discrimination legislation, regulations, polices and workplace procedures; and

- Demonstrated performance across a representative range of contexts from the prescribed items below:

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
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRTS09A Develop secondary isolation instructional documents

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

BSBMGT507A	Manage environmental performance
UEUNEEED002A	Assembly, set-up and test personal computers
UEUNEEED004A	Use engineering application software
UEUNEEED027A	Develop structured programs for control sub systems to access external devices
UEUNEEEEE002A	Dismantle, assemble and fabricate electrotechnology components
UEUNEEEEE007A	Use drawings, diagrams, schedules and manuals
UEUNEEEG049A	Solve problems in complex polyphase power circuits
UEUNEEEH011A	Solve problems in D.C power supplies with single phase input
UEUNEEEH012A	Find and repair faults in the digital components in electronic apparatus
UEUNEEEH039A	Solve problems in basic amplifier circuits

UEUNEEH070A Terminate and connect components, conductors, wiring and cables for electronic circuits.

UETTDRIS26A Manage an electricity supply industry OHS management system

Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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.

License to practice

3.1)

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.

Competency Field

4)

Testing Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

- | | | | |
|---|-------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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. |
| | | 1.5 | Testing parameters are established from organisational established procedures on polices 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 | 2.1 | Circuit/systems modelling is used to evaluate alternative proposals as per established procedures. |

secondary isolation instructional documents	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 instructional documents 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 is 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 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

6) 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.

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 principles - 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

RANGE STATEMENT

7) 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 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 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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.
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Context of and specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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.
- 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application:	3
	1.1	
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRTS10A Design secondary isolation instructional documents

Unit Descriptor 1)

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.

Prerequisite Unit(s) 2)

Competencies 2.1)

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

BSBMGT507A	Manage environmental performance
UEUNEEED002A	Assembly, set-up and test personal computers
UEUNEEED004A	Use engineering application software
UEUNEEED017A	Install and configure internetworking systems
UEUNEEED027A	Develop structured programs for control sub systems to access external devices
UEUNEEED028A	Develop and test basic specification for microcontroller equipment devices
UEUNEEEEE002A	Dismantle, assemble and fabricate electrotechnology components
UEUNEEEEE007A	Use drawings, diagrams, schedules and manuals
UEUNEEEG049A	Solve problems in complex polyphase power circuits
UEUNEEEH011A	Solve problems in D.C power supplies with single phase input

UEUNEEH012A	Find and repair faults in the digital components in electronic apparatus
UEUNEEH039A	Solve problems in basic amplifier circuits
UEUNEEH070A	Terminate and connect components, conductors, wiring and cables for electronic circuits.
UETTDRTS26A	Manage an electricity supply industry OHS management system

Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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.

License to practice

3.1)

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.

Competency Field 4)

Testing Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 polices 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.
 - 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 is 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 | <p>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.</p> <p>3.2 Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.</p> <p>3.3 Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.</p> <p>3.4 Approved copies of the design of secondary isolation instructional documents are issued and records are updated in accordance with established procedures.</p> |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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 principles - enterprise responsibilities |
| T2.11.35 | Secondary switching/isolation principles and sheet preparation |

RANGE STATEMENT

7) 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 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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	Bus protection High impedance bus protection Feeder/line protection Transformer protection Earth fault protection Backup protection

	equipment:	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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRTS11A Maintain, test and commission voltage regulating equipment

Unit Descriptor 1)

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

Prerequisite Unit(s) 2)

Competencies 2.1)

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

BSBMGT507A	Manage environmental performance
UEUNEEED002A	Assembly, set-up and test personal computers
UEUNEEED004A	Use engineering application software
UEUNEEED027A	Develop structured programs for control sub systems to access external devices
UEUNEEEEE002A	Dismantle, assemble and fabricate electrotechnology components
UEUNEEEEE007A	Use drawings, diagrams, schedules and manuals
UEUNEEEG049A	Solve problems in complex polyphase power circuits
UEUNEEEH011A	Solve problems in D.C power supplies with single phase input
UEUNEEEH012A	Find and repair faults in the digital components in electronic apparatus

UEUNEEH039A	Solve problems in basic amplifier circuits
UEUNEEH070A	Terminate and connect components, conductors, wiring and cables for electronic circuits.
UETTDRIS26A	Manage an electricity supply industry OHS management system

Literacy and numeracy skills

2.2)

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 5 Writing 5 Numeracy 5

Application of the Unit

3)

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.

License to practice

3.1)

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.

Competency Field

4)

Testing Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 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. |
| | | 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 | 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. |

Distribution field devices	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

6) 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.

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 principles - 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
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 fundamentals
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

RANGE STATEMENT

7) 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

**Skills Enabling
Employment 8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRTS12A Conduct evaluation of primary plant

Unit Descriptor 1)

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.

