



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **UEENEEG118A Maintain operation of electrical mining equipment and systems**

**Release: 1**

## **UEENEEG118A Maintain operation of electrical mining equipment and systems**

### **Modification History**

Not applicable.

### **Unit Descriptor**

#### **Unit Descriptor**

#### **1) Scope:**

##### **1.1) Descriptor**

This unit covers servicing of electrical systems and equipment in underground and open-cut mines. It encompasses working safely, applying knowledge of mining electrical systems and equipment, reading circuit and reticulation diagrams, applying logical fault diagnosis procedures, following fault rectification procedures and maintaining the necessary documentation.

### **Application of the Unit**

#### **Application of the Unit 2)**

This unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training. It may also be used to augment formally acquired competencies.

### **Licensing/Regulatory Information**

#### **License to practice 3)**

The skills and knowledge described in this unit may require a license to practice in the workplace subject to regulations for undertaking of electrical work and working in mines. Competencies in working in hazardous areas and with explosion-protected equipment are required where the workplace includes hazardous areas such as underground coalmines.

Practice in workplace and during training is also subject to

**License to practice****3)**

regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.
2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.

**Pre-Requisites****Prerequisite Unit(s)****4)****Competencies****4.1)**

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

UEENEEE1 01A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE1 02A	Fabricate, dismantle, assemble of utilities components
UEENEEE1 04A	Solve problems in d.c circuits
UEENEEE1 05A	Fix and secure electrotechnology equipment
UEENEEE1 07A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG0 06A	Solve problems in single and three phase low voltage machines

**Prerequisite Unit(s)****4)**

- |                 |  |
|-----------------|--|
| UEENEEG0<br>33A | Solve problems in single and three phase electrical apparatus and circuits       |
| UEENEEG0<br>63A | Arrange circuits, control and protection for general electrical installations    |
| UEENEEG1<br>01A | Solve problems in electromagnetic devices and related circuits                   |
| UEENEEG1<br>02A | Solve problems in low voltage a.c. circuit                                       |
| UEENEEG1<br>06A | Terminate cables, cords and accessories for low voltage circuits                 |
| UEENEEG1<br>08A | Trouble-shoot and repair faults in low voltage electrical apparatus and circuits |

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

**Literacy and numeracy skills****4.2)**

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

Reading	4	Writing	4	Numeracy	4
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**Employability Skills Information****Employability Skills****5)**

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

## Elements and Performance Criteria Pre-Content

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

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to maintain operation of electrical mining equipment.	1.1 OHS procedures for a given work area are identified, obtained and understood.
	1.2 OHS risk control measures and procedures in preparation for the work are followed.
	1.3 The likely extent of work to be undertaken is envisaged from fault/breakdown reports and/or discussions with appropriate person(s).
	1.4 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
	1.5 Sources of materials that may be required for the work are established in accordance with established procedures.
	1.6 Tools, equipment and testing devices needed to locate faults are obtained in accordance with established procedures and checked for correct operation and safety.
2 Maintain operation of electrical mining equipment.	2.1 OHS risk control measures and procedures for carrying out the work are followed.
	2.2 The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
	2.3 Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.4 Safety hazards resulting from the fault or

**ELEMENT****PERFORMANCE CRITERIA**

- breakdown are documented and risk control measures devised and implemented in consultation with appropriate personnel.
- 2.5 Fault finding is approached methodically drawing on knowledge of mining electrical equipment and circuits using measured and calculated values of circuit/apparatus parameters.
- 2.6 Circuit/apparatus components are dismantled where necessary and parts stored to protect them against loss or damage.
- 2.7 Faulty circuits/components are rechecked and their fault status and acquired.
- 2.8 Materials/replacement parts required to rectify faults are sourced and obtained in accordance with established procedures.
- 2.9 Effectiveness of the repair is tested in accordance with established procedures.
- 2.10 Apparatus is reassembled, finally tested and prepared for return to service.
- 2.11 Unexpected situations are dealt with safely and with the approval of an authorised person.
- 2.12 Fault finding and repair activities are carried out without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices.
- 3 Complete and report on maintaining operation of electrical mining equipment.
- 3.1 OHS work completion risk control measures and procedures are followed.
- 3.2 Reusable, faulty or worn components are tagged and dispatched for repair to maintain adequate spares.
- 3.3 Maintenance work activities are documented in accordance with established procedures.

