Australian Government

Department of Education, Employment and Workplace Relations

PMAOPS521C Plan plant shutdown

Revision Number: 1

INDUSTRY SKILLS COUNCILS

Creating Australia's Future

PMAOPS521C Plan plant shutdown

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers the planning of work to be done in a plant shutdown or outage, eg maintenance or inspection shutdown of a plant.

Application of the Unit

Application of the unit	In a typical scenario, a senior plant technician takes a lead technical role in the planning of a plant shutdown such as the maintenance/pressure vessel inspection shut. This competency requires the application of a detailed plant knowledge to the task of developing a detailed shutdown plan. This competency is not actually about the shutting down of the plant itself (see *PMAOPS411B Manage plant shutdown and restart*), nor decommissioning (*see PMASUP441C Decommission plant*) but rather about the planning for the activities which will occur during a planned, major shutdown. Shutdown planning is usually a team activity and so this technician would also be working with technical (process) experts, maintenance experts, contractor representatives and liaising with production and other management. The reasons for the shutdown could include: • regulatory vessel inspection (PVI) • major maintenance • upgrades or refits • catalyst and/or column repacking • other activities which are scheduled for the shutdown. Generally this would be a seconded role of a senior plant technician who for the period of the shutdown, and for a significant period before the shutdown, would undertake this as their primary activity.

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 maintenance/project and plant requirements.	1.1. Analyse relevant company records to determine activities which have been scheduled for the shutdown 1.2. Obtain information on maintenance activities intended for the shutdown 1.3. Obtain information on production activities intended for the shutdown 1.4. Obtain information on projects or construction activities intended for the shutdown 1.5. Compile a list of all activities intended for the shutdown, including sufficient detail to allow for shutdown planning 1.6. Negotiate conflicts between proposed activities.
2. Identify tasks, timelines and resources.	2.1. Break down each agreed shutdown activity into required tasks 2.2. Determine time, people, material, other resources required and 'owner' for each task 2.3. Determine prerequisite tasks for each task 2.4. Identify conflicts between tasks arising from resources or other causes 2.5. Negotiate conflicts between tasks 2.6. Compile database of all tasks and their requirements.
3. Develop schedule.	3.1. Develop draft shutdown schedule (including planning activities) 3.2. Determine critical path for shutdown tasks 3.3. Analyse tasks on critical path to determine methods of reducing critical path 3.4. Develop revised schedule 3.5. Consult with all relevant stakeholders and analyse revised schedule for conflicts and possible savings 3.6. Negotiate conflicts 3.7. Develop final schedule and critical path.
4. Communicate with all relevant stakeholders.	4.1. Contribute to shutdown planning meetings with stakeholders. 4.2. Meet with stakeholders individually 4.3. Prepare reports and documents as required 4.4. Ensure all permissions required for tasks have been obtained

ELEMENT	PERFORMANCE CRITERIA
	4.5. Liaise with suppliers and contractors to obtain parts, materials and services.
5. Monitor shutdown.	5.1. Establish systems to allow monitoring of shutdown to schedule 5.2. Monitor progress to schedule 5.3. Identify causes of not meeting schedule 5.4. Negotiate a solution to cause 5.5. Adjust schedule to meet changed circumstances but still meet overall timeline (if at all possible).

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 the ability to: • identify all necessary sequences of activities to ensure safe and efficient shutdown • negotiate with a range of people to obtain the best outcome for the shutdown from the conflicting priorities • use planning tools to develop and modify complex plans/schedules • use planning tools to optimise the plans • use planning software (eg critical path, PERT or similar methods) • breakdown work tasks into steps/stages/trades/contractors/parts/designs/spares/tools • apply knowledge of plant operations, clearance/permits • logically sort work tasks into sequences • optimise planned activities into a workable schedule/plan • re-schedule/adjust/update plans during shutdown • estimate labour/job times/materials/interactions • follow plant schematics • apply process knowledge of plant • apply mechanical/electrical/instrument knowledge
Required knowledge
Competence includes an understanding of the operation of the plant and its units including: • principles of operation of entire plant being shut down • physics and chemistry relevant to the plant being shut down and the materials processed and their hazards/requirements • plant idiosyncrasies • all items on a schematic of the plant item and the function of each • correct methods of starting, stopping plant items • function of major components and their problems

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. Typically this unit will be assessed by a shutdown planning project. It may not be appropriate to wait until the shutdown planning is completed as it may be desirable to test for competence before taking a major role in a shutdown. In this case a simulation should be used. 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 undertake a structured analysis of the activities to be completed during the shutdown and then undertaking the planning in a systematic manner. Consistent performance should be demonstrated. In particular look to see that: • the plan minimizes the time of the shutdown • required activities/tasks are actively sought, broken into their components and scheduled • plant drawings (eg P&IDs) and engineering specifications are interpreted correctly • priorities for action consider all relevant factors. This will typically be assessed by a major shutdown project on an operating plant. One complex project, or a number of simple projects, is required to demonstrate competence. As shutdown planning is usually a team activity, it is appropriate to assess the technician while they undertake this activity as part of the team, provided competence in all aspects can be

EVIDENCE GUIDE	
	demonstrated.
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. It may be appropriate to co-assess this unit with • *PMASUP410B Develop plant documentation*
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 are covered by the shutdown. Where only a plant area is being shut (or one plant in an integrated complex), it also includes the impact of the shut on those areas still operating. Databases may be: • electronic databases (such as Access, DB, Oracle) • other electronic forms (such as spread sheets) • card files • other paper based systems Scheduling may include: • electronic project planning tools (such as MS Project) • other specialised planning software • paper techniques
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

RANGE STATEMENT	
	and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit sector	Operational/technical

Competency field

Competency field	

Co-requisite units

Co-requisite units		