



Australian Government

Department of Education, Employment and Workplace Relations

PMASUP346A Control corrosion

Revision Number: 1

PMASUP346A Control corrosion

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the control of corrosion in plant, equipment and/or pipelines (plant) by the use of chemical (or biological) controls. For cathodic protection see <i>PMASUP343B Monitor and maintain cathodic protection systems</i> .
------------------------	--

Application of the Unit

Application of the unit	In a typical scenario a technician will monitor plant for signs of corrosion and or monitor the concentration of inhibiting chemicals or similar. They will maintain an appropriate dosing regime in order to control the rate of corrosion. Generally the operations technician would operate independently and be expected to be capable of performing all parts of this unit, however they may be part of a team during critical inspections or maintenance operations. At all times they would be liaising and cooperating with other members of the team.
--------------------------------	--

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		
---------------------------	--	--

Employability Skills Information

Employability skills	This unit contains employability skills.
-----------------------------	--

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
---	--

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify corrosion controls in use.	1.1. Identify sites susceptible to corrosion on work area 1.2. Explain the causes and effects of corrosion at these sites 1.3. Identify the corrosion inhibitor(s) used in work area 1.4. Determine hazards associated with corrosion and corrosion control 1.5. Control hazards associated with corrosion and corrosion control 1.6. Coordinate with appropriate personnel.
2. Dose corrosion inhibitor.	2.1. Monitor indicators of rate of corrosion as required 2.2. Monitor inhibitor dosing equipment as required 2.3. Adjust rate of dosing as required by procedures 2.4. Monitor inhibitor stocks as required 2.5. Recognise situations requiring action 2.6. Take appropriate action.
3. Test plant for corrosion as required	3.1. Identify corrosion testing methods used in work area 3.2. Complete testing activities as required by procedures 3.3. Examine test results and take appropriate action
4. Isolate and de-isolate dosing plant.	4.1. Isolate dosing plant 4.2. Make safe for required work 4.3. Check dosing plant is ready to be returned to service 4.4. Prepare dosing plant for return to service.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- efficient and effective operation of plant/equipment
- hazard analysis
- completing plant records
- communication
- problem solving.

Required knowledge

- the galvanic series
- electrochemical corrosion
- types of corrosion/causes of anode formation
- factors controlling the rate of corrosion
- types of corrosion inhibitors used and their action
- hazards associated with corrosion inhibitors and relevant hazard controls
- costs and hazards of corrosion
- principles of operation of dosing equipment
- physics and chemistry relevant to the process unit and the materials processed
- process parameters and limits, eg temperature, pressure, flow, pH
- duty of care obligations
- hierarchy of control
- routine problems, faults and their resolution
- relevant alarms and actions
- plant process idiosyncrasies
- all items on a schematic of the plant item and the function of each
- correct methods of starting, stopping, operating and controlling process
- corrective action appropriate to the problem cause
- function and troubleshooting of major components and their problems
- types and causes of problems within operator's scope of skill level and responsibility.

Evidence Guide

EVIDENCE GUIDE

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 the Training Package.

Overview of assessment

Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation.

Simulation may be required to allow for assessment of parts of this unit. Simulation should be based on the actual plant and will include walk-throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios, role plays and 3D virtual reality interactive systems. In the case of evacuation training or training for competencies practised in life threatening situations, simulation may be used for the bulk of the training.

This unit of competency requires an application of the knowledge contained in the use of the corrosion control systems and their integral equipment, to the level needed to maintain control and recognise and resolve problems. This can be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk throughs of abnormal operations) and off the plant.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action. The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster.

Consistent performance should be demonstrated. In particular look to see that:

- early warning signs of equipment/processes needing attention or with potential problems are recognised

EVIDENCE GUIDE	
	- the range of possible causes can be identified and analysed and the most likely cause determined - appropriate action is taken to ensure a timely return to full performance - obvious problems in related plant areas are recognised and an appropriate contribution made to their solution. These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk-through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This unit of competency includes all such items of equipment and unit operations which form part of the corrosion control system. For your plant/pipeline this may include: • dosing pumps • flow rate controllers • analytical instrumentation related to corrosion • head tanks • test coupons or similar • brushes • inspection devices This unit does not include the operation of smart pigs - see <i>PMAOPS335A Conduct pipeline pigging</i>.
Work area	Work area refers to the systems or units the technician is responsible for and may be a plant area, a well head or pipeline covering thousands of kilometers.
Corrosion	Corrosion typically refers to any electrochemical process leading to the decay of metal. It may also be applied to decay processes in non-metals if appropriate.
Corrosion inhibitors	Corrosion inhibitors for metals are typically amines but may include: • anodic or cathodic inhibitors • film formers • oxygen scavengers • pH adjusters/buffers • biocides • additives and carriers such as: • solvent base • surfactants • dispersants

RANGE STATEMENT	
	• demulsifiers • de-foamers • other materials.
Inhibitor dosing	Inhibitor dosing may be continuous or batch injection of corrosion inhibitor to the plant.
Appropriate action	Appropriate action includes: • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person.
Procedures	Procedures may be written, verbal, computer-based or in some other form. They include: • all work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Responsible Care) and government regulations.
Health, safety and environment (HSE)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State 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.

Unit Sector(s)

Unit sector	Support/generic
--------------------	-----------------

Competency field

Competency field	
------------------	--

Co-requisite units

Co-requisite units		
--------------------	--	--