



Australian Government

Department of Education, Employment and Workplace Relations

PMASUP444A Plan plant preparation and isolation

Release: 1

PMASUP444A Plan plant preparation and isolation

Modification History

New unit

Unit Descriptor

This unit of competency covers the skills and knowledge needed to undertake the planning and organisation needed before plant is isolated and prepared for subsequent work, typically maintenance of some sort. It also includes the planning to prepare for the plant's return to service.

Application of the Unit

This unit applies to a person who has the responsibility for planning to isolate and prepare plant. This is probably part of their work role, although it could be a full time secondment for a major shutdown. The type of people to whom this unit may apply include (but are not limited to):

- operators and maintainers
- supervisors
- maintenance planners
- maintenance personnel
- authorised permit issuers, coordinators or similar.

While this unit is written to apply to an individual they will rarely if ever complete this competency as a lone individual and will usually do so in liaison with relevant experts and stakeholders.

This unit applies:

- after the work scope has been agreed
- before the isolation and preparation commences.

This unit has a strong relationship with the relevant ‘permit’ units (e.g. MSAPMPER300C Issue work permits) as well as HAZOP (e.g. PMASUP445A Participate in HAZOP studies) and decommissioning/recommissioning units (e.g. PMASUP440B Commission/recommission plant and PMASUP441C Decommission plant). Where relevant, these units should also be accessed.

This unit requires a detailed knowledge of the plant to be prepared and isolated, such as might be obtained from the relevant technical units covering this plant. Hands-on operating competency, however, is not necessarily required.

This unit does not include the actual isolation and preparation of plant – see PMASUP244A Prepare and isolate plant.

This unit has been written with the preparation and isolation of hazardous plant, such as a major hazard facility in mind. However, it should also be applicable to the preparation and isolation of lower hazard plants and mobile plant with appropriate contextualisation.

Much of this unit is iterative and the text below should not be taken as specifying necessary sequence.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

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

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|---|---------------------------------------|------|--|
| 1 | Confirm scope of work | 1.1 | Examine identified work scope |
| | | 1.2 | Confirm purpose of identified work |
| | | 1.3 | Identify plant and equipment involved |
| | | 1.4 | Negotiate any conflicts/inconsistencies with relevant stakeholders |
| | | 1.5 | Identify possible need for temporary lifting of any isolations |
| 2 | Develop isolation philosophy for work | 2.1 | Apply relevant isolation philosophy/strategy |
| | | 2.2 | Determine implications of isolation |
| | | 2.3 | Identify physical limits of effected plant and equipment |
| | | 2.4 | Check suitability and effectiveness of existing isolation procedures |
| | | 2.5 | Assess possible boundaries for isolations |
| | | 2.6 | Seek local knowledge for similar isolations and preparations |
| | | 2.7 | Draft strategies for isolation and preparation |
| | | 2.8 | Communicate, as appropriate, with stakeholders |
| | | 2.9 | Negotiate isolation and preparation conflicts |
| | | 2.10 | Prepare isolation philosophy for work |

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| 3 | Manage hazards | 3.1 Identify existing hazards of plant, process and materials |
| | | 3.2 Identify hazards associated with performing the isolations and preparation |
| | | 3.3 Identify hazards associated with purging/flushing/venting materials |
| | | 3.4 Draft strategies for controlling any releases |
| | | 3.5 Estimate required preparation durations |
| | | 3.6 Make recommendations for improvement in accordance with procedures |
| | | 3.7 Liaise with technical experts as required |
| | | 3.8 Specify types of isolations and locations of isolations required |
| | | 3.9 Specify other required hazard controls |
| | | 3.10 |
| 4 | Plan required isolation and preparation | 4.1 Determine required sequencing of all steps |
| | | 4.2 Develop isolation procedure |
| | | 4.3 Develop preparation procedure |
| | | 4.4 Develop decontamination procedures |
| | | 4.5 Develop required procedures for plant supplementary systems |
| | | 4.6 Verify procedures against relevant drawings and the plant |
| | | 4.7 Identify and schedule required prework |
| | | 4.8 Determine competencies required to complete planned isolations and preparation |
| | | 4.9 Plan required deisolation and preparation for return to service |
| | | 4.10 Discuss proposed plans with relevant stakeholders |

