Department of **Energy, Mines, Industry Regulation and Safety**

GOVERNMENT OF WESTERN AUSTRALIA

WorkSafe Western Australia Petroleum Safety

GUIDE

Hazard identification

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Reference

WorkSafe Western Australia, 2024, Hazard identification: Guide. Department of Energy, Mines, Industry Regulation and Safety, Western Australia, 21 pp.

This publication can be available on request in other formats for people with special needs.

Further details of safety publications can be obtained by contacting:

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Foreword

Western Australia's work health and safety (WHS) legislation came into force in March, 2022. This resulted in the amendment of the various petroleum Acts and the repeal of the associated regulations so that all onshore and offshore petroleum, pipeline and geothermal energy operations are now subject to the requirements of the:

- *Work Health and Safety Act 2020* (the WHS Act)
- Work Health and Safety (Petroleum and Geothermal Energy Operations) Regulations 2022 (WHS PAGEO Regulations).

A key responsibility for the WorkSafe Group (WorkSafe) of the Department of Energy, Mines, Industry Regulation and Safety (the Department) continues to be the ongoing risk management and safety requirements for the onshore and offshore petroleum, pipeline and geothermal energy operations. To support these requirements, the guides previously developed have been updated to provide support and assist operators to meet their commitments under the WHS Act and WHS PAGEO Regulations.

Application

This Guide is a non-statutory document provided by WorkSafe to assist persons subject to duties under the WHS Act and requirements to conduct audits of the safety management system as prescribed by the WHS PAGEO Regulations.

It has been developed to provide advice and guidance to operators to meet the WHS Act and the WHS PAGEO Regulations requirements administered by WorkSafe.

Who should use this Guide?

You should use this Guide if you are:

- the operator of onshore or offshore petroleum, pipeline or geothermal energy operations under the WHS Act
- responsible for hazard identification and risk assessment and ongoing risk management.

WHS legislation

Under the WHS Act, the WorkSafe Commissioner is responsible for performing the functions and exercising the powers of the regulator. Each safety document must be submitted for acceptance by the regulator.

WorkSafe assists the regulator in the administration of the WHS Act and the WHS PAGEO Regulations, including the provision of inspectors and other staff to oversee compliance with the legislation.

For facilities outside the Western Australian waters, the WHS Act does not apply and guidance should be sought from National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA). If a vessel does not fall under the definition of "facility" in the Act, operators should contact the Australian Maritime Safety Authority and Department of Transport.

No petroleum or geothermal operations can be conducted on any onshore or offshore petroleum, pipeline or geothermal energy operations unless the facility has an operator registered in accordance with the requirements of WHS PAGEO Regulations.

The WHS PAGEO Regulations provided for transitional provisions in relation to facility operators and safety cases in place or submitted before the commencement of the WHS legislation.

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1 Introduction

WHS PAGEO Regulations r. 32(3)
Formal safety assessment

WHS PAGEO Regulations r. 32(4)
Safety management system

WHS PAGEO Regulations r. 72(2)
Contents of a diving safety management system (DSMS)

This Guide has been developed to provide operators with assistance to meet their obligations for effective hazard identification within their operations.

For the purpose of this Guide, the term “safety case” is used to cover all of the safety documents referred to in the WHS PAGEO Regulations.

The term “facility” covers offshore and onshore facilities and pipelines, including above ground structures.

The objective of the Guide is to provide clarity on areas of the legislation which may be ambiguous or open to interpretation.

1.1 Aims and outcomes of hazard identification

The aims and outcomes of the hazard identification processes are to:

- identify all hazards to the health and safety of all people at or near a facility, including psychosocial hazards which may lead to psychological or physical harm
- identify the associated events and outcomes and rank these based on risk
- show clear links between hazards, causes and the potential events
- identify hazards that can lead to major accident events
- provide the operator and workers with sufficient knowledge, awareness and understanding of the hazards to be able to prevent and deal with accidents and dangerous occurrences
- provide a systematic record of all identified hazards which may affect health and safety of all people and property or the environment at or near the facility, and in particular those which may lead to major accident events (MAEs), together with assumptions
- provide a basis for identifying, evaluating, defining and justifying the selection (or rejection) of control measures for eliminating or reducing risk.

1.2 Linked guides

The following guides have been developed that will provide information to assist operators in the area of hazard identification and risk management and the development and implementation of a safety case.

- *Risk assessment and management including operational risk assessment*
- *Identification of major accident events, control measures and performance standards*
- *Demonstration of risk reduction so far as is reasonably practicable (SFAIRP)*
- *Psychosocial hazards in the workplace*
- *Human factors fundamentals for petroleum and major hazard facility operators*
- *Human factors self-assessment guide and tool for safety management systems at petroleum and major hazard facility operators*

These six guides, together with this Guide, form a suite of information for effective hazard identification, risk assessment and management including identification of MAEs and control measures.

Figure 1 gives an example of the overall formal safety assessment (FSA) process which may be used by operators to identify and manage the hazards and risks within their organisations and also meet the requirements of the WHS PAGEO Regulations.

