



Australian Government

UEGNSG411A Maintain cathodic protection systems

Release 1

UEGNSG411A Maintain cathodic protection systems

Modification History

This unit replaces UEGNSG401B Maintain cathodic protection systems

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers maintaining cathodic protection (CP) systems to prevent corrosion of steel gas pipelines in accordance with relevant legislation, code, regulations and established procedures.

It encompasses the types of cathodic protection faults, as well as the location and the type of electrical equipment used, testing procedures and related maintenance requirements.

Application of the Unit

Application of the Unit 2)

This competency standard shall apply to gas transmission and distribution pipelines, subject to all Workplace Health and Safety (WHS) /Occupational Health and Safety (OHS) and duty of care requirements being met for the workplace.

This unit is intended as an AQF 3 competency for new and existing workers in the gas industry. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice 3)

During Training:

Competency development activities are subject to regulations directly related to licensing, workplace health and safety/occupational health and safety and where applicable contracts of training such as apprenticeships.

In the workplace:

The application of the skills and knowledge described in this unit require a license to practice in the workplace where work is carried out on electrical equipment or installations which are designed to operate at voltages greater than 50 V a.c. or 120 V d.c.

The skills and knowledge described in this unit are also subject to licence regulation directly related to Workplace/Occupational Health and Safety, gas/electricity/water industry safety and compliance, industrial relations, environmental protection, telecommunications, anti-discrimination and training.

Note:

Other conditions may apply under State and Territory legislative and regulatory requirements, for example:

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, lifting equipment. Permits may also be required for some work environments such as hazardous areas, confined spaces, working aloft, near live electrical devices, site rehabilitation.
2. Compliance may be required in various jurisdictions relating to currency in First Aid, hazardous areas, confined space, lifting and risk

License to practice 3)

safety measures

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

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

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

- UEGNSG005A Prepare to work in the gas industry
- UEGNSG006A Use a portable gas detectors to locate escape
- UEGNSG132A Carry out basic work activities in a gas industry work environment
- UEGNSG140A Apply environmental policies and procedures in the utilities industry
- UEGNSG134A Establish a utilities infrastructure work site
- UEGNSG141A Apply Workplace Health and Safety regulations, codes and practices in the gas industry

Literacy and numeracy skills 4.2)

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

Reading 3 Writing 3 Numeracy 3

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 and plan to maintain cathodic protection systems	1.1 Cathodic protection system maintenance activity is identified and confirmed according to the work schedule(s), drawings, plans, requirements, established procedures and Australian Standards.
	1.2 Readings from cathodic protection monitoring equipment and anode beds are taken at regular intervals and data collected in accordance with approved procedures and Australian Standards
	1.3 Relevant work schedules and requirements are communicated to all persons and identified for all work sites
	1.4 WHS/OHS, environmental and sustainable energy policies and procedures related to the

ELEMENT**PERFORMANCE CRITERIA**

- maintaining of cathodic protection systems are obtained and confirmed and communicated
- 1.5 Work is prioritised and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures
- 1.6 WHS/OHS risk control measures for identified hazards are prioritised, implemented and monitored against the work schedule
- 1.7 Relevant work permits are obtained to access and perform work according to requirements and established procedures
- 1.8 Resources including persons, equipment, tools and personal protective equipment required for the job are identified, scheduled and obtained and confirmed in a safe working order
- 1.9 Relevant persons at worksite are suitably trained and qualified for the work to be performed.
- 1.10 Liaison and communication issues with authorised persons, 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 Third party issues are referred to appropriate persons in accordance with established procedures, for example "low voltage electrical work"
- 1.13 Persons 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

ELEMENT	PERFORMANCE CRITERIA
2 Maintain and adjust cathodic protection system equipment	including traffic management plans
	2.1 WHS policies and procedures and safe work practices are followed to eliminate or minimise incidents and hazards
	2.2 Lifting, climbing, working in confined spaces, excavations, trenches, or aloft, and use of power tools, techniques and practices are safely exercised according to requirements.
	2.3 Cathodic protection system is maintained correctly according to established procedures and Australian Standards.
	2.4 Hazard warnings and safety signs are correctly interpreted and hazards and assessed WHS/OHS risks are reported to the immediate authorised persons for directions according to established procedures.
	2.5 Unplanned events in the maintaining of cathodic protection systems is undertaken with the scope of established procedures
	2.6 Known solutions to a variety of problems are applied
3 Re-establish system and complete relevant documentation	2.7 Data is collected and interpreted and ongoing checks of quality of the work are undertaken in accordance with given instructions, established procedures and Australian Standards.
	3.1 Cathodic protection system is re-established in order to meet pipeline system operational requirements and the work undertaken is checked against work schedules for conformance with requirements, anomalies are reported in accordance with established procedures and Australian Standards.
	3.2 Accidents, injuries and non-conformances are reported in accordance with established procedures where applicable
	3.3 Work site is rehabilitated, cleaned up and made safe in accordance with given instructions and

ELEMENT**PERFORMANCE CRITERIA**

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 Work permits are signed off and equipment is returned to service in accordance with requirements
- 3.6 Work completion records, reports as installed/modified drawings and documentation and information are finalised and processed and appropriate persons notified

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Evidence shall show that knowledge has been acquired of safe working practices for maintaining cathodic protection systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies. The extent of the required skills and knowledge is provided below. It forms an integral part of this unit

KS01-G411A Cathodic protection system maintenance

Evidence shall show an understanding of maintaining cathodic protection systems in accordance with relevant legislation, code, regulations and procedures. to an extent indicated by the following aspects:

T1. Relevant legislation, Australian Standards, codes, regulations and procedure requirements

T2. Relevant WHS/OHS safety requirements

- hazards, risk assessment and control measures
- identify environmental and safety hazards, assess risks and implement control measures
- Hazardous materials and MSDS
- PPE

T3. Corrosion processes on a Gas Industry pipeline

- corrosion processes, causes and prevention.
- how Cathodic Protection systems prevent corrosion

T4. Electrical fundamentals for the Gas Industry

- extra low voltage operation
- electrical risks associated activities within the Gas Industry
- meters and other relevant electrical equipment
- Licensed low voltage electrical work requirements

T5. Gas system design, planning and operation

- applicable to cathodic protection on a Gas Industry pipeline, including safe design

principles.