- 4.11 Complete required documentation
- 5 Obtain authority to execute plan
 - 5.1 Obtain approval to implement the isolation and preparation plan
 - 5.2 Obtain approval to implement the deisolation and preparation for return to service plan
 - 5.3 Acquire hardware and resources for isolation and deisolation and preparation for work and return to service

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills include:

Ability to:

- read and interpret technical documentation and drawings/graphics
- interpret material safety data sheets (MSDS)
- use appropriate risk assessment tools/risk effect matrices
- calculate vessel inventory
- calculate purging/ventilation times
- calculate required volumes for purging
- calculate required times for ventilation (e.g. to achieve a specified number of turns/volumes)

Required knowledge includes:

Knowledge of:

- work control system for site and organisation
- regulations and other external controls relevant to the proposed work
- isolation philosophy or organisation
- hierarchy of isolations
- fluid hydraulics as applied to draining and purging of vessels
- types of purging and ventilation media and their uses and limitations
- methods and equipment used for purging and ventilation
- physical properties of process materials (e.g. density and viscosity)
- hazardous properties of relevant materials (e.g. process, purging and ventilation materials)
- as low as reasonably practicable (ALARP) concept and methods of achieving it
- vessel chilling causes and controls
- appropriate rates of change for pressure and temperature for vessels and other plant
- organisation's authorisation procedures
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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria required skills and knowledge range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	This unit should be assessed as holistically as is practical and will generally be assessed using a workplace project as a significant assessment activity.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: <ul style="list-style-type: none"> • develop an appropriate isolation philosophy for

	<p>the work on a significant item of equipment or plant area</p> <ul style="list-style-type: none"> • manage relevant hazards • develop an appropriate plan for the required isolations and preparation.
Context of and specific resources for assessment	<p>Assessment of performance must be undertaken in a workplace.</p> <p>Access may be required to:</p> <ul style="list-style-type: none"> • workplace procedures and plans relevant to work area • specifications and documentation relating to planned work • documentation relating to the plant, process and materials • any other materials which would normally be available in the workplace while conducting this activity.
Guidance information for assessment	<p>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.</p>

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. 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) may also be included.

Isolation	<p>Isolation is a process for ensuring no energy or material can enter the isolated area</p>
Preparation	<p>Preparation is a process for ensuring that plant and equipment is in a safe and appropriate condition for the required work. Preparation may include, but is not limited to:</p> <ul style="list-style-type: none"> • draining • purging • inerting

	<ul style="list-style-type: none"> • decontaminating • cleaning • ventilating • controlling atmosphere (e.g. to ensure it is breathable, and is not within the flammable range) • adjusting temperature to make a workable environment • adjusting pressure (usually to atmospheric) • ensuring adequate access and egress
Scope of work	<p>Scope of work includes, but may not be limited to:</p> <ul style="list-style-type: none"> • what work is to be done • where the work will be done • who will be doing the work • when the work needs to be done • why the work is to be done • how the work will be undertaken (tools and techniques) • frequency with which this work is/will be required • duration of work (from beginning of shutdown to back to normal operations)
Relevant isolation philosophy/strategy	<p>Relevant isolation philosophy/strategy will normally be that of the organisation for which the isolations are being done although they could include regulatory or similar requirements and may include, but are not limited to:</p> <ul style="list-style-type: none"> • types of isolations allowed (e.g. positive, double block and bleed), removal of item (e.g. fuse and spool piece), and single block isolations • lock out/tag out • preparation strategies • types of equipment to be used • purging or other preparation fluids/techniques <p>Strategy will be consistent with relevant external standards, such as:</p> <ul style="list-style-type: none"> • Government of Western Australia, Department of Commerce, Guidance note – Isolation of plant, 2010 • National Offshore Petroleum Safety Authority (NOPSA) requirements • Major Hazard Facility (MHF) Licence to Operate
Hazards	<p>Hazards will include:</p>

