Australian Government

Department of Education, Employment and Workplace Relations

PMAOPS201B Operate fluid flow equipment

Revision Number: 1

PMAOPS201B Operate fluid flow equipment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers the operation of the range of pumps and valves typically encountered in the fluid flow system of a processing plant. It includes identifying, operating, monitoring and troubleshooting these items.

Application of the Unit

Application of the unit	In a typical scenario, an operator uses a number of general purpose pumps, piping and valves to move liquids from a storage tank area into the processing plant and products to the finished goods tanks. The operator utilises in-line mixers, strainers and filters, valves, controls and meters to complete this work. The operator would: • identify and report operational problems • be aware of and contribute to a safe working environment • contribute to the safe and productive operation of the equipment • operate, monitor and maintain equipment using relevant procedures. Generally the operator would be part of a team during start up and shut down procedures and would be expected to be capable of demonstrating competence in all parts of this unit. At all times they would be liaising and cooperating with other members of the team. This unit does not require the operation of a central control panel. This competency covers all general duty pumps, their associated drivers (motors) and valves. It does not cover special duty pumps (eg hydrocarbon transmission pumps), drivers which incorporate ancillaries and valves which are used for high pressure/flow situations (see *PMAOPS221 Operate and monitor prime movers*, *PMAOPS222B Operate and monitor pumping systems and equipment* and *PMAOPS223B Operate and monitor valve systems*). Competence in this unit (*PMAOPS20B1 Operate fluid flow equipment*) would preclude counting *PMAOPS223B Operate and monitor valve systems* towards a qualification.

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. Prepare for work.	1.1. Identify work requirements 1.2. Identify and control hazards 1.3. Coordinate with appropriate personnel
2. Operate pumps.	2.1. Identify the type of pump 2.2. Start up and shut down pump as required 2.3. Adjust flow and head/pressure as appropriate to type of pump 2.4. Complete routine checks and reports taking action as required 2.5. Change over pumps as required.
3. Operate pump drivers.	3.1. Monitor critical variables such as amps, temperature and vibration 3.2. Keep critical variables in range 3.3. Recognise trends/patterns which indicate a potential or actual problem with the pump driver 3.4. Take action to ensure driver as required.
4. Operate valves.	4.1. Identify the type of valve 4.2. Operate valve in a manner appropriate to the valve type 4.3. Complete routine checks and reports, taking action as required.
5. Respond to fluid system problems.	5.1. Monitor fluid flow system frequently and critically throughout shift using measured/indicated data and senses (sight, hearing, etc) as appropriate 5.2. Recognise issues requiring action 5.3. Take appropriate action.
6. Isolate and de-isolate pump.	6.1. Isolate equipment 6.2. Make safe for required work 6.3. Check plant is ready to be returned to service 6.4. Prepare plant for return to service .

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
• efficient and effective operation of plant/equipment • hazard analysis • completing plant records • communication • problem solving.
Required knowledge
Competence includes an understanding of the fluid flow system and its integral equipment to a level needed to control the system, and recognise and resolve operational problems. In particular it includes a knowledge of: • principles of operation of plant/equipment • physics and chemistry relevant to the process unit • process parameters and limits eg temperature, pressure, flow, pH • duty of care obligations • hierarchy of control • communication protocols eg radio, phone, computer, paper, permissions/authorities • routine problems, faults and their resolution • relevant alarms and actions • plant process idiosyncrasies • all items on a schematic of the fluid flow system and the function of each • correct methods of starting, stopping, operating and controlling flow • causes of head loss in piping systems (including comparison of fittings using Le/d concept, fluid and pipe material properties, flow geometry, etc) • corrective action appropriate to the problem cause • function and troubleshooting of major internal components and their problems (such as impellors, seals or bearings) • types and causes of fluid flow problems within operator's scope of skill level and responsibility.

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 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: • early warning signs of equipment/processes needing attention or with 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 a timely return to full performance • obvious problems in related plant areas are recognised and an appropriate contribution made to their solution. These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a

EVIDENCE GUIDE	
	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.
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. Consider co-assessment with units covering: • measurements and readings • housekeeping • communication. In a major hazard facility, it may be appropriate to assess this unit concurrently with: • *MSAPMOHS200A Work safely*. The assessment should cover at least one type of centrifugal pump and one type of positive displacement pump, as well as at least two different types of valves for the operator to be regarded as competent.
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 if 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 competency is typically performed by all operators. It includes items of equipment such as: • pumps, including various types of centrifugal, positive displacement, acid egg • valves, such as globe, needle, gate, butterfly, plug cock, wedge plug, ball cock, non-return, diaphragm, pneumatic globe, pneumatic butterfly • piping systems and components, including bends and elbows, tee pieces, expansion mechanisms, pipe joints, reducers, nipples, orifices, in-line mixers, filters and strainers, flexible hoses and couplings • shaft seals, such as stuffing boxes, mechanical seals, fluid seals, labyrinth seals. The effect of pipe fittings on pump performance and problems/problem analysis is also included. All operations are performed to procedures.
Problems	Typical problems include: • cavitation • seal leaks • head loss/low flow • bearing problems.
Appropriate action	Appropriate action includes: • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person.
Procedures	Procedures may be written, verbal, computer-based or in some other form.

RANGE STATEMENT	
	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.
Start up shut down as required	Start up shut down as required includes: • start up and shut down to/from normal operating conditions • start up and shut down to/from isolated, cold, empty • all other conditions experienced on the plant. • ie from any condition to any condition experienced on the plant.
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	