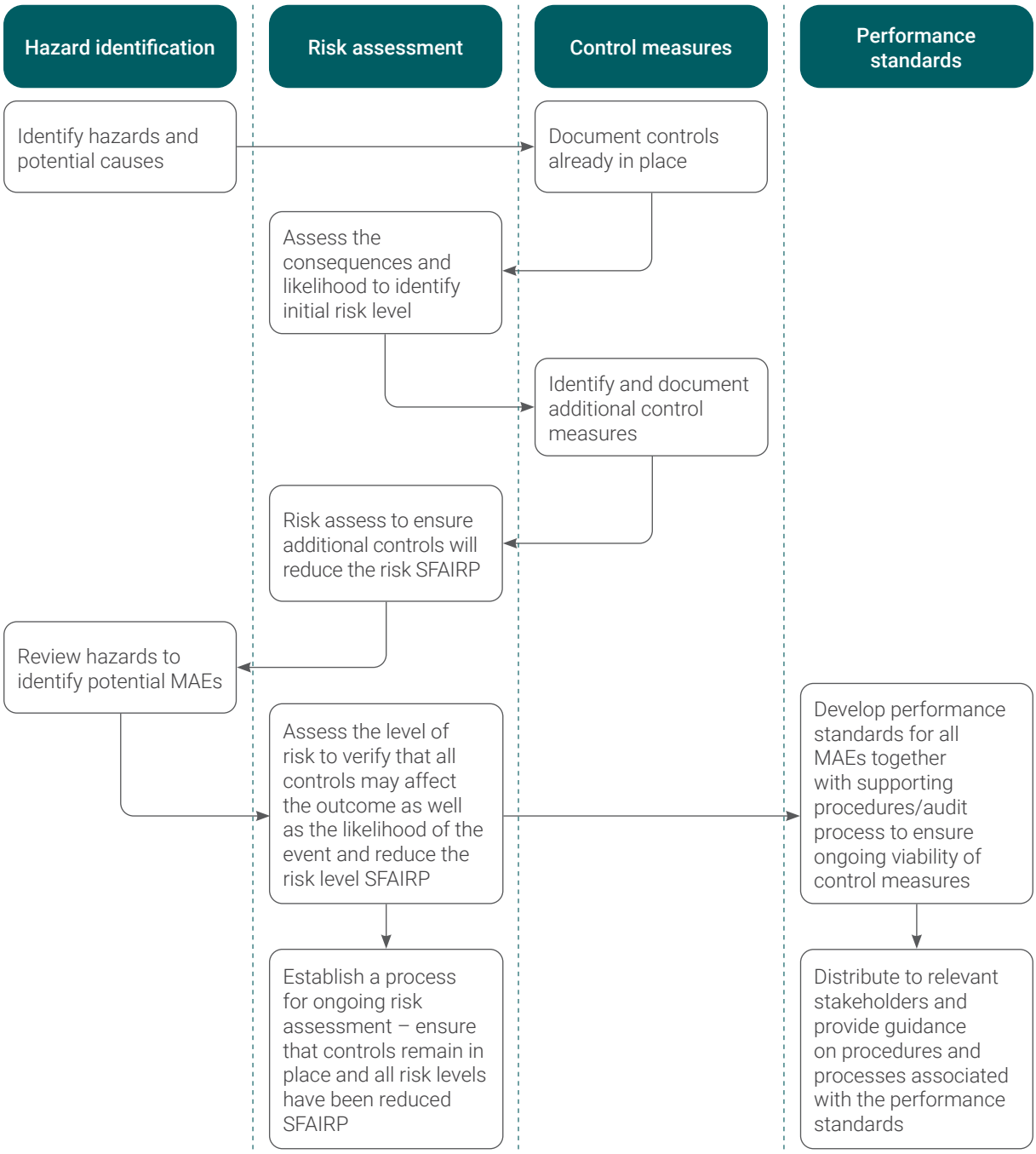

Figure 1 Formal safety assessment process

2 Hazard identification planning and preparation

WHS PAGEO Regulations r. 107

Specific requirements must be complied with

WHS PAGEO Regulations r. 108

Duty to identify hazards

Detailed planning and preparation for hazard identification is critical to the successful outcome of the process. Apart from the collation and provision of all the information required to support the hazard identification process, a scheduled workshop is recommended to:

- ensure key subject matter experts (SMEs) and worker representation will be available
- allow sufficient time for participants to review and consider all aspects of the hazards identified including relevant historical incidents on similar facilities both locally and internationally
- if conducting workshops, include regular breaks to avoid fatigue
- ensure safe staffing levels are maintained at the facility.

Regardless of the methodology to be adopted for a hazard identification study, this will generally be conducted using a brainstorming process undertaken by a skilled and experienced group with knowledge of the particular facility, project or activities to be undertaken.

While the main aim of the FSA is the identification and control of MAEs or serious harm incidents (depending on the relevant legislation) it is important that all known hazards which may affect the health and safety of workers at or near the facility, are identified, assessed and documented.