	<ul style="list-style-type: none"> • hazards to people, environment and plant • other hazards as relevant to the organisation/facility
Implications of isolation	<p>Implications of isolation apply to both the area of the work as well as upstream and downstream implications and may include, but are not limited to:</p> <ul style="list-style-type: none"> • upstream and downstream process implications • ability to prepare plant once isolated • integrity of plant once isolated and prepared
Controlling releases	<p>Controlling releases to the environment may include, but is not limited to:</p> <ul style="list-style-type: none"> • preventing any release • containing any release • recovery and reuse or disposal of any release
Physical limits of plant	<p>Physical limits of plant may include, but are not limited to:</p> <ul style="list-style-type: none"> • temperature/pressure limits of plant and equipment • limits on rates of change of temperature/pressure • suitable steam pressures/temperatures
Strategies for isolation and preparation	<p>Strategies for isolation and preparation may include, but are not limited to:</p> <ul style="list-style-type: none"> • sequence of isolations and preparations • type of isolation, based on hierarchy of isolations • type of preparations to be used
Hierarchy of isolations	<p>Isolations may be categorised according to a hierarchy of:</p> <ul style="list-style-type: none"> • positive • proven • unproven
Estimating preparation durations	<p>Estimating preparation durations may include, but is not limited to:</p> <ul style="list-style-type: none"> • determining inventory in plant to be drained/purged • establishing safe rates of change, such as: <ul style="list-style-type: none"> • pressurisation • depressurisation • draining • flushing • cooling

	<ul style="list-style-type: none"> • heating • calculating required volumes and pressures of flushing/purging venting materials • calculating the time required to drain, flush, purge, depressure, pressure, cool and heat
Isolation procedure	<p>Isolation procedure may include, but is not limited to:</p> <ul style="list-style-type: none"> • isolation processes • isolation list • multiple isolations • temporary lifting of isolations, when and if required • interlocks <p>and will include consideration of:</p> <ul style="list-style-type: none"> • isolation alternatives • conflicts of isolation
Verifying procedures	<p>Verifying procedures may include, but is not limited to:</p> <ul style="list-style-type: none"> • checking existing documents which have been used are accurate, current and complete • checking planned isolation points do exist, are accessible, and are suitable for the isolation planned • having a history of providing the isolation desired
Relevant drawings	<p>Relevant drawings may include, but are not limited to:</p> <ul style="list-style-type: none"> • piping and instrumentation diagrams (P&IDs) • process flow diagrams (PFDs) • process flow sheets (PFSs) • process engineering flow sheets (PEFs)
Required prework	<p>Required prework may include, but is not limited to:</p> <ul style="list-style-type: none"> • scaffolding • building up/depletion of inventories/work in progress (WIP) • obtaining of supplies • identification tags • lock out kits
Competencies required	<p>Competencies required for isolation and preparation may include, but are not limited to:</p> <ul style="list-style-type: none"> • electrical (normal) • electrical high voltage and hazardous area

	<ul style="list-style-type: none"> • electrical isolation/deisolation • radiation • heights • mobile plant • plumbing • mechanical fitting • permit preparation
Required documentation	<p>Required documentation may include, but is not limited to:</p> <ul style="list-style-type: none"> • drawings • procedures • marking up existing documents • punch lists • vendor documents/engineering specifications • documentation required by the site work control system (e.g. permits) <p>Documents will conform to the site requirements and document control systems</p> <p>Documents may be:</p> <ul style="list-style-type: none"> • paper, electronic or other approved form
Authority to execute	<p>Authority to execute includes both the authorisation to proceed and the timing of that execution. Authority will be obtained through the channels required by the organisation/facility.</p> <p>The level of authority required will vary for different types of work, different types of isolation and different plants/facilities</p>

Unit Sector(s)

Support

Custom Content Section

Not applicable.