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

GOVERNMENT OF WESTERN AUSTRALIA

WorkSafe Western Australia Petroleum Safety

GUIDE

Emergency response planning

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Reference

WorkSafe Western Australia, 2024, Emergency response planning: Guide. Department of Energy, Mines, Industry Regulation and Safety, Western Australia, 27 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 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 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 development of the safety case and emergency response planning for the facility and operations.

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 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. 43

Emergency analysis

WHS PAGEO Regulations r. 46

Emergency preparedness

This Guide has been developed to provide operators with assistance to meet their obligations for effective emergency planning required under the WHS PAGEO Regulations.

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

1.1 Intent and purpose of emergency planning

A well planned response to an emergency can minimise escalation of an event and prevent or reduce the likelihood of any further injuries or fatalities.

Human performance plays a significant role during emergency situations and human behaviour can be unpredictable during stressful situations. Preparing for the emergency or abnormal situation prior to the actual occurrence will increase the likelihood that human performance will mitigate the emergency or abnormal situation. The preparation should identify likely emergency scenarios, develop a simple plan to manage the emergency and then practice those simple plans.

Internationally, poor emergency planning has contributed to significant loss of life and escalation of events that may otherwise have been avoided.

It is essential that operators plan for all types of emergencies that could occur on their facilities to ensure their response is both efficient and effective to prevent and minimise injuries and fatalities.

1.2 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 (SMS) 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*.

1.3 Worker involvement

WHS Act s. 47

Duty to consult workers

WHS Act. S. 48

Nature of consultation

WHS PAGEO Regulations r.38

Involvement of workers

It is appropriate that relevant workers who have been involved in the hazard identification and risk assessment consultations should also be included in the planning and development of emergency preparedness.

As well as including the subject matter experts in the emergency planning process, include workers with direct knowledge of the activities under consideration and the effectiveness of the controls that are being considered to reduce the level of risk. Workers who have firsthand experience with performing the work on a regular basis are best placed to be involved in the risk management process and hence the emergency response planning.

Those workers involved in this phase can then provide feedback for the general workforce to ensure a better understanding of the need for emergency response planning. This inclusion and consultation promotes a positive safety culture where workers are involved and are aware of safety issues and their own responsibilities.

1.4 Linked guides

The following guides have been developed to provide information to assist operators in effective hazard identification, risk assessment and management, as well as the development of the formal safety assessment (FSA) of a safety case.

- *Hazard identification*
- *Risk assessment and management including operational risk assessment*
- *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*
- *Identification of major accident events, control measures and performance standards.*

These five guides, together with this Guide, form an inter-related suite of information for effective hazard identification, risk assessment and management including identification of major accident events (MAEs) and control measures.

2 Emergency planning within a safety case

WHS PAGEO Regulations r. 43

Emergency analysis

WHS PAGEO Regulations r. 46

Emergency preparedness

WHS PAGEO Regulations r. 51

Safety case to be submitted to regulator

The WHS PAGEO Regulations have specific requirements covering emergency preparedness and define two key emergency analysis requirements that must be completed before a safety case can be submitted for review and acceptance by the regulator. These analyses are:

- Evacuation, escape and rescue analysis (EERA)
- Fire and explosion risk analysis (FERA)

It is recommended that operators, when developing their safety case for submission to the regulator, have a separate section within the safety case devoted to emergency response planning, rather than including these requirements within the SMS.

Operators need to detail general emergency planning procedures and processes that are in place on their facilities which provide for:

- continual and systematic assessment of risk during emergency situations
- risk reduction to a level that is so far as is reasonably practicable (SFAIRP) for risks arising during evacuation, escape and rescue in case of emergency.

The relationship between specific contents listed in the WHS PAGEO Regulations and the general emergency safety case requirements are shown in Figure 1.

