



Australian Government

PMAOPS305 Operate process control systems

Release: 1

PMAOPS305 Operate process control systems

Modification History

Release 1. Supersedes and is equivalent to PMAOPS305B Operate process control systems

Application

This unit of competency covers the skills and knowledge required to operate and monitor the plant using a centralised control panel, such as distributed control system (DCS) type controls. The panel controls multiple vessels/plant items and or products. It will typically be located on-site but off plant in a control room, but may also be off-site.

This unit of competency applies to operations technicians who have overall responsibility for the operation of all units of equipment covered by the control system/portion of the control system they operate. They are required to identify, correct and report operational problems, operate, monitor and maintain equipment using relevant procedures, take appropriate action following an alarm or out-of-specification condition developing, and contribute to safe operations.

The control system will typically use a range of control algorithms and multiple control loops. The control system may include other local controllers which are integral to its operation.

This unit of competency applies to an individual operating as part of a team during start-up, shutdown and normal operating conditions. They would take a leading role in liaising and cooperating with other members of the team, including 'outside operators'. However, this unit does not preclude the situation where the panel operator may also undertake 'outside' functions.

The operations technician is expected to be capable of performing all parts of this unit of competency.

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 Performance criteria describe the performance needed to

essential outcomes. 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 plant units being controlled |
| | | 1.6 | Note any outstanding/incomplete work |
| | | 1.7 | Check operational status of plant units being controlled |
| | | | |
| 2 | Use operator interface | 2.1 | Use human interface devices to access control system/panel |
| | | 2.2 | Monitor the process using the operator interfaces |
| | | 2.3 | Select appropriate controller modes |
| | | 2.4 | Access historical data and information |
| | | 2.5 | Acknowledge messages and alarms |
| | | | |
| 3 | Access control information | 3.1 | Obtain relevant data and information from the control system by applying systems knowledge |
| | | 3.2 | Identify the status of individual pieces of equipment from the control panel and use information to identify potential faults |
| | | 3.3 | Minimise fluctuations and variations in process through the interpretation of existing trends and control schematics |
| | | 3.4 | Record process variations/irregularities to procedures |
| | | | |
| 4 | Control process variations and | 4.1 | Use historical data to assist the identification of problems |

	monitor operations	4.2	Process available information to identify potential faults
		4.3	Undertake required set point/output changes to meet plant and process requirements
		4.4	Optimise plant operating conditions in accordance with guidelines
		4.5	Adjust production in response to test results and control panel information
		4.6	Monitor key process and environmental variables and take appropriate action
		4.7	Adjust controller settings in accordance with procedures
		4.8	Use fine tuning software as appropriate.
		4.9	Coordinate with upstream and downstream units as appropriate
		4.10	Record adjustments and variations to specifications/schedules
		4.11	Communicate to appropriate personnel as required
		5	Facilitate planned and unplanned process start-ups and shutdowns
5.2	Select and apply procedures to unplanned shutdown processes		
5.3	Implement all required emergency responses		
5.4	Communicate necessary information to all personnel affected by events		
5.5	Log all required information		
6	Respond to alarms or out of specification conditions	6.1	Identify system(s) affected by the alarm or condition
		6.2	Interpret alarms and prioritise actions to be taken
		6.3	Take appropriate action to respond to the alarm or incident

- 6.4 Deal with any out-of-specification material in accordance with procedures
- 6.5 Communicate the problem/solution to appropriate personnel
- 6.6 Record the information as required
- 6.7 Provide details of the alarm and action taken to the next shift at changeover

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 • gases and liquids under pressure • 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, noise, 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
Non-routine problems	Non-routine problems 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 Non-routine problems are unexpected problems, or variations of previous problems and include one or more of the following: • loss of power/utilities • variation in feed rate, quality or loss of feed • unstable control of pressure, temperature, level and/or flows • unstable/suboptimal operation • control equipment failure • process plant trips • change in atmospheric conditions (rain, temperature, wind and lightning)

- emergency situations

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

Human interface devices Human interface devices include one or more of the following:

- keyboards
- track ball/mouse
- touch screen
- monitor and/or
- standalone controllers

Alarms or abnormal conditions Alarms or other abnormal conditions include the following:

- emergency, including emergency shut down
- partial or complete controller failure

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 all other conditions experienced on the plant (i.e. from any condition to any condition experienced on the plant)

Operate Operate is to monitor, adjust/change the plant item/unit/system to meet specifications, by the following:

- using the process control system in the control room

This competency does not require operation other than through the control panel.

- 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

Unit Mapping Information

Release 1. Supersedes and is equivalent to PMAOPS305B Operate process control 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 PMAOPS305 Operate process control 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 demonstrate the ability to:

- identify and control hazards
- use schematics and data to monitor plant and optimise performance
- isolate the causes of problems and distinguish between causes of problems/alarm/fault indications, including:
 - instrument failure/malfunction
 - electrical failure/malfunction
 - mechanical failure/malfunction
 - equipment design deficiencies
 - product parameters (temperature, flows, pressure and levels)
 - process control system malfunction
 - power/utility failures
- communicate effectively with team, group, supervisors and other personnel
- recognise early warning signs of equipment/processes needing attention or with potential problems
- take appropriate action to ensure a timely return to full performance
- select and apply planned and unplanned start-up shutdown procedures
- identify and communicate information required by others
- complete written records.

Knowledge Evidence

Evidence must be provided that demonstrates knowledge of:

- organisation procedures
- hazards that may arise in the job/work environment, and:
 - their possible causes
 - potential consequences
 - appropriate risk controls
- the function and location of the process/production equipment
- interactions between plant items/processes
- product specifications and tolerances
- systems' operating parameters

- impact of external factors (e.g. variations in weather and feed)
- system integrity limits
- process control philosophies and strategies
- emergency shutdown procedures
- specific plant process operations
- process-specific science (physics, chemistry and biochemistry) to the level of being able to interpret the science and extract factors controlling the process and product and by-product production rate and quality (e.g. for chemistry interpret the equation for factors controlling rate and yield and also interfering reactions, such as salts and hydrates)
- basic science of upstream and downstream processes
- emergency shutdown procedures
- process drawings, such as piping and instrumentation diagram (P&ID) and process flow diagram (PFD)
- cause and effect
- control system architecture
- basis of control for the plant/s
- types of instrumentation and control systems, including feed forward, feedback and open control
- types of instrumentation and control system components and their role, including primary sensing devices, final control elements and transducers/transmitters
- how control loops and their components, including PID control, set points, controlled variable, indicated variable operate to control the process, and their limitations
- interaction between multiple control loops, including cascade control
- impacts of changing controller settings and the limits within which changes can be made
- effective communication techniques
- uninterrupt power supplies (UPS) and its applications and use.

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 operation of an operating plant
 - will typically include a supervisor/third-party report or other evidence 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
 - may include the use of an appropriate process control system controlling an industrial plant requiring demonstration of operation, start-up and shutdown procedures and responding to problems

- may use an appropriate process control system linked to a simulator which simulates an industrial plant requiring demonstration of operation, start-up and shutdown procedures 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:
 - simulator
 - 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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