2.1 Successful hazard identification processes

A successful hazard identification may include:

- hazard identification processes relevant and appropriate for the facility
- hazard identification teams should take a fresh view of any existing knowledge and should not assume that no new knowledge is available
- appropriate workers are actively involved in the hazard identification process and there are regular and ongoing consultation sessions with workers
- any assumptions and uncertainties are explicitly identified and recorded for later analysis
- full documentation of all methods, results, assumptions and data
- documented identification of hazards is regularly reviewed and maintained from alerts and incidents and used as a live document.

Hazard identification outcomes should be used to plan for management of health and safety and should be provided to workers.

Knowledge of hazards and their implications is necessary for the next steps of risk assessment and evaluation of control measures.

Figure 2 shows the various steps in the hazard identification process.

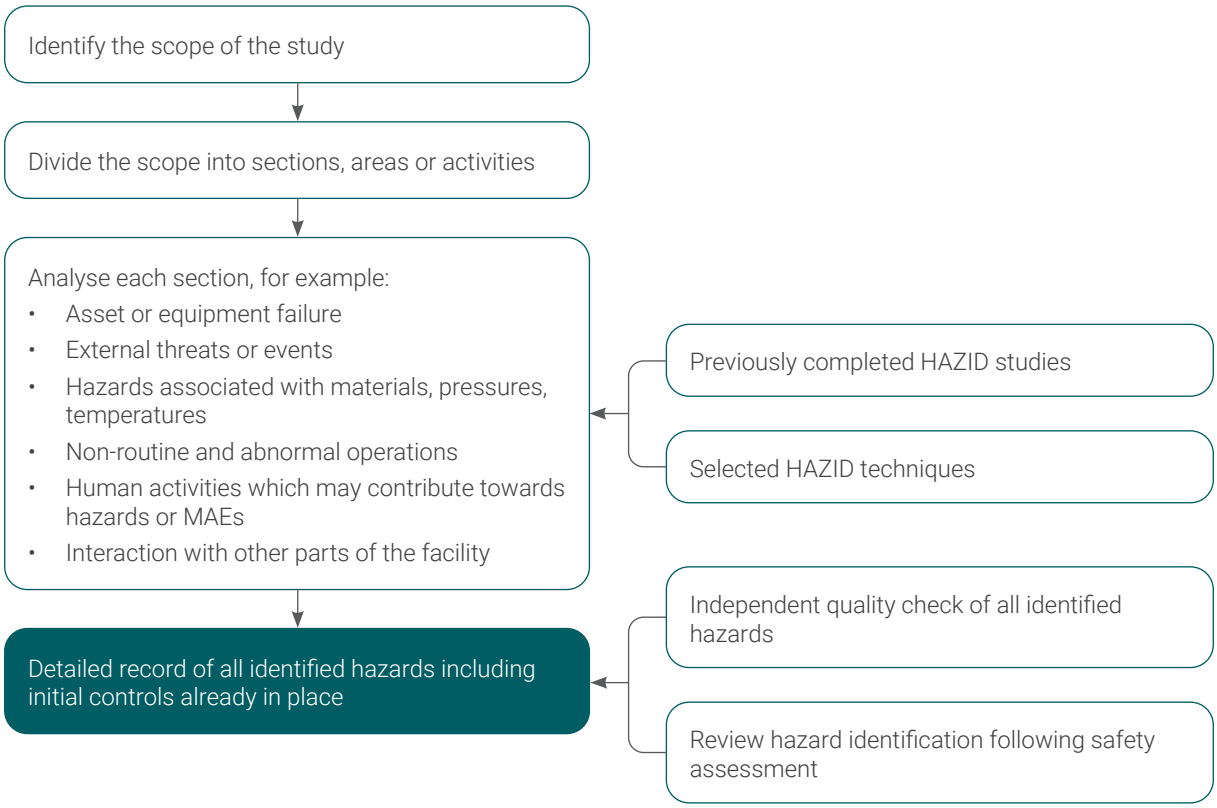

Figure 2 Hazard identification process

2.2 Hazard identification techniques

There are a number of techniques and methodologies, or combinations of appropriate techniques and methodologies that can be used for the identification of hazards on a facility. Some common techniques are:

- incident data – review of past incident and accidents that have occurred on the facility or known to have occurred elsewhere can be useful in identifying hazards
- brainstorming
- guideword analysis
- what-if – using a set of pre-prepared and customised what-if questions on potential deviations and upsets at the facility
- facility operational experience
- hazard and operability study (HAZOP)
- safety management studies – identifies threats to onshore pipelines or pipeline systems and associated surface facilities (AS 2885.6)
- failure modes and effects analysis (FMEA)
- task analysis
- event tree
- fault tree.

Some issues to consider when selecting a hazard identification technique are listed in Table 1.

Table 1 Hazard identification technique selection issues

Issue	Check
Depending on the lifecycle phase of the facility	• At a concept development phase it may be appropriate to use a HAZOP or HAZID technique • During detailed design, more detailed techniques may be required to provide a greater understanding of operational concerns • For onshore pipelines and associated aboveground facilities, a safety management study in accordance with AS 2885.6 to identify all threats to the pipelines • For construction, installation, commissioning and start-up, a focus on procedures and task analysis may be beneficial • For ongoing routine operations phase, the technique will be influenced by factors such as the level of knowledge of hazards, the history of risk assessments and the extent of change that has occurred • Accident and dangerous occurrences that have occurred at the facility or at other similar facilities (e.g. lessons learned and safety alerts)
Complexity and size	The complexity and size of a facility includes the number of activities or systems, the number of pieces of equipment, the type of process and the range of potential outcomes. Some techniques can get bogged down when they analyse complex problems. For example, event tree and fault tree analyses can become overly time consuming and difficult to structure effectively. However, simple techniques may not provide sufficient focus to reach consensus or confidence in the identification of hazards.

