



Australian Government

PMASUP343 Monitor and maintain cathodic protection systems

Release: 1

PMASUP343 Monitor and maintain cathodic protection systems

Modification History

Release 1. Supersedes and is equivalent to PMASUP343B Monitor and maintain cathodic protection systems

Application

This unit of competency covers the skills and knowledge required to monitor and maintain cathodic protection (CP) systems.

This unit of competency applies to process technicians and those in similar roles who are required to monitor CP systems on pipelines or other structures, retrofit components that test faulty, optimise system outputs, identify and rectify operational problems, and troubleshoot problems.

This unit of competency applies to an individual working alone or as part of a team or group and working in liaison with other shift team members and the control room operator, as appropriate.

This unit of competency aligns with AS 2885.3-2012 Pipelines – gas and liquid petroleum - Operation and maintenance.

Some jurisdictions may require the holder of this unit to be licensed or certified and users should check with the relevant authorities.

Pre-requisite Unit

Nil

Competency Field

Support

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

1	Prepare and organise operational and maintenance	1.1	Review previous reports and check for outstanding work orders or notices
		1.2	Assemble necessary equipment and plan maintenance activities

activities		1.3	Take readings at regular intervals from CP system monitoring/test equipment and interpret collected data
		1.4	Identify CP faults and notify appropriate personnel
		1.5	Compile reports based on the collected data and analyse to determine system maintenance and operational adjustments to optimise system integrity
2	Monitor and adjust electrical equipment	2.1	Monitor equipment operating parameters to ensure operation within relevant Australian Standard specifications and make adjustments as required
		2.2	Operate CP equipment in accordance with the principles of CP impressed current/sacrificial anode systems
		2.3	Maintain CP system at maximum efficiency within design parameters
		2.4	Monitor equipment operating parameters to determine if the correct operating conditions of the equipment are being maintained
		2.5	Collect and interpret data and determine maintenance requirements
		2.6	Conduct regular inspections to ensure equipment integrity is maintained and results are recorded and any system abnormalities identified
		2.7	Carry out adjustments and maintenance to the equipment where abnormalities in the system have been identified
3	Conduct CP system surveys	3.1	Interpret survey specifications to determine survey path and equipment requirement
		3.2	Conduct preparation activities on CP system to enable survey to be carried out
		3.3	Conduct CP surveys of the system and log and record results of the survey
		3.4	Fault find and diagnose operating CP systems
		3.5	Download collected survey data to allow a report to be

compiled concerning survey findings

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| 4 | Recommission the system | 4.1 | Recommission the system to meet system operational requirements |
| | | 4.2 | Restore site to meet environmental and operational requirements |
| | | 4.3 | Compile and update records and drawings to reflect the repair/modification |
| | | 4.4 | Maintain incident records |
| | | | |
| 5 | Analyse and utilise CP data | 5.1 | Analyse survey report data and findings to determine system abnormalities and maintenance required for the continued operation of the system |
| | | 5.2 | Liaise with appropriate personnel to repair or modify, as required, areas/equipment identified for maintenance |
| | | | |
| 6 | Control hazards | 6.1 | Identify hazards in CP systems |
| | | 6.2 | Assess the risks arising from those hazards. |
| | | 6.3 | Implement measures to control those risks in line with procedures and duty of care. |
| | | | |
| 7 | Respond to problems | 7.1 | Identify possible problems in equipment or process. |
| | | 7.2 | Determine problems needing action. |
| | | 7.3 | Determine possible fault causes. |
| | | 7.4 | Rectify problem using appropriate solution within area of responsibility. |
| | | 7.5 | Follow through items initiated until final resolution has occurred. |
| | | 7.6 | Report problems outside area of responsibility to designated person. |

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Regulatory framework The latest version of all legislation, regulations, industry codes of practice and Australian/international standards, or the version specified by the local regulatory authority, must be used, and include one or more of the following:

- legislative requirements, including work health and safety (WHS)
- industry codes of practice and guidelines
- environmental regulations and guidelines
- Australian and other standards (or their authorised replacement) such as:
 - *AS 2885 (Set) Pipelines - Gas and liquid petroleum*
 - *AS/NZS 1768:2007 Lightning protection*
 - *AS/NZS 1596:2014 Storage and handling of LP Gas*
 - *AS 2832 (set) Cathodic protection of metals*
 - *AS/NZS 3000:2007 Electrical installations (known as the Australian/New Zealand Wiring Rules)*
 - *AS 2239-2003 Galvanic (sacrificial) anodes for cathodic protection*
- utility codes and standards
- • licence and certification requirements

All operations to which this unit applies are subject to stringent health, safety and environment (HSE) requirements, which may be imposed through state/territory or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

Procedures All operations must be performed in accordance with relevant procedures.

Procedures are written, verbal, visual, computer-based or in some other form, include one or more of the following:

- emergency procedures
- work instructions
- standard operating procedures (SOPs)
- safe work method statements (SWMS)
- formulas/recipes
- batch sheets
- temporary instructions
- any similar instructions provided for the smooth running of the plant

Hazards

Hazards include one or more of the following:

- electricity
- gases and liquids under pressure
- equipment failures
- flammability and explosivity
- extreme weather
- other hazards that might arise

Routine problems

Problems at this level includes both routine and non-routine problems.

