



Australian Government

Department of Education, Employment and Workplace Relations

PMAOPS411B Manage plant shutdown and restart

Release: 1

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Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the co-ordination of the shutdown and restarting of a production process in a safe and efficient manner due to a planned or an unplanned shutdown or emergency situation. It does not apply to individual plant operators shutting down individual production units or following directions during a shutdown, as this is included in the normal unit of competency for operating that production unit.
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Application of the Unit

Application of the unit	In a typical scenario, a complex and integrated plant (usually but not necessarily large and continuous) needs to be shut down for some reason. Shutting down is a complex process and is more than the simple turning off of a switch. This competency would typically be exercised by the leading plant technician on a shift. This unit requires the exercise of discretion as the plant technician's responses are governed by the cause of the shutdown and the plant's responses to that. They are required to adapt normal practice, within the overall guidelines, to the current situation to obtain the best outcome. This competency requires the coordination of all personnel involved in the shutdown to ensure it happens in as orderly a fashion as possible and that the plant is left in the best condition possible for a quick restart. The person exercising this competency needs to balance the varying requirements to ensure the shutdown occurs with maximum safety to personnel, plant, the environment and the business's productivity (in that order).
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		
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Employability Skills Information

Employability skills	This unit contains employability skills.
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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.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Manage shutdown sequence.	1.1. Check and verify safety systems to ensure that the unit has been made safe 1.2. Identify the reason for, or cause of the shutdown by troubleshooting the system and by utilising all available data and information systems 1.3. Obtain confirmation of the identified shutdown from field based operators to verify both the nature and the reliability of the shutdown 1.4. Rectify or initiate procedures to rectify the fault or shutdown cause through either repair of the operational fault or readjustment before returning the system to start-up status.
2. Conduct start-up process.	2.1. Satisfy all start-up permissives prior to start- up process being commenced 2.2. Conduct start-up according to procedures and in a safe and efficient manner, ensuring a return to steady state operation is achieved.
3. Document shutdown and start-up process.	3.1. Complete all logs and workplace documentation relating to the shutdown/start-up process, ensuring all details, actions and responses are accurately recorded 3.2. Record any further ongoing production problems and report to appropriate persons or authority.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

Competence includes:

- efficient and effective planning of shut down/start up
- hazard analysis
- completing plant records
- communication
- problem solving

Required knowledge

Demonstration of competence in this unit must include knowledge of the following:

- principles of operation of plant/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
- communication protocols, eg radio, phone, computer, paper, permissions/authorities
- 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.
- architecture of the process/production systems
- the plant
- product specifications and tolerances
- systems operating parameters
- process control philosophies and strategies
- the process
- emergency shutdown procedures
- physics, chemistry and mathematics relevant to the process
- outside process knowledge and equipment operation

as is relevant to the practical operation of equipment at that job level.

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 and role plays.

This unit of competency requires a significant body of knowledge which will 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
- 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.

EVIDENCE GUIDE	
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. In a major hazard facility, it may be appropriate to assess this unit concurrently with: • <i>MSAPMOHS200A Work safely.</i> The person undertaking this competency is expected to be able to work under and manage situations of high pressure, in order to ensure the safe and efficient management of the control room production process and the safety of plant employees.
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	Causes of shutdown may be: - planned, eg for maintenance or other planned work - unplanned, eg in response to a plant upset or equipment failure - emergency, eg in response to an automatic shutdown sequence or plant trip. The shutdown may be: - shutdown 'to cold', eg complete plant shutdown and purging of all process materials from equipment - short shutdown to allow minor work 'warm shutdown', eg partial shutdown, with retention of some or all of process materials - managing a plant trip and restart 'hot shutdown', eg short duration shutdown in response to a plant upset or trip This competency also includes: - coordinating the shift team - implementing emergency procedures - using the permit to work system (for repairs required). - This competency may apply to: - panel technicians - outside technicians - technicians seconded to a shut down role - other relevant personnel All operations are performed according to procedures.
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

RANGE STATEMENT	
	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	Operational/technical
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Competency field

Competency field	
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Co-requisite units

Co-requisite units		
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