Issue	Check
Type of process or activity	• Where activities are procedural or human error is dominant then task analysis may be appropriate • Where knowledge of the failure modes of equipment is critical (e.g. control equipment) then FMEA may be appropriate • Where the facility is readily shown on a piping and instrumentation diagram or process and instrument diagram, then HAZOP may be used • Where multiple failures need to combine to cause an accident or multiple outcomes are possible, then fault tree or event tree analysis may be beneficial.

The methodology chosen will depend on the type, size and complexity of the facility and the activities to be conducted during operations.

Hazard identification is key to the development and review of the safety case, and all hazards must be identified so they can be assessed and appropriately managed for ongoing safety at the facility.

The selected technique should:

- be systematic and structured
- encourage lateral thinking about possible hazards that have not previously been identified and considered
- be appropriate for the facility and its phase of development or level of maturity
- provide for the maximum amount of information to be extracted during the process.

2.3 Input information for hazard identification

Once the scope of the hazard identification process is defined, the input information needs to be collated and reviewed prior to the consultation.

The hazard identification process should be based on a comprehensive and accurate description of the facility, including:

- all necessary diagrams
- process information
- existing conditions
- modifications
- procedures and work instructions
- hazardous materials information (safety data sheet).

This input information can be drawn from a number of areas including:

- site drawings including process flows, layouts, pipeline and instrumentation diagrams (P&IDs)
- detailed description of the equipment to be installed on the facility and its mode of operation; any new equipment (i.e. not previously installed on similar facilities) should be clearly identified as it may require additional analysis
- any previously documented consultations conducted for the facility under review or similar facilities which may also be relevant to the scheduled study
- details of any incidents or accidents reported either on the facility under review or similar facilities.

Conduct a quality check once the information has been gathered and prior to commencement of the workshop to ensure:

- all information is accurate and relevant to the proposed hazard identification study
- that no critical information is missing which may restrict the required depth of analysis being completed by the consultation participants.

The hazard identification study may be supported by past risk assessments, historical incident data and previous hazard identification studies. Ensure any existing studies used:

- are understood by the hazard identification team
- are still relevant for the current operating conditions and condition of the facility
- were conducted to an acceptable standard
- addressed any gaps identified in the studies.

Previous studies may be helpful, but should not be assumed to be correct. The absence of identified hazards in previous risk studies may not indicate there are no hazards to be identified. The previous hazard identification process may have been inadequate, with hazards inappropriately screened (not considered further based on incorrect assumptions), or there may have been changes to the facility.

2.4 Hazard identification team

When selecting participants, consider:

- the overall scope of the proposed process and the activities to be conducted during the phase of operation under review; i.e. design, construction, operational or decommissioning
- technical expertise; i.e. leadership, engineering, design, operational, or, if relevant decommissioning; this will allow identification of hazards not evident in individual workgroups to be identified through interaction between the workgroups.
- workers with a thorough knowledge of the facility or similar facilities if appropriate, and its history
- areas of the general workforce that need to attend taking into account any interactive areas within the facility, shift rosters, simultaneous operations (SIMOPs) and third party impacts.

Consider the appointment of a facilitator. It is important the facilitator has the appropriate level of expertise and knowledge of the technique adopted for the hazard identification process and is able to manage the team so that all attendees have the opportunity to put forward their views and opinions.

2.5 Worker involvement in the hazard identification process

WHS Act s. 47
Duty to consult workers

WHS Act. s. 48
Nature of consultation

WHS PAGEO Regulations r. 38
Involvement of workers

The operator of a facility must demonstrate that there has been effective consultation with, and participation of, workers in the hazard identification process.

Workers are entitled to take part in consultations and to be represented in consultations by a health and safety representative who has been elected to represent their work group. Consultation with workers and their health and safety representatives is required at each step of the hazard identification process.

In the event that a proposed hazard identification process relates to a new facility where the workforce has not yet been fully identified and put in place, involving workers from a similar facility should be considered.

Operators should ensure that contributions from workers are considered on the basis of technical and working knowledge and not on the seniority of the contributor. Ensure opportunities to contribute are not dominated by individual persons or groups within the organisation.

By drawing on the experience, knowledge and ideas of workers, operators are more likely to identify all hazards and choose effective control measures.

Those workers invited to be part of hazard identification process should be involved in:

- development of the process
- forming the team and scheduling consultation, such as through meetings and workshops
- considering a range of methods for consultation such as via email, surveys, an intranet health and safety page, and conducting meetings via teleconference or video link up as well as in person.
- conducting the consultations and reviewing any results or outcomes
- implementing of any actions arising from the process
- assisting in provision of feedback of the consultation outcomes to the rest of the workforce.