Note.

**ELEMENT****PERFORMANCE CRITERIA**

Examples of documentation are component faults reports, test results, authorisations, permits, and parts/component dispatch and stores records.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and maintaining operation of electrical mining equipment.

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

#### **KS01-EG118A Electrical mining equipment and systems**

Evidence shall show an understanding of maintaining the operation of mining equipment to an extent indicated by the following aspects:

T1 Technical standards, regulations and codes for mining encompassing:

- Regulation governing mining and related activities
- Standards and Codes that apply to mining electrical systems
  - Standards mandated under regulation or by an authority, deemed-to-comply standard and local service requirements.
  - Codes - applicable to electrical safe working practices
- Applying standards, regulations and codes to mining electrical systems encompassing:
  - Protection for safety
  - Installation arrangement
  - Certified/approved electrical equipment
  - Installation of electrical equipment
  - Testing and verification

T2 Electrical mining systems overview encompassing:

- Mine reticulation
- Substations
- Transmission lines
- Switchgear
- Earthing

T3 Electrical control and protection in mines encompassing:

- Types of protection
- Operation of protection devices and systems
- Prospective fault currents
- Discrimination

T4 Mining cables encompassing:

- Handling
- Storage
- Testing

T5 Operation and safety of mining equipment encompassing:



## REQUIRED SKILLS AND KNOWLEDGE

- Battery charging
- Battery operated vehicles
- Conveyors
- Mine winder and package systems
- Ore extraction machinery
- Shuttle cars
- Ventilation fans

T6 Environmental monitoring and control encompassing:

- Basic principles
- Types and application of sensors
- Control methods

T7 Equipment monitoring methods

T8 Fire detection, warning and control systems

## Evidence Guide

### EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

### Overview of Assessment

#### 9.1)

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

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

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

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

**Critical aspects  
of evidence  
required to  
demonstrate  
competency in  
this unit**     **9.2)**

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

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a

percentile graded result for the purpose of regulatory or licensing requirements.

- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Maintain operation of electrical mining equipment as described in 8) and including:

A Envisaging the likely extent of work from fault/breakdown reports and discussion with appropriate person(s).

B Using methodical fault finding techniques.

C Finding faults efficiently.

D Rectifying faults effectively.

E Completing documentation correctly.

F Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

**Context of and  
specific  
resources for  
assessment**      **9.3)**

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

OHS policy and work procedures and instructions.

Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to maintaining operation of electrical mining equipment.

**Method of  
assessment****9.4)**

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

**Concurrent  
assessment and  
relationship with  
other units****9.5)**

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEE11 Solve problems in multiple path extra low voltage  
9A (ELV) a.c. circuits

The critical aspects of occupational health and safety covered in unit UEENEEE101A and other discipline specific occupational health and safety units shall be incorporated in relation to this unit.

## Range Statement

### RANGE STATEMENT

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

This unit shall be demonstrated in relation to maintaining operation of electrical mining equipment by rectifying any four of the following faults in mining equipment and circuits.

- Open-circuit
- Short-circuit
- Incorrect connections
- Insulation failure
- Unsafe condition
- Apparatus/component failure
- Related mechanical failure

Note:

1. Examples of apparatus are switchboards/distribution boards, protective devices such as circuit breakers, and earth leakage devices, control equipment, socket outlets, electric vehicles and motor starters and associated control devices.

2. Examples of circuits include those supplying fix equipment; lighting; motors; socket outlets; trailing cable and within electric vehicles.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

## Unit Sector(s)

Not applicable.

## Competency Field

**Competency Field**                      **11)**

Electrical