



Australian Government

PMASUP440B Commission/recommission plant

Revision Number: 1

PMASUP440B Commission/recommission plant

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the commissioning of new plant/pipeline or the re-commissioning of significantly modified plant/pipeline. This unit does not cover startup of a plant/ pipeline after a shutdown, unless there have been major changes to the plant during the shutdown. For a normal startup use <i>PMAOPS411B Manage plant shutdown and restart</i> .
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Application of the Unit

Application of the unit	<p>In a typical scenario, a new plant/pipeline or a major plant/pipeline upgrade is to be commissioned/recommissioned with a leading plant technician taking a significant role.</p> <p>The technician is involved in the design of the plant/plant modifications and the planning of the startup. Being 'involved in' could mean participating in design meetings or HAZOPS or reviewing/checking the design for operability issues or checking the HAZOP outcomes. This does not preclude the inclusion of 'turnkey' type projects, provided the technician has had a role in the plant design, eg checking operability, suitability for local conditions.</p> <p>This competency includes all equipment associated with the new/modified plant. The technician would not normally have a 'hands on' operating role for all items of equipment, but may have a 'hands on' role for major items of equipment. More importantly, the technician will have an overall role and would be expected to have an understanding of the function of all items of equipment in the plant so that detailed directions can be given plant operators who are performing the 'hands on' role during the commissioning/recommissioning.</p> <p>This competency is typically performed by experienced technicians, likely to be the leaders of an operational team. This may include working in conjunction with a design team, or reviewing final design to ensure plant/pipeline meets operational requirements and for the purpose of commissioning or recommissioning plant/pipelines. As commissioning is usually a team activity, the technician will take a lead technical role, rather than undertake all aspects on an individual basis.</p>
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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. Contribute to/review the design of plant/ equipment.	1.1. Apply process understanding to the design process 1.2. Identify the role and purpose of the plant and equipment 1.3. Ensure design meets the identified need 1.4. Identify process conditions and apply to hazard and operability studies 1.5. Undertake investigations following hazard studies 1.6. Record and report findings.
2. Take part in commissioning planning.	2.1. Ensure the work is coordinated effectively with others involved on the work site 2.2. Obtain materials necessary to complete the work and check against job requirements 2.3. Obtain tools and equipment necessary to carry out the work and check for correct operation and safety 2.4. Prepare plans to ensure that procedures are performed in the correct sequence 2.5. Obtain approvals where necessary from appropriate authorities.
3. Participate in acceptance of plant/ equipment.	3.1. Undertake pre-commissioning activities 3.2. Complete safety acceptance documentation 3.3. Identify, record and report problems or non-conformance 3.4. Conduct trials/test runs 3.5. Record and report performance data.
4. Commission system.	4.1. Bring the plant/plant systems/pipeline on line 4.2. Make and report adjustments 4.3. Prepare reports in accordance with legislative and company requirements to maintain the historical record.
5. Evaluate results and identify modifications.	5.1. Identify modifications and improvements required 5.2. Check specifications, procedures and training material match the final system/procedures 5.3. Complete documentation and report to appropriate personnel.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- hazard analysis
- completing plant records
- communication
- problem solving.

Required knowledge

Competence to include the ability to apply and explain:

- HAZOP (or similar) study process and the interpretation of findings
- results and impact of a HAZAN (or similar) study
- the process of hazard identification, risk assessment and control
- hierarchy of control
- sources of hazard information (such as Material Safety Data Sheets)
- principles of operation of equipment
- interpretation of design drawings, schematics and manuals
- physics and chemistry relevant to the plant and the materials processed or produced
- process parameters and limits, eg temperature, pressure, flow, pH
- duty of care obligations
- expected problems, faults and their resolution
- possible alarms and actions
- any known or expected plant process idiosyncrasies
- all items on a schematic of the plant 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 to be expected
- principles of operation of instrumentation
- principles of basic control systems
- distinguish between the following problem sources, and their avoidance:
 - chemical
 - instrument
 - equipment (electrical/mechanical)
 - maintenance.

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.

Simulation may be required to allow for assessment of parts of this unit. It is possible that a simulation will be required to ensure that the technician is competent before taking a significant role in a commissioning activity. Commissioning is an infrequent and often frenetic activity and so it may not be practical or equitable to wait for an actual commissioning to occur to use this as the basis 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 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:

- 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

EVIDENCE GUIDE	
	<p>commissioning stays on schedule</p> <ul style="list-style-type: none"> obvious problems in related plant areas are recognised and an appropriate contribution made to their solution. <p>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.</p>
Context of and specific resources for assessment	<p>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.</p>
Method of assessment	<p>In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units.</p> <p>In a major hazard facility, it may be appropriate to assess this unit concurrently with relevant OHS units.</p>
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

RANGE STATEMENT	
<p>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.</p>	
Appropriate authorities	<p>Appropriate authorities may include:</p> <ul style="list-style-type: none"> • local councils • road authority • sewerage and stormwater authorities • providers of services such as electricity, water and telephones.
Codes of practice/ standards	<p>Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.</p>
Plant	<p>Plant covers on or off shore plant, well heads and also transmission pipelines or similar.</p>
Commissioning	<p>Commissioning refers to the start-up of a new plant or plant unit and the associated equipment for the first time.</p>
Commissioning/re-commissioning activities	<p>Commissioning/recommissioning activities may include:</p> <ul style="list-style-type: none"> • trial running of equipment • use of trial materials in plant • safe introduction of process materials to plant • producing product within specification • bringing plant to design rates • solving operational problems • disposal of waste generated in the start-up.
Documentation	<p>Documentation may include:</p> <ul style="list-style-type: none"> • operating procedures • OHS and environmental legislative requirements • manufacturer specifications • appropriate authority approvals • quality assurance inspection and test reports.
Health, safety and environment	<p>All operations to which this unit applies are subject to</p>

RANGE STATEMENT	
(HSE)	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.
Plant/pipeline systems	Plant/pipeline systems may include: <ul style="list-style-type: none"> • pipes • valves • operating units • electrical and electronic components • PLCs/DCS control (programmable logic controllers, distributed control systems) or other plant controls • cathodic protection • pressure/flow/temperature etc regulation and meters.
Pre-commissioning	Pre-commissioning activities may include: <ul style="list-style-type: none"> • checking plant is built to design • ensuring plant is safe to operate • ensuring plant area is clean and clear of debris • ensuring the plant internals are clean and clear of debris • functional checking of equipment and ancillaries.
Procedures	All operations are performed in accordance with standard operating procedures. Procedures may be written, verbal, computer-based or in some other form. They include: <ul style="list-style-type: none"> • 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.

RANGE STATEMENT	
Recommissioning	<p>Recommissioning refers to the start-up of an existing plant following major modifications, rebuild or reconfiguration.</p> <p>This competency unit includes functions such as :</p> <ul style="list-style-type: none"> • liaison with relevant personnel such as manufacturers, engineering personnel, designers, contractors and maintenance and other company personnel • participation in/reviewing of hazard studies, which may include: <ul style="list-style-type: none"> • hazard and operability studies (HAZOP) • hazard analysis studies (HAZAN) • participation in/reviewing of design or modification plans
Tools, materials and equipment	<p>Tools, materials and equipment may include:</p> <ul style="list-style-type: none"> • hand tools, including power operated • other power operated tools • plant • emergency equipment • electrical and electronic test equipment • gas detectors • air compressor • water pump.

Unit Sector(s)

Unit sector	Support/generic
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Competency field

Competency field	
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Co-requisite units

Co-requisite units		
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