For more information, refer to the *Guide: Involvement of workers* and the *Code of practice: Work health and safety consultation, cooperation and coordination*.

2.6 Human factors

When identifying the hazards in operations and the workplace generally, it is important that the human factor is taken into account, assessed as to the risk applicable and appropriate controls put in place to manage the risk.

Human factors focuses on understanding how human performance is shaped by conditions within the system.

Integrating human factors into safety management systems is important for achieving error-tolerant systems. Safety case documentation should clearly demonstrate how human factors have been considered in the management of risk. It should include and demonstrate how various aspects of human performance in the areas of prevention, initiation, detection, control, escalation, mitigation and emergency response have been considered when identifying, assessing and controlling for hazards and MAEs.

Safety case documentation that does not demonstrate the consideration of human factors may not be sufficient to demonstrate the risks associated with hazards and MAEs have been reduced SFAIRP.

For further information, refer to the *Guide: Human factors fundamentals for petroleum and major hazard facility operators* and the *Human factors self-assessment guide and tool for safety management systems at petroleum and major hazard facility operations*.

2.7 Psychosocial hazards

WHS Act s. 19
Primary duty of care

As the person conducting a business or undertaking (PCBU), the operator has a primary duty of care to ensure, so far as is reasonably practicable, that workers and other persons are not exposed to health and safety risks arising from work carried out as part of the business or undertaking. Health, in the WHS Act, is defined as physical and psychological.

Psychosocial hazards at work are aspects at work and work situations which can harm psychological and physical health. Psychosocial hazards can stem from:

- the way the tasks or job are designed, organised, managed and supervised
- tasks or jobs where there are inherent psychosocial hazards and risks
- the equipment, working environment or requirements to undertake duties in physically hazardous environments
- social factors at work, workplace relationships and social interactions.

The operator must have systems in place for preventing and managing psychosocial hazards such as stress, fatigue, burnout, bullying, harassment, violence and aggression, discrimination and misconduct.

For more information, refer to the *Psychosocial hazards in the workplace, Mentally healthy workplaces for fly-in fly-out workers in the resources and construction sectors* and *Workplace behaviour codes of practice*. These three codes of practice detail how to assess and manage psychosocial hazards and risk factors using the risk management approach.

2.8 Inclusion of all hazards identified

In order to provide a comprehensive report of the hazard identification process conducted, it is important to include all identified hazards regardless of whether they are considered to have a very low impact on the safety of the facility.

Operators should not eliminate hazards with a very low likelihood as these may become MAEs after further analysis. See Section 3 for further clarification.

2.9 Depth of analysis

The hazard identification process should provide sufficient details for an operator to understand the nature of each hazard and to identify the controls necessary for the management of that hazard.

It is important to get to the root causes (or hazards) leading to an undesirable event or MAE. The hazard identification should detail when, where and why the hazard is present. This helps in the assessment of the relevant control measures.

2.10 General considerations of hazard identification

Effective hazard identification is comprehensive and accurate. It may assist the process to divide the facility into sections.

Operators should review each section and ask:

- Can the process or activity deviate from the design intent or 'safe operating procedure'?
- What activities are conducted and how could they go wrong?
- What hazards are present continuously or only occasionally?
- What equipment within the section could fail or be impacted by internal or external hazardous events?
- What abnormal or infrequent activities could be conducted and how could they go wrong?
- What are the possible events or consequences?
- What could happen in the section under review to create additional hazards, for example SIMOPs?
- Could the section of the facility interact with other sections (for example adjacent equipment, an upstream or downstream process or something sharing a service) in such a way as to cause an incident or lead to escalation?
- Could additional hazards result from the introduction of control measures?

The analysis should consider the interaction between these influencing factors such as:

- a safety system may be by-passed in start-up mode
- workers may not be adequately trained for start-up due to its infrequent occurrence.

Operators may also consider the possibility of grouping types of hazards if they could occur facility-wide; for example, natural hazards and power loss. These hazards can then be considered generically and not for each part of the facility, unless special circumstances apply to a part of the facility and it needs to be considered individually (e.g. equipment vulnerable to loss of power).

2.10.1 Identification of controls

If the decision is made to identify and record control measures during the hazard identification process, then this should make clear which control measures apply to a specific cause or consequence. This assists third parties to understand that all identified hazards have controls. When combined with performance indicators and other relevant information, it helps to demonstrate adequacy of hazard and MAE risk reduction measures.

It may be helpful to chart the links between incidents, hazards and controls using either a bowtie or an event or fault tree diagram.

2.10.2 Realism and lateral thinking in hazard identification

Look for potentially complex events when conducting hazard identification studies. Figure 3 shows how a combination of active and latent failures in risk control barriers progress from a hazardous event to an accident.

The hazard identification team should:

- challenge assumptions and existing norms of design and operation
- think beyond their immediate experiences
- explore the effect of failure of management systems, controls and procedures
- consider how relatively minor problems may grow into MAEs because of other problems compounding the seriousness of the event.

The Swiss cheese model in Figure 3 demonstrates that there may be a variety of outcomes with a range of consequences depending on which barriers function and which do not. For example, if adequate technical barriers are put in place to prevent the ignition of a gas release, then the event may not result in fire or explosion, but may still result in toxic effects depending on the nature of the gas release.

