Australian Government

PMAOPS364 Operate an electrochemical process

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to PMAOPS364A Operate an electrochemical process

Application

This unit of competency covers the skills and knowledge required to operate an electrochemical process in the metalliferous or chemical industry.

This unit of competency applies to electrochemical processes for the extraction of metals from their ores, such as electrowinning of copper, zinc, nickel and other metals, where the metal is extracted from an ore solution and electrorefining of copper from blister copper, lead, nickel, silver and other metals, where the metal is purified by electroplating pure metal from an intermediate product. It may be applied to other metals and also processes, such as chlorine/caustic soda with appropriate contextualisation.

This unit of competency applies to operations technicians who are required to demonstrate a significant understanding of the process and the equipment operation in order to identify and rectify operational problems, conduct start-up and shutdown and isolation of cells, and operate and monitor equipment.

This unit of competency applies to an individual operating independently in a plant with local control or in liaison with the control room operator in a plant with a centralised control panel, such as distributed control system (DCS) type controls. In the case of large complex plant, the operations technician would be part of a team during start-up and shutdown procedures.

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 does not require the operation of a central control panel.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Nil

Competency Field

Operations

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 for work**	1.1	Receive and give shift handover
		1.2	Identify work requirements
		1.3	Identify and control hazards
		1.4	Coordinate with appropriate personnel
		1.5	Check for recent work undertaken on electrochemical system
		1.6	Note any outstanding/incomplete work
		1.7	Check operational status of electrochemical system
2	**Operate electrochemical process**	2.1	Describe the type of electrochemical system, the component plant items and their duties
		2.2	Complete routine checks, logs and paperwork taking action on unexpected reading
		2.3	Change rate, grade or specification smoothly as required.
		2.4	Adjust solution volume, feed quality, temperatures, electrical current, voltage and production rate, in accordance with procedures
		2.5	Adjust electrochemical system and its component plant items as appropriate to their type and duty to meet production requirements
		2.6	Pull and strip plates/electrodes in accordance with procedures
3	**Diagnose and take action on abnormal**	3.1	Monitor electrochemical system and its component plant items frequently and critically throughout shift using measured/indicated data and senses

	situations in accordance with procedures	3.2	Describe impacts of any changes upstream and downstream
		3.3	Recognise actual and developing situations which may require action.
		3.4	Apply operational knowledge to resolve problems
		3.5	Take other actions on abnormal situations which cannot be resolved during the shift to ensure safety and the resolution of the situation
		3.6	Follow through items initiated until final resolution has occurred
4	**Isolate and de-isolate electrochemical system and its component plant items**	4.1	Complete any required pre-start checks
		4.2	Start up/shut down electrochemical system according to the electrochemical system type and duty in liaison with other personnel
		4.3	Start up/shut down/changeover component plant items within unit according to their type and duty in liaison with other personnel
		4.4	Isolate entire electrochemical system and/or any component plant item
		4.5	Make safe for required work
		4.6	Check electrochemical system /plant item is ready to be returned to service
		4.7	De-isolate and prepare electrochemical system/plant item for return to service

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
- 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.

Hazards

Hazards include one or more of the following:

- electricity
- gas
- structural hazards
- structural collapse
- equipment failures
- industrial (machinery, equipment and product)
- equipment or product mass
- noise, rotational equipment or vibration
- plant services (steam, condensate and cooling water)
- working at heights, in restricted or confined spaces, or in environments subjected to heat, dusts or vapours
- fire and explosion
- hazardous products and materials
- unauthorised personnel
- sharp edges, protrusions or obstructions
- slippery surfaces, spills or leaks
- extreme weather
- other hazards that might arise

Routine problems

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

- variations in feed material
- control of temperature
- control of feed rates and composition of feeds
- control of impurities, waste material and irregularities

Non-routine problems

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 and engineering specifications
- remembered experience
- relevant knowledge obtained from appropriate people

Start up/shut down

Start up shut down includes the following:

- start up and shut down to/from normal operating conditions
- start up and shut down to/from isolated, cold or empty
- start up and shut down to/from other conditions/situations experienced on the plant

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

Operate

Operate is to monitor, adjust/make change to the production unit and/or its component items to meet specifications, by one or both of the following:

- manually in the plant
- using local controller in the plant

Product

Product includes anything produced by a process step and so includes:

- intermediate products, such as the product from one process step, which then becomes the feed for another

Logs and reports

Logs and reports include one or more of the following:

- paper or electronic-based logs and reports
- verbal/radio reports
- reporting items found which require action

Work requirements

Work requirements will be identified from one or more of the following:

- briefings
- handovers and
- orders
- compliance documentation
- product specifications
- nature and scope of tasks
- achievement targets
- operational conditions
- lighting conditions
- plant or equipment defects
- hazards and potential hazards
- coordination requirements or issues

Unit Mapping Information

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Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=9fc2cf53-e570-4e9f-ad6a-b228ffdb6875