Australian Government

Department of Education, Employment and Workplace Relations

PMAOPS600B Modify plant

Release: 1

INDUSTRY SKILLS COUNCILS

Creating Australia's Future

PMAOPS600B Modify plant

Modification History

Not applicable.

Unit Descriptor

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 co-ordination of the installation of the modified equipment. This unit does not cover the optimisation of plant by modification of process, procedures or practice (see **PMAOPS400C - Optimise operating systems**), as it is to do with the modification of plant hardware.

This unit does not cover work requiring special certification (e.g. registered structural engineer) but may include working with such people and providing process and product expertise.

Prerequisites

This unit has prerequisites of:

PMAOPS400C - Optimise operating systems OR

PMAOPS401B - Trial new process/product

AND

PMCOPS530B - Analyse equipment performance OR

PMAOPS511A - Determine energy transfer loads OR

PMAOPS512A - Determine mass transfer loads.

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Application of the Unit

Not applicable.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

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Element	Performance Criteria
1 Confirm required outcomes from modification	1.1 Communicate with production and engineering managers and other key stakeholders and agree necessary and desirable: , technical requirements , operations requirements , timelines , cost and other requirements.
	1.2 Determine regulatory/industry code requirements.
	1.3 Obtain relevant drawings of existing plant.
	1.4 Develop modification brief, including relevant P&ID 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 (e.g. 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.
		4.5 Rank remaining competing items by safety performance.

5 Make final choice of solution	5.1 Evaluate competing items by their economic performance (e.g. 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

Not applicable.

Evidence Guide

Assessment context and methods

Assessment for this unit of competency will be on an operating plant. 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 timely assessment of this unit of competency as modifications may not occur with sufficient frequency to allow for assessment. 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

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 a number of simple projects, are required to demonstrate competence.

Resource implications

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.

Other assessment advice

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:

PMACOM400A - Develop plant documentation

PMAOHS401B - Assess risk

Essential 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.

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Range Statement

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.
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.
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Unit Sector(s)

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