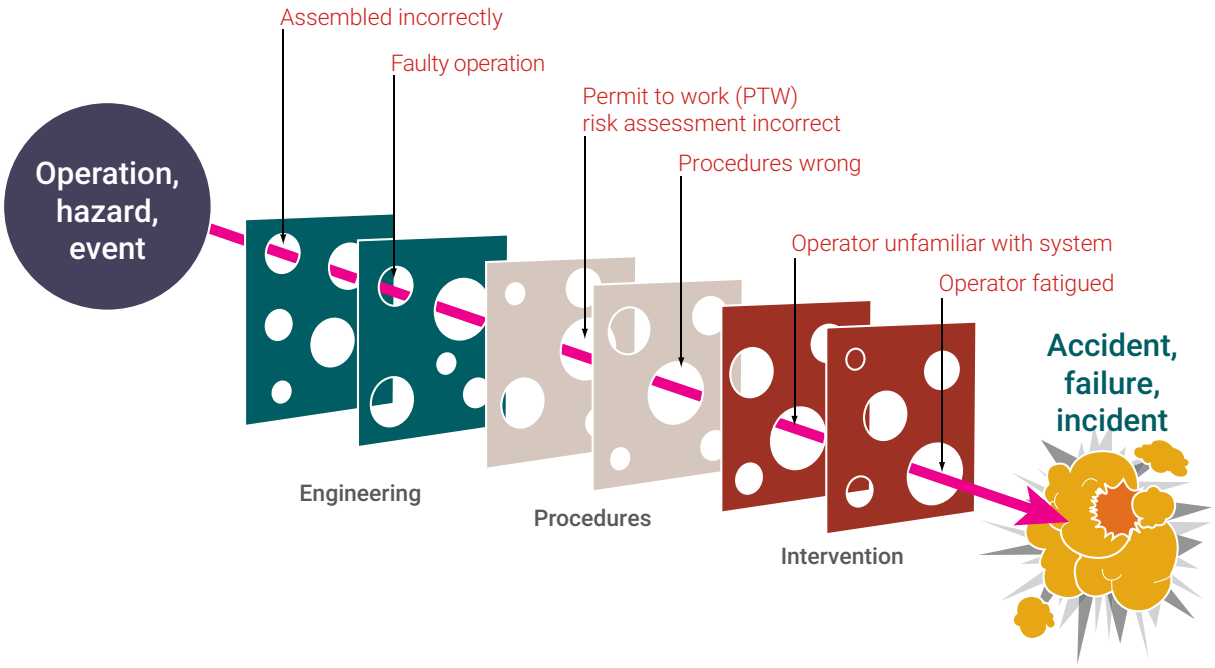

Figure 3 Swiss cheese model

2.11 Documenting the hazard identification outcomes

It is important that the results of hazard identification are clearly documented, including any underlying causes and control measures already identified. This process forms the basis for the later steps of safety case development including ongoing risk assessment and identification of further mitigating controls that will reduce the risks arising from the hazard SFAIRP.

All reports and documentation generated from hazard identification and risk assessment should be managed within a document control system with version control.

2.12 Review and monitoring of hazards

Upon the completion of the hazard identification process, the findings should be circulated to the consultation participants for review and comment. This will serve as a quality check that all relevant information has been captured and included in the documentation.

Once finalised, the outcomes of the hazard identification consultation should be conveyed to the rest of the workers by the participants.

Operators should ensure that there is a process or procedure in place for the ongoing review and monitoring of identified hazards to ensure controls remain in place and the levels of risk associated with each identified hazard are maintained SFAIRP.

Hazard identification is a dynamic process which should precede any changes in a facility or operation that could affect the safe operating environment or introduce new hazards.

3 Major accident events

A major accident event (MAE) is an event connected with a facility or pipeline operation, including a natural event, having the potential to cause multiple fatalities of persons at or near the facility.

Therefore by definition MAEs are consequence based.

Identification of MAEs is a key area of the FSA of a safety case and each hazard that may lead to an MAE must be assessed as part of the FSA process.

All hazards should be subject to a screening process to determine if they can result in an MAE. Figure 4 shows a process where hazards are screened and separated according to whether or not they could lead to events where multiple fatalities could occur. Those hazards which can lead to MAEs must be considered in the FSA, whereas hazards that cannot result in an MAE but are a hazard to health and safety must be covered by the operator's safety management system (SMS). The SMS should address both MAEs and non-MAEs through procedural systems designed to reduce risks SFAIRP.

Further details on the management of identified MAEs and the control measures and performance standards associated with those MAEs are in *Major accident events, control measures and performance standards* guide.

