Australian Government

Department of Education, Employment and Workplace Relations

PMAOPS600C Modify plant

Revision Number: 1

INDUSTRY SKILLS COUNCILS

Creating Australia's Future

PMAOPS600C Modify plant

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the process specification, selection or management of the equipment and supervision of the installation and commissioning of the modification to a plant.

Application of the Unit

Application of the unit	In a typical scenario, it has been identified that modifications need to be made to the plant, and equipment needs to be chosen to undertake these modifications. The identification of the need for modification is not part of this unit, and it may have arisen from any number of possible sources. This competency does not require the design of equipment (which would typically be an engineering role), but does require the process specification of the equipment and the matching of performance specifications of off-the-shelf and/or tendered equipment to the required specification. It also requires the selection of the most appropriate item. This competency assumes that the technician responsible for these modifications takes the overall responsibility for the modifications, but would work with the support of other company and external experts. This extends to the coordination of the installation of the modified equipment. This unit does not cover the optimisation of plant by modification of process, procedures or practice (*see MSAPMOPS400A Optimise process/plant area*) as it is to do with the modification of plant hardware. This unit does not cover work requiring special certification (eg registered structural engineer) but may include working with such people and providing process and product expertise.

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. Confirm required outcomes from modification.	1.1. Communicate with relevant technical, operational and other key personnel, to determine operational and technical requirements of the plant modification. 1.2. Determine regulatory/industry code requirements 1.3. Obtain relevant drawings of existing plant 1.4. Develop modification brief, including relevant plant schematic sketch, to meet needs 1.5. Establish required performance measures to indicate success of project 1.6. Obtain 'sign off' on modification brief from all relevant persons.
2. Short list possible modifications to meet brief.	2.1. Investigate the range of available equipment/plant units 2.2. Determine relative advantages and disadvantages of each class of equipment/type of modification which may provide a solution 2.3. Compile a shortlist of modification types/equipment classes which will best meet the modification brief 2.4. Discuss shortlist alternatives with relevant stakeholders and obtain 'sign off' for the chosen approach.
3. Select technically best equipment/unit/modification.	3.1. Complete technical specification for required modification incorporating feedback received 3.2. Compare specification with that of 'off the shelf' equipment where appropriate 3.3. Arrange for equipment suppliers to tender to the specification where necessary, following company procedures 3.4. Rank competing items by their compliance with the technical specification.
4. Compare hazard profile of possible modifications.	4.1. Organise a hazard analysis (eg HAZOP) for the modification according to company procedures 4.2. Ensure that all stakeholders are represented on the hazard analysis team 4.3. Brief the hazard analysis team on the modification and the alternatives under evaluation 4.4. Eliminate alternatives which do not meet hazard requirements

ELEMENT	PERFORMANCE CRITERIA
	4.5. Rank remaining competing items by safety performance.
5. Make final choice of solution.	5.1. Evaluate competing items by their economic performance (eg, life, maintenance, running costs) and rank by total lifetime cost 5.2. Seek further information where necessary to allow a rational selection to be made 5.3. Choose the modification which meets all required minimum standards and will provide the best solution 5.4. Verify choice in discussion with production and engineering managers and other key stakeholders 5.5. Arrange for order to be placed, following company procedures.
6. Check and commission modification.	6.1. Undertake pre-commissioning activities 6.2. Complete safety acceptance documentation 6.3. Identify, record and report problems or non-conformances 6.4. Conduct trials/test runs 6.5. Record and report performance data 6.6. Bring the plant/plant systems/pipeline on line.
7. Complete modification.	7.1. Evaluate performance of modification 7.2. Make adjustments as required 7.3. Accept (or otherwise) the equipment/unit (and ensure payment flows) 7.4. Ensure plant procedures and training material updated 7.5. Ensure plant drawings and engineering specifications are updated 7.6. Complete all other required paperwork.

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 read and interpret: • plant schematics (eg P&IDs, PFDs, instrument and process diagrams) • construction or layout drawings equipment designs, specifications and manufacturer data Discuss and negotiate with other appropriate personnel to agree necessary and desirable: • technical requirements • operations requirements • timelines • cost and other requirements
Required knowledge
Demonstration of competence in this unit must include knowledge of the following: • the operations of the plant and each major unit in it • the principles of operation of the equipment being investigated to the extent required to interpret technical specifications in a meaningful manner • the basics of plant economics and whole of life costing • hazard analysis principles (while it is beneficial, it is not expected that the candidate will be able to undertake HAZOP (or similar) analyses but will understand basic principles and be able to interpret and use the outcomes) • typical hazards with the type of equipment being investigated • OHS legislative requirements related to plant including registration and documentation requirements related to modification of registered plant

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 specify the requirements and then select the best solution to meet the necessary and desirable requirements. In particular look to see that: • safety, technical and economic aspects are all considered • the decision made can be justified on those criteria • all key stakeholders are kept well informed and agree with the decisions • the modification, and particularly its timelines, are a good fit for the overall plant requirements • obvious problems in related plant areas are recognised and an appropriate contribution made to their solution. This will typically be assessed by a modification project on an operating plant. One complex project, or

EVIDENCE GUIDE	
	a number of simple projects, are required to demonstrate competence.
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 assess this unit concurrently with: • *PMASUP410B Develop plant documentation* • *MSAPMOHS401A Assess risk.*
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	The need for the modification may arise from a continuous improvement project, as a result of an analysis of plant performance or from any other source. The modification may require the selection of any number of items of equipment such as: • pumps • heat exchangers • mixers • separators • columns • reaction kettles. • Classes of equipment (see Element 2) means the selection between different members of an overall class such as: • heat exchangers - various types of shell and tube, plate etc • mixers - propellers, impellors, jet mixing etc • packed columns - rings, saddles etc • kettles - jacketed, coiled etc. Required minimum standards include: • OHS legislative requirements related to plant • industry and enterprise OHS standards • enterprise standards related to maintenance • output requirements • economic performance
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

Competency field

Competency field	

Co-requisite units

Co-requisite units		