- cathodic protection electrical and civil drawings

T6. Relevant gas industry documents

- signs, symbols terminology and legends as used in gas industry procedures and documents
- gas industry standards, policies and procedures
- basic drawings and diagrams
- Process and Instrumentation Diagrams (PID)
- Facility and pipeline construction and as-built drawings
- Geographical Information System (GIS) drawings and data
- Electrical drawings
- Survey maps
- Pipeline route maps and alignment sheets
- topographical and geographical maps and information.
- workplace forms and reports

T7. Cathodic protection systems operation on a Gas Industry pipeline

- cathodic protection system design, planning and operation
- types and applications
 - impressed current
 - sacrificial
- equipment and components
- operating principles and circuits diagrams
- cathodic protection system in relation to other services
- coating requirements and their purpose

T8. Cathodic protection systems maintenance

- electrical test equipment
- safety requirements, procedures and PPE
- adherence of electrical principles and regulatory requirements
- manufacturers specifications and requirements
- monitoring requirements and procedures
- testing requirements and procedures
- calibration and adjustment requirements and procedures
- fault finding and repair/replacement requirements and procedures
- requirements and procedures for referring low voltage electrical work to relevant licensed persons
- requirements and procedures referring major repairs to immediate supervisor
- relevant documentation, records and reports

Evidence Guide

EVIDENCE GUIDE

8) 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)

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 instruments are included for Assessors in the Assessment Guidelines of this

Training Package.

**Critical aspects 8.2)
of evidence
required to
demonstrate
competency in
this unit**

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

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines — UEG11'. 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 will incorporate evidence that shows a candidate is able to:
 - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range
 - Apply sustainable energy principles and practices as specified in the Performance Criteria and range
 - Demonstrate an understanding of the required knowledge and skills as described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment
 - Demonstrate an appropriate level of employability skills
 - Conduct work observing the relevant Anti-Discrimination legislation, regulations, policies and workplace procedures
- Demonstrate performance across a representative range of contexts from the prescribed items below:
 - Maintain cathodic protection system in accordance with relevant legislation, code, regulations and procedures as described in 9.) Range Statement and including:

Range of tools/equipment/procedures/workplace		
Group No	The minimum number of items on which skill is to be demonstrated	Item List
A Types of faults:	At least 8	• Coating damage/deterioration • Interference from other systems • Anode not working • Equipment fault/failure • Earth faults • Transformer failure • Anode bed

		deterioration • Anode cable failure • Telluric effects on CP systems • IJ failure and testing • FIK failure and testing
B. Checks and tests on CP systems	At least 4	• CP Potential surveys • On/off potential surveys • Coating defect assessment surveys (DCVG method, Pearson technique/method, over pipeline potential method) • Loop impedance testing • Anode bed testing • Soil resistivity testing • Interference testing • TRAD unit commissioning and testing
C. Australian Standards or their equivalents:	All	• AS 2885 • AS 2430 • AS 1768 • AS 1596 • AS 2832.1 • AS 3000 • AS 2239 • AG 603 • AS 2865
D. Procedures	All	• Interpreting cathodic protection data system surveys and readings • Locating and repairing faults • Procedures for coating surveys • Checking and maintaining potentials
E	At least one	Dealing with an unplanned

	occasion	event by drawing on required knowledge and 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 work as prescribed by this Competency Standard Units.
- Appropriate environmental regulation and work practices.
- Appropriate organisational requirements.
- Appropriate work environment, equipment and tools.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency in maintaining cathodic protection systems.

Assessment of this competency must also be undertaken in either an actual workplace or under a simulated work environment. Assessment must also integrate the employability skills.

Method of assessment

8.4)

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

Note: Competent performance with inherent safe working practices is expected in the Industry to which this Competency Standard Units applies. This requires that the specified required Knowledge and Skills are assessed in a structured environment

which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the required knowledge and skills described in this unit.

**Concurrent
assessment and
relationship
with other units**

8.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied Competency Standard Units where listed.

UEGNSG132A	Carry out basic work activities in a gas industry work environment
UEGNSG140A	Comply with environmental policies and procedures in the utilities industry
UEGNSG134A	Establish a utilities infrastructure work site
BSBFLM312B	Contribute to team effectiveness
BSBFLM303C	Contribute to effective workplace relationships

Range Statement

RANGE STATEMENT

9) *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 be demonstrated in relation to maintaining cathodic protection systems on Gas Industry pipelines.

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:

- Types of CP faults
- Applicable Australian standards/legislation
- Location
- Electrical equipment
- Types of checks and tests
- Test equipment
- Components and systems
- Relevant documentation
- Relevant authorities and other stakeholders/authorities
- Location for maintaining CP systems
- Drawings and specifications

Unit Sector(s)

Gas supply industry

Competency Field

Competency Field **11)**

Cathodic protection.