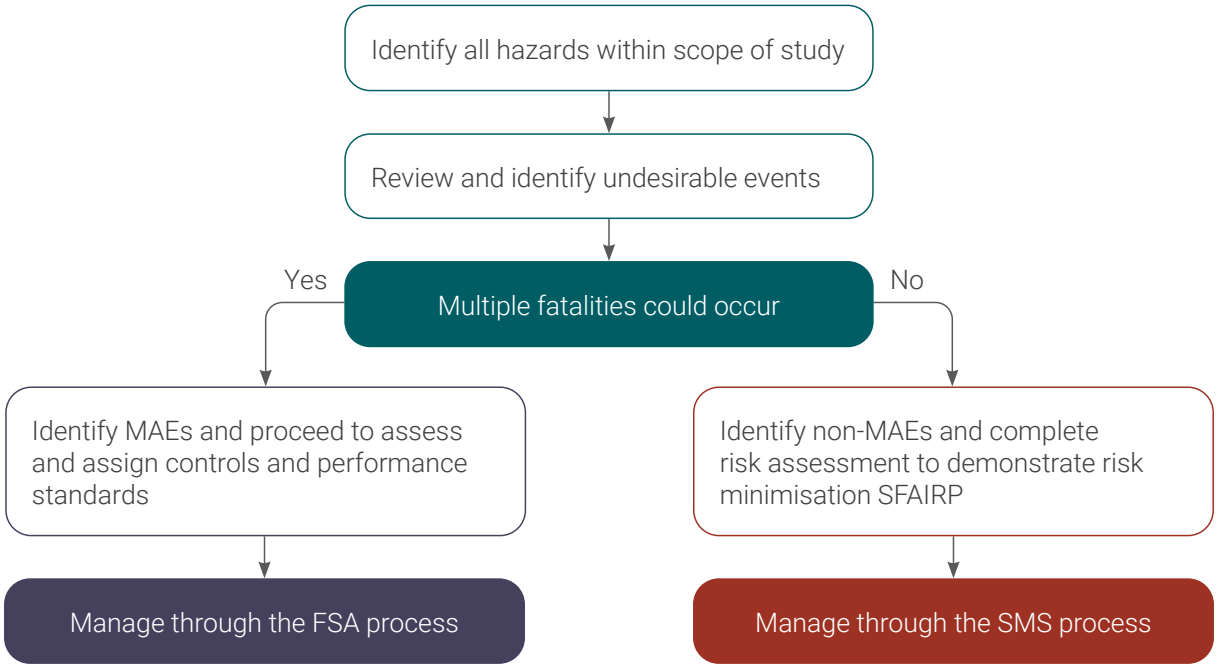

Figure 4 Screening of hazards for MAEs

4 Success factors for hazard identification

Hazard identification should include:

- appropriate workers (i.e. experienced, skilled and includes workers potentially exposed to the risks) actively involved in the process and others that have been given the opportunity to provide input
- processes appropriate to the facility and that the operator is able to explain the process selection
- systematic and structured techniques which foster creative thinking about possible hazards not previously identified
- the scope of hazard identification and that studies include MAE related hazards and general safety and health hazards
- hazards with a very low likelihood
- a process based on a comprehensive and accurate description of the facility, including all necessary drawings, process information, existing conditions, modifications, procedures and work instructions and hazardous materials information
- involvement and input from designers, manufacturers, contractors and suppliers, where appropriate
- any assumptions and uncertainties that have been explicitly identified and recorded so that these can be verified or analysed later
- documented records which list at least all potential MAEs and hazards together with the underlying causes and control measures
- specific, measurable, attainable, realistic and timely (SMART) actions managed and closed out in an auditable manner
- an explanation why certain control measures have been adopted and others have been rejected included in the SFAIRP demonstration process
- a review of the information gathered once the hazard identification consultations have been completed.

5 Potential issues in hazard identification

Potential issues to avoid in the hazard identification process include:

- becoming complacent; it is important that everyone involved in hazard identification remain vigilant and wary about the hazards they are exposed to
- being too generic in identification of hazards and potential MAEs; for example, recording corrosion as a potential cause of loss of containment may not be sufficiently specific, it may be necessary to record where the corrosion can occur, under what circumstances, and at what rate
- limiting the hazard identification to the immediate cause of potential MAEs without determining the fundamental underlying cause; for example, the underlying cause of corrosion might be use of incorrect materials of construction, change of operating conditions, or a failure to conduct routine inspections
- carrying out the hazard identification with incomplete or inaccurate facility description information
- allowing the consultation to be dominated by individual persons or groups within the organisation
- assuming systems and procedures only function as intended
- failing to:
  - review or close gaps from previous session findings
  - remind consultation participants of the scope and objectives
  - introduce new participants to the consultation team without first explaining the process and assumptions.

Appendix 1 Glossary

The following terms are defined for the purposes of this Guide.

