



Australian Government

Department of Education, Employment and Workplace Relations

PMASUP445A Participate in HAZOP studies

Revision Number: 1

PMASUP445A Participate in HAZOP studies

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the principles and application for technicians in undertaking hazard and operability studies. It is a systematic method for examining complex facilities or processes to identify actual or potentially hazardous procedures and operations so that they may be eliminated or mitigated. HAZOP studies are performed by a multi disciplinary team that identifies the potential hazards and operating issues with the design, construction and commissioning of equipment and plant. This unit may also apply to other personnel with extensive plant knowledge who are involved in the study as team members.
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Application of the Unit

Application of the unit	In a typical scenario an experienced operations technician would be a participant in a multi disciplinary team consisting of operators, engineers, safety and other personnel to review a change in plant, process or equipment to see if the change can cause unforeseen hazards or introduce unexpected operability problems and that the change meets the standards. The operations technician would: • review pipe and instrumentation diagrams • identify possible hazards or operability issues • contribute to the safe and productive operation of the plant • recommend amendments to improve safety and operability of the proposed change • review and amend procedures in relation to the change The operations technician would be an experienced operator of the plant under review and part of a HAZOP study team during all phases of the study, including at the initial concept stage, when the pipe and instrumental diagrams (PID) are available, during construction, installation and commissioning and during operation reviewing and amending procedures. He/she would be expected to be capable of demonstrating competence in all parts of this unit. He/she would be actively participating in all phases of the study, liaising and cooperating with other members of the team.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	<i>PMAOPS280B Interpret process plant schematics</i>
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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.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify the principles of a HAZOP study	1.1.Explain the purpose of a HAZOP 1.2.Describe the key steps in undertaking a HAZOP study 1.3.Identify the tools used in a HAZOP study 1.4.Describe how key words assist in identifying problems 1.5.Explain how HAZOP studies are applied in the workplace
2. Participate in a HAZOP study	2.1.Identify the purpose and operation of the new/modified equipment/process 2.2.Explain the normal operating conditions, method of operation and associated equipment and componentry of proposed change 2.3.Review relevant information to assist in the identification of possible problems 2.4.Process available information to identify potential hazards or operability issues 2.5.Identify potential hazards or operability issues and possible consequences utilising key words 2.6.Assess the risks arising from identified potential hazards or operability issues 2.7.Identify items needing further action 2.8.Review relevant operating and safety procedures 2.9.Recommend possible solutions to minimise risk of proposed change.
3. Complete delegated actions within scope of responsibility.	3.1.Perform delegated actions within area of responsibility 3.2.Follow initiated items through until final resolution has occurred 3.3.Identify problems needing further action 3.4.Determine possible fault causes within area of responsibility 3.5.Report outcomes to designated person.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

This competency includes the following skills:

- analysis
- communication
- instrument failure/malfunction
- electrical failure/malfunction
- mechanical failure/malfunction
- equipment design deficiencies
- product parameters (temperature, flows, pressure and levels)
- process control system malfunction
- power/utility failures.
- An ability to operate the plant under review is considered to be an essential element of this unit of competency.

Required knowledge

The knowledge referred to in the evidence guide for this unit includes:

- the architecture and location of the process/production equipment
- specific plant process operations
- interactions between plant items/processes
- product specifications and tolerances
- systems operating parameters
- system integrity limits
- process control philosophies and strategies
- emergency shutdown procedures
- process specific physics, chemistry and mathematics
- basic science of upstream and downstream processes
- impact of external factors (eg variations in weather, feed)
- process drawings (eg P&ID, PFD, cause and effect)
- basis of control for the plant/s
- instrumentation and control systems, components and loops as they relate to the modification under review
- impacts of changing process/production equipment settings and the limits within which changes can be made
- organisation procedures
- OHS, hazardous substances and environmental requirements
- thorough knowledge of enterprise standard operating procedures, plant processes and

REQUIRED SKILLS AND KNOWLEDGE

equipment for area under review

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

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. Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Simulation may be required to allow for timely assessment of parts of this unit of competency (eg elements 1-2). Simulation should be based on an actual HAZOP study relevant to the plant and may include the use of case studies/scenarios and role plays.

This unit of competency requires an application of the knowledge contained in the use of the process control system and its integral equipment, to the level needed to maintain control and recognise and resolve problems. This can 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 responses. 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
- key words are utilised in the identification of potential hazards or operability issues
- possible consequences are identified and

EVIDENCE GUIDE	
	explained • risks are assessed from identified potential hazards or operability issues • appropriate contribution is made to the identification of potential hazards and operability issues and risk assessment. 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.
Context of and specific resources for assessment	Assessment will require access to HAZOP tools and relevant plant documentation 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, communication and leadership units.
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 italicized 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 AS61882, the latest version must be used.
Context	This unit of competency includes all relevant information and plant and equipment that might be required for the HAZOP study. This may include (select relevant items): • provisional layouts • material safety data sheets • process drawings (eg P&ID, PFD, cause and effect) • plant model • equipment arrangement drawings • provisional operating instructions/procedures • plant operating procedures • logic diagrams • equipment reference manuals • hazardous area layouts • start up and shut down emergency procedures • access to plant and equipment. Typical HAZOP study for your plant may include: • purpose of new equipment/plant • how the design will cope with abnormal conditions • identification of potential hazards and operating issues.
Designated action	Designated action may include: review of plant operating procedures undertaking additional tasks from action list HAZOP report attendance at HAZOP review meetings recording results from additional tasks.
Health, safety and environment	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

RANGE STATEMENT

(HSE)	and HSE requirements, the HSE requirements take precedence.
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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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