Prerequisite Unit(s) 2)

Competencies 2.1)

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

BSBMGT507A	Manage environmental performance
UEUNEEED002A	Assembly, set-up and test personal computers
UEUNEEED004A	Use engineering application software
UEUNEEED017A	Install and configure internetworking systems
UEUNEEED027A	Develop structured programs for control sub systems to access external devices
UEUNEEED028A	Develop and test basic specification for microcontroller equipment devices
UEUNEEEEE002A	Dismantle, assemble and fabricate electrotechnology components
UEUNEEEEE007A	Use drawings, diagrams, schedules and manuals
UEUNEEEG049A	Solve problems in complex

	polyphase power circuits
UEUNEEH011A	Solve problems in D.C power supplies with single phase input
UEUNEEH012A	Find and repair faults in the digital components in electronic apparatus
UEUNEEH039A	Solve problems in basic amplifier circuits
UEUNEEH070A	Terminate and connect components, conductors, wiring and cables for electronic circuits.
UETTDRTS26A	Manage an electricity supply industry OHS management system
UETTDRTS09A	Develop secondary isolation instructional documents

Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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.

License to practice

3.1)

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.

Competency Field 4)

Testing Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 polices 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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|---|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| | 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 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 is 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 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

6) 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.

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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| E2.18.1 | Occupational Health and Safety principles |
| E2.18.2 | Electrical safe working practices |
| E2.18.8.2 | Occupational Health and Safety principles - 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 |

RANGE STATEMENT

7) 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
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3

How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1

4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRTS13A Undertake project management of substation augmentation and maintenance

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTDRTS06A	Commission metering schemes
UETTDRTS08A	Test, repair and calibrate protection relays and meters
UETTDRTS12A	Conduct evaluation of primary plant
UETTDRTS15A	Maintain network protection and control systems (complex)

Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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.

License to practice 3.1)

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.

Competency Field 4)

Testing Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 polices 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 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 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 is 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 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 issued and records are updated in accordance with established procedures. |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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 polices and procedures

RANGE STATEMENT

7) 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
- MSDS
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and,

Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti discrimination legislation, regulations, polices and workplace procedures; and

- Demonstrated performance across a representative range of contexts from the prescribed items below:

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 skills should include all of the following:	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 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3

How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5

3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRTS14A Install and maintain power system communication equipment

Unit Descriptor 1)

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.

Prerequisite Unit(s) 2)

Competencies 2.1)

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

BSBMGT507A	Manage environmental performance
UEUNEE002A	Assembly, set-up and test personal computers
UEUNEE004A	Use engineering application software
UEUNEE027A	Develop structured programs for control sub systems to access external devices
UEUNEE002A	Dismantle, assemble and fabricate electrotechnology components
UEUNEE007A	Use drawings, diagrams, schedules and manuals
UEUNEE049A	Solve problems in complex polyphase power circuits
UEUNEE011A	Solve problems in D.C power supplies with single phase input
UEUNEE012A	Find and repair faults in the digital components in electronic apparatus

UEUNEEH039A	Solve problems in basic amplifier circuits
UEUNEEH070A	Terminate and connect components, conductors, wiring and cables for electronic circuits.
UETTDRIS26A	Manage an electricity supply industry OHS management system

Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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.

License to practice

3.1)

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.

Competency Field

4)

Testing Units

ELEMENT**PERFORMANCE CRITERIA**

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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.
		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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| | 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 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 is 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. |

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|---|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 | <p>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.</p> <p>3.2 Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned.</p> <p>3.3 Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.</p> <p>3.4 Approved copies of the installation and maintenance of power system communication equipment documents are issued and records are updated in accordance with established procedures.</p> |

REQUIRED SKILLS AND KNOWLEDGE

6) 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.

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
- 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

RANGE STATEMENT

7) 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 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
- Work clearance systems

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

Range of tools/equipment/materials/procedures/workplaces/other variables		
Group	The minimum	Item List

No	number of items on which skill is to be demonstrated	
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 incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies

8.6)

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application:	

	1.8	3
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Skills Enabling Employment

8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRTS15A Maintain network protection and control systems (complex)

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

BSBMGT507A	Manage environmental performance
UEUNEEED002A	Assembly, set-up and test personal computers
UEUNEEED004A	Use engineering application software
UEUNEEED017A	Install and configure internetworking systems
UEUNEEED027A	Develop structured programs for control sub systems to access external devices
UEUNEEED028A	Develop and test basic specification for microcontroller equipment devices
UEUNEEEEE002A	Dismantle, assemble and fabricate electrotechnology components
UEUNEEEEE007A	Use drawings, diagrams, schedules and manuals
UEUNEEEG049A	Solve problems in complex

		polyphase power circuits
UEUNEEH011A	Solve problems in D.C power supplies with single phase input	
UEUNEEH012A	Find and repair faults in the digital components in electronic apparatus	
UEUNEEH039A	Solve problems in basic amplifier circuits	
UEUNEEH070A	Terminate and connect components, conductors, wiring and cables for electronic circuits.	
UETTDRIS26A	Manage an electricity supply industry OHS management system	
UETTDRTS01A	Maintain network protection and control systems (interdependent)	

Literacy and numeracy skills

2.2)

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 5 Writing 5 Numeracy 5

Application of the Unit

3)

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.

