Australian Government

PMAOPS405 Operate complex control systems

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to PMAOPS405A Operate complex control systems

Application

This unit of competency covers the skills and knowledge required to operate a complex control panel. The panel will control entire plant areas and multiple products/process streams and will use a large number of control loops and a broad range of control algorithms; and will probably include advanced process control (APC) as one of its operations. Its operation will require managing multiple complex tasks.

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

- process control systems (e.g. distributed control systems (DCS), and supervisory control and data acquisition (SCADA))
- use of multiple control systems
- interacting control loops/cascade control
- personal computers
- printers
- fire and gas detection/protection systems
- emergency shutdown (ESD) systems
- communications systems.

This unit of competency applies to senior technicians or those in similar roles who are required to apply in-depth knowledge of process and plant to in order to operate, monitor and optimise an entire plant area consisting of several plant units/systems, solve process problems and liaise with other plant areas.

This control system would typically be an advanced control system and may include operation of simpler control systems as part of its operation. The panel will typically be located off plant in a control room.

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	**Use operator interface**	1.1	Use keyboards, track ball and monitor and/or stand-alone controllers to access control system/panel
		1.2	Monitor the process using the operator interfaces
		1.3	Select appropriate controller modes
		1.4	Access historical data and information
		1.5	Acknowledge messages and alarms
		1.6	Access advanced control features as appropriate
2	**Access control information**	2.1	Obtain relevant data and information from the control system by applying systems knowledge
		2.2	Identify the status of individual pieces of equipment from the control panel and use information to identify potential faults
		2.3	Minimise fluctuations and variations in process through the interpretation of existing trends and control schematics
		2.4	Determine the overall operating effectiveness of the plant area related to the required targets for the area
		2.5	Record process variations/irregularities to procedures
3	**Control process variations and monitor operations**	3.1	Monitor process using all information available in the control room
		3.2	Use historical data to assist the identification of problems
		3.3	Process available information to identify potential faults
		3.4	Undertake required set point/output changes to meet

			plant area and process requirements
		3.5	Adjust production in response to test results and control panel information
		3.6	Monitor key process and environmental variables and take action to achieve required outcomes
		3.7	Adjust controller settings in accordance with procedures
		3.8	Use advanced control features as appropriate
		3.9	Turn controller features on and off to meet process and control needs
		3.10	Optimise operation of entire plant area in accordance with guidelines
		3.11	Undertake calibration operations in accordance with procedures.
		3.12	Coordinate with stakeholders external to the plant area in accordance with procedures
		3.13	Record adjustments and variations to specifications/schedules
		3.14	Communicate to appropriate personnel as required
4	**Facilitate planned and unplanned process start-ups and shutdowns**	4.1	Select and apply procedures to planned start-up and shutdown processes.
		4.2	Select and apply procedures to unplanned shutdown processes
		4.3	Implement all required emergency responses
		4.4	Communicate necessary information to all personnel affected by events
		4.5	Log all required information
5	**Respond to alarms or out-of-specificati**	5.1	Identify system(s) affected by the alarm or condition
		5.2	Interpret alarms and prioritise actions to be taken

	on conditions	5.3	Respond to the alarm or incident by following procedures
		5.4	Deal with any out-of-specification material in accordance with procedures
		5.5	Communicate the problem/solution to appropriate personnel
		5.6	Record the information as required
		5.7	Provide details of the alarm and action taken to the next shift at changeover
		5.8	Follow up on the incident to see that appropriate action has been taken
6	**Control hazards**	6.1	Identify hazards/changes in hazards in the production/processing work area
		6.2	Assess the risks arising from those hazards
		6.3	Implement measures to control risks in line with procedures and duty of care
		6.4	Communicate hazards and hazard controls to affected personnel
7	**Resolve other problems within scope of responsibility**	7.1	Identify possible problems in equipment, control systems 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 initiated items through 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
- 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
- gases and liquids under pressure
- equipment failures
- 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
- flammability and explosivity
- hazardous products and materials
- unauthorised personnel
- sharp edges, protrusions or obstructions
- slippery surfaces, spills or leaks

- extreme weather
- other hazards that might arise

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

Routine problems

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

- operating without advanced control features
- loss of power/utilities
- analysing failure modes
- variation/loss of feed
- unstable control of pressure, temperature level and flows
- control equipment failure
- process plant trips
- change in atmospheric conditions (rain, temperature, wind and lightning)
- emergency situations
- control function problems

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

Alarms or abnormal conditions

Alarms or other abnormal conditions include the following:

- emergency, including emergency shutdown (ESD)
- partial or complete controller failure

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