Routine problems are predictable and have known solutions and include one or more of the following:

- coating damage/deterioration
- interference from other systems
- anode not working
- incorrect current output from central processing unit (CPU)/transmission (TR) unit
- equipment fault/failure

Non-routine problems are unexpected problems, or variations of previous problems and must be resolved by applying operational knowledge to develop new solutions, either individually or in collaboration with relevant experts, to:

- determine problems needing action
- determine possible fault causes
- develop solutions to problems which do not have a known solution
- follow through items initiated until final resolution has occurred
- report problems outside area of responsibility to designated person

Operational knowledge includes one or more of the following:

- procedures
- training
- technical information such as journals, engineering specifications
- remembered experience
- relevant knowledge obtained from appropriate people.

CP system This unit of competency includes all such items of equipment and unit operations which form part of the CP system and includes, as appropriate to the site:

- solar powered power generation systems
- 240 V power generation systems
- CP system interrupters
- insulation and monolithic joints
- galvanic anode beds
- battery banks (e.g. nicad and lead acid)
- transformer rectifiers and CPUs
- lightning protection equipment
- CP test points
- Kirk cells

Unit Mapping Information

Release 1. Supersedes and is equivalent to PMASUP343B Monitor and maintain cathodic protection systems

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=9fc2cf53-e570-4e9f-ad6a-b228ffdb6875>

Assessment Requirements for PMASUP343 Monitor and maintain cathodic protection systems

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria, and include the ability to:

- monitor and adjust equipment to meet specifications
- prepare for and conduct cathodic protection (CP) system surveys
- analyse data from CP system surveys to diagnose and troubleshoot problems
- distinguish between causes of problems/alarm/fault indications, such as:
 - interference within the system
 - instrument failure/wrong reading
 - electrical failure
 - operational problems
- recognise early warning signs of equipment/processes needing attention or with potential problems
- complete forms and documentation
- prepare and analyse reports related to the equipment/systems.

Knowledge Evidence

Evidence must be provided that demonstrates knowledge of:

- company-specific work organisations and work flow
- function of CP systems and CP equipment
- operations and functions of CP systems and equipment
- function of solar powered power generation systems
- operations of 240 V power generation systems
- insulation and monolithic joints
- organisation procedures, including those covering:
 - safety, emergency and hazard control
 - work permit systems
 - maintenance
 - standard operating procedures (SOPs)
- hierarchy of control.

Assessment Conditions

- The unit should be assessed holistically and the judgement of competence based on a holistic assessment of the evidence.
- The collection of performance evidence:
 - should occur over a range of situations which include typical disruptions to normal, smooth operations
 - will typically include a supervisor/third-party report focusing on consistent performance and problem recognition and solving. A supervisor/third-party report must be prepared by someone who has a direct, relevant, current relationship with the person being assessed and who is in a position to form a judgement on workplace performance relevant to the unit of competency
 - must include the use of industrial type CP systems, appropriate tools, equipment and safety gear requiring demonstration of preparation, operation, completion and responding to problems
 - may use industry-based simulation for all or part of the unit particularly where safety, lack of opportunity or significant cost is an issue.
- Assessment should occur in operational workplace situations. Where this is not possible, or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment reflecting realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Assessment in a simulated environment should use evidence collected from one or more of:
 - walk-throughs
 - pilot plant operation
 - demonstration of skills
 - industry-based case studies/scenarios
 - ‘what ifs’.
- Knowledge evidence may be collected concurrently with performance evidence (provided a record is kept) or through an independent process, such as workbooks, written assessments or interviews (provided a record is kept).
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications associated with this unit.
- The regulatory framework will be reflected in workplace policies and procedures and is not required to be independently assessed.
- Foundation skills are integral to competent performance of the unit and should not be assessed separately.
- Assessors must satisfy the assessor competency requirements that are in place at the time of the assessment as set by the VET regulator.

- In addition, the assessor or anyone acting in subject matter expert role in assessment must demonstrate both technical competency and currency. If the assessor cannot demonstrate technical competency and currency they must assess with a subject matter expert who does meet these requirements.
- Technical competence can be demonstrated through one or more of:
 - relevant VET or other qualification/Statement of Attainment
 - appropriate workplace experience undertaking the type of work being assessed under routine and non-routine conditions
 - appropriate workplace experience supervising/evaluating the type of work being assessed under routine and non-routine conditions
- Currency can be demonstrated through one or more of:
 - being currently employed undertaking the type of work being assessed
 - being employed by the organisation undertaking the type of work being assessed and having maintained currency in accordance with that organisation's policies and procedures
 - having consulted/had contact with an organisation undertaking the type of work being assessed within the last twelve months, the consultation/contact being related to assessment
 - conducting on-the-job training/assessments of the type of work being assessed
 - being an active member of a relevant professional body and participating in activities relevant to the assessment of this type of work.

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