Key terms	Meaning
Facility	**Geothermal energy facility** – a place at which geothermal energy operations are carried out and includes any fixture, fitting, plant or structure at the place **Petroleum facility** – a place at which petroleum operations are carried out and includes any fixture, fitting, plant or structure at the place **Mobile facility** – includes an onshore drilling rig The term facility has been adopted throughout this document to cover offshore and onshore facilities and pipelines including aboveground structures associated with onshore pipelines.
FMEA	Failure modes and effects analysis
FSA	Formal safety assessment
Geothermal energy operation	Means an operation to: • explore for geothermal energy resources • drill for geothermal energy resources • recover geothermal energy • or is any other kind of operation that is prescribed by the regulations to be a geothermal energy operation for the purpose of this definition and carry on of such operations and the execution of such works as are necessary for that purpose.
HAZID	Hazard identification study
HAZOP	Hazard and operability study
Inspector	WorkSafe Petroleum Safety inspector
Major accident event (MAE)	An event connected with a facility, including a natural event, having the potential to cause multiple fatalities of persons at or near the facility.
Operator	A person who has, or will have, the day-to-day management and control of operations at a facility and is registered as the operator of the facility under r.22(3).
Person conducting a business or undertaking (PCBU)	A PCBU is an umbrella concept capturing all types of working arrangements or relationships. A PCBU includes a company, unincorporated body or association and sole trader or self-employed person. Individuals who are in a partnership that is conducting a business will individually and collectively be a PCBU. A reference to a PCBU includes reference to the operator of a facility.

Key terms	Meaning
P&ID	Pipeline and instrumentation diagram
Performance standard	A standard established by the operator defining the performance required for a safety critical element typically defining the functionality, availability, reliability, survivability and interdependency of the safety critical element.
Petroleum operation	Means an activity that is carried out in an area in respect of which a petroleum title is in force, or that is carried out in an adjacent area, for the purpose of any of the following: • exploring for petroleum • drilling or servicing a well for petroleum • extracting or recovering petroleum • injecting petroleum into a natural underground reservoir • processing petroleum • handling or storing petroleum • the piped conveyance or offloading of petroleum
Regulator	The WorkSafe Commissioner is the regulator under the *Work Health and Safety Act 2020*.
Safety case	Documented provisions related to the health and safety of people at or in the vicinity of a facility, including identification of hazards and assessment of risks; control measures to eliminate or manage hazards and risks; monitoring, audit review and continual improvement
Safety critical element (SCE)	Any item of equipment, system, process, procedure or other control measure the failure of which can contribute to an MAE
SFAIRP	So far as is reasonably practicable
SIMOPS	Simultaneous operations
SME	Subject matter expert
SMS	Safety management system
WHS Act	*Work Health and Safety Act 2020*
WHS PAGEO	Work Health and Safety (Petroleum and Geothermal Energy Operations) Regulations 2022
Worker	Any person who carries out work for a person conducting a business or undertaking, including work as an employee, contractor or subcontractor (or their employee), self-employed person, outworker, apprentice or trainee, work experience student, employee of a labour hire company placed with a 'host employer' or a volunteer

Appendix 2 Further information

Petroleum safety guidance

Interpretive guidelines

- *Development and submission of a diving safety management system*
- *Development and submission of a safety case*
- *Development and submission of an onshore facility safety case – drilling operations*

Guides

- *Audits, review and continual improvement*
- *Bridging documents and simultaneous operations (SIMOPS)*
- *Dangerous goods and hazardous chemicals in petroleum, pipeline and geothermal energy operations*
- *Decommissioning and management of ageing assets*
- *Demonstration of risk reduction so far as is reasonably practicable (SFAIRP)*
- *Diving start-up notices*
- *Emergency response planning*
- *Facility design case*
- *Hazard identification*
- *Health and safety leading and lagging performance indicators*
- *Human factors fundamentals for petroleum and major hazard facility operators*
- *Human factors self-assessment guide and tool for safety management systems at petroleum and major hazard facility operations*
- *Identification of major accident events, control measures and performance standards*
- *Inspections – Land-based drilling rigs*
- *Involvement of workers*
- *Management of change*
- *Nomination of an operator*
- *Records management including document control*
- *Risk assessment and management including operational risk assessment*
- *Validation requirements*

Australian and international standards

- AS 2885 *Pipelines – Gas and liquid petroleum – suite of standards*
- AS IEC 61511 *Functional safety – Safety instrumented systems for the process industry sector*
- AS IEC 61882 *Hazard and operability studies (HAZOP studies) – Application guide*
- AS/NZS ISO 31000 *Risk management – Principles and guidelines*
- IEC ISO 31010 *Risk management – Risk assessment techniques*
- ISO 17776 *Petroleum and natural gas industries – Offshore production installations – Guidelines on tools and techniques for hazard identification and risk assessment*

Codes of practice

- *How to manage work health and safety risks*
- *Mentally healthy workplaces for fly-in fly-out workers in the construction and resources sector*
- *Psychosocial hazards in the workplace*
- *Workplace behaviour*

Other resources

WorkSafe WA

- *How to determine what is reasonably practicable to meet a health and safety duty: Interpretive guideline*
- *Incident notification: Interpretive guideline*
- *The health and safety duty of an officer: Interpretive guideline*
- *The meaning of 'person conducting a business or undertaking' (PCBU): Interpretive guideline*

Other agencies

- Centre for Chemical Process Safety (CCPS), Guideline for initiating events and independent protection layers in layer of protection analysis
- National Offshore Petroleum Safety and Environmental Management Authority's (NOPSEMA), Hazard identification guidance note
- National Offshore Petroleum Safety and Environmental Management Authority's (NOPSEMA), Risk assessment guidance note

Department of **Energy, Mines, Industry Regulation and Safety**

GOVERNMENT OF WESTERN AUSTRALIA

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