License to practice

3.1)

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.

Competency Field 4)

Testing Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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.
- 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 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 is 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 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

6) 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).

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 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
T2.10.17	Static reactive plant principles - substations
T2.11.18	Discrete protection systems
T2.11.19	Interdependent protection systems
T2.11.20	Complex protection systems
T2.10.27	Use of test equipment on discrete protection scheme - substations

RANGE STATEMENT

7) 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)
- 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06". 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 skills enabling employment; and
 - Conduct work observing the relevant Anti discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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: Note: Utilise different schemes from within the complex schemes in Section 5 - Range Statement.	Isolate protection, control and alarms associated with complex protection and 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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment 8.7)

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1

UETTDRTS16A Commission network protection and control systems (complex)

Unit Descriptor

1)

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.

Prerequisite Unit(s)

2)

Competencies

2.1)

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

UETTDRTS02A	Commission network protection and control systems (interdependent)
UETTDRTS15A	Maintain network protection and control systems (complex)

Literacy and numeracy skills

2.2)

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	5	Writing	5	Numeracy	5
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Application of the Unit

3)

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.

License to practice

3.1)

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.

Competency Field

4)

Testing Units

ELEMENT

PERFORMANCE CRITERIA

5) Elements: Elements describe the essential outcomes of a unit of competency

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

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 polices 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.

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| | 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 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 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 is 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 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

6) 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 network protection and control systems (complex).

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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|---------|-----------------------------------------------|
| 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
- T2.10.9 Analyse and interpret results and measurements - substations
- T2.10.17 Static reactive plant principles - substations
- T2.11.18 Discrete protection systems
- T2.11.19 Interdependent protection systems
- T2.11.20 Complex protection systems
- T2.10.27 Use of test equipment on discrete protection scheme - substations

RANGE STATEMENT

7) 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 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

EVIDENCE GUIDE

8) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

8.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

8.2)

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 – UET06”. 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 skills enabling employment; and
 - Conduct work observing the relevant Anti discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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: Note: Utilise different	Commissioning of a protection and control system involving five (5) complex schemes

	schemes from within the complex schemes in Section 5 - Range Statement.	
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

8.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources 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

8.4)

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

8.5)

There are no concurrent assessment recommendations for this unit.

Key competencies**8.6)**

Evidence that particular key competencies have been achieved within this Competency Standard Unit is in the context of the following Performance Criteria of evidence. See Volume 2, Part 4 for an explanation of Key competencies and levels of this Training Package.

Key competencies	Example of Application	Performance Level
How are ideas and information communicated within this competency?	Refer to the following Performance Criteria for examples of application: 1.6, 1.7, 1.8, 1.9	3
How can information be collected, analysed and organised?	Refer to the following Performance Criteria for examples of application: 1.1	3
How are activities planned and organised?	Refer to the following Performance Criteria for examples of application: 1.2, 1.5	3
How is team work used within this competency?	Refer to the following Performance Criteria for examples of application: 1.3, 1.10, 2.2	3
How are mathematical ideas and techniques used?	Refer to the following Performance Criteria for examples of application: 2.1, 2.4	3
How are problem solving skills applied?	Refer to the following Performance Criteria for examples of application: 1.4, 2.7	3
How is use of technology applied?	Refer to the following Performance Criteria for examples of application: 1.8	3

Skills Enabling Employment**8.7)**

Evidence that competency in this unit incorporates skills enabling employment is in the context of the following performance. See Volume 2, Part 5 for definitions and an explanation of skills enabling employment.

Skills for Employment		Example of Application
1	Developing and using skills within a real workplace	Refer to the following Performance Criteria for examples of application: 2.3
2	Learning to learn in the workplace	Refer to the following Performance Criteria for examples of application: 2.5
3	Reflecting on the outcome and process of work task	Refer to the following Performance Criteria for examples of application: 2.8, 3.1
4	Interacting and understanding of the context of the work task	Refer to the following Performance Criteria for examples of application: 3.2
5	Planning and organising the meaningful work task	Refer to the following Performance Criteria for examples of application: 3.3
6	Performing the work task in non-routine or contingent situations	Refer to the following Performance Criteria for examples of application: 2.1