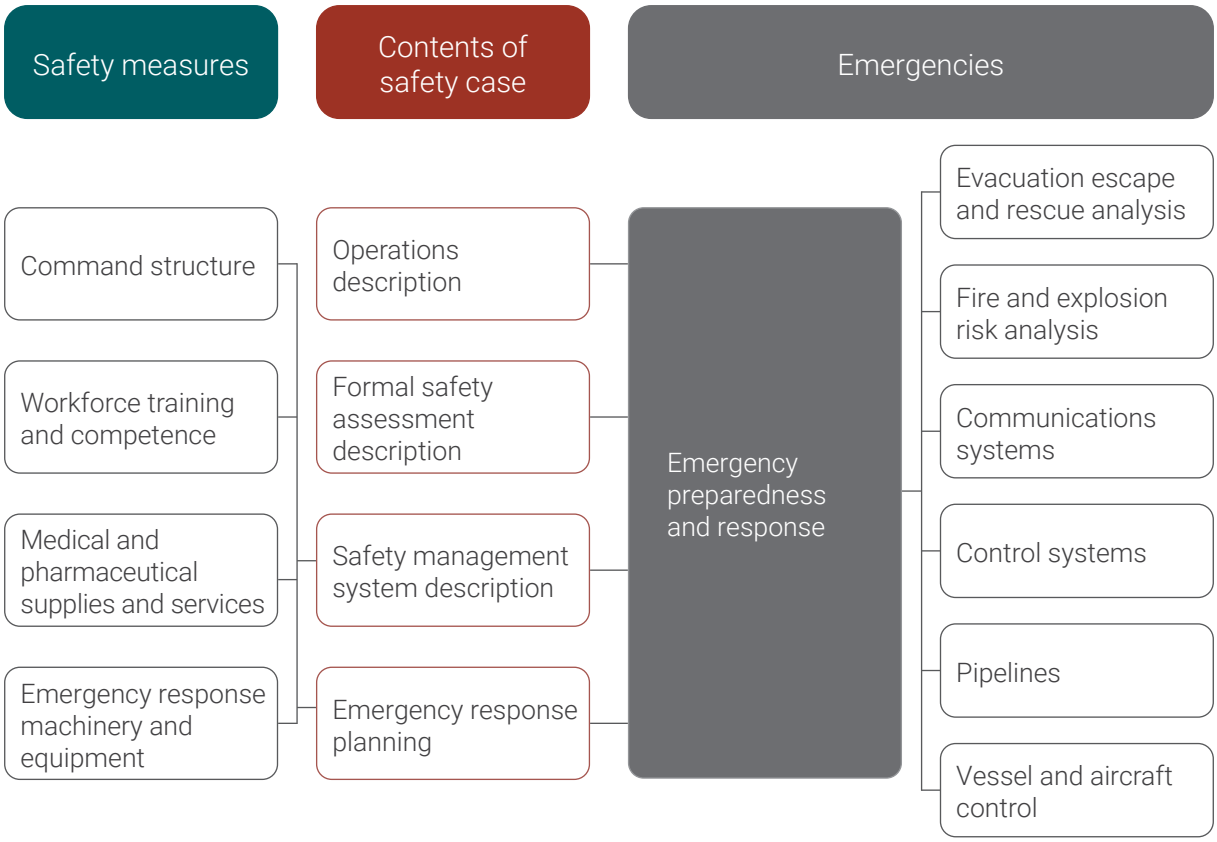

Figure 1 Emergency planning safety case relationship model

3 Safety measures

Key safety measure areas that must be addressed in relation to emergency response are:

- command structure during an emergency
- trained and competent workers
- medical and pharmaceutical supplies and services
- emergency response machinery and equipment.

3.1 Command structure

WHS PAGEO Regulations r. 35

Command structure

It is critical that the emergency response command structure is clear to all workers as well as members of the emergency response team (ERT), by providing well defined roles, responsibilities and a chain of command.

Command structures for a facility (which may include offshore and onshore response teams depending on the type of facility) must be described in the safety case. Referencing the emergency response plan (ERP) in this regard is not sufficient. The safety case must specify an office or position at the facility, the holder of which is responsible for implementing and supervising procedures in the event of an emergency and the command structure that applies in the event of an emergency at the facility.

This is often done with the aid of an organisation chart which clearly identifies the decision-making hierarchy. The command structure must clearly allocate an individual who has overall responsibility for implementing and supervising the emergency response procedures.

This information must also be available at all times to all workers at the facility or involved in the operations.

A typical ERT may include:

- emergency commander
- deputy emergency commander
- emergency response team leader
- emergency response team members
- communications officer (e.g. radio operator)
- muster checker and co-ordinator
- control room operator.

Other workers who have expertise in specific incident response types may be included in the ERT as and when required.

The ERT should also interact with external emergency services who should be apprised of the types of activity taking place on the facility as well as details of hydrocarbons, chemicals or other toxic substances on site.

3.2 Training and competence

WHS PAGEO Regulations r. 36
Competence of workers

Worker training and competence is critical for emergency response. Operators must provide a description of the means by which workers have the required skills, training and ability to undertake tasks, involving emergency response.

The training system must provide a demonstration that all reasonably practicable steps have been taken to ensure workers will be competent in performing their assigned duties in an emergency.

All workers required to be part of the ERT should be assessed to verify the required level of competency for particular skills and abilities. This may include knowledge of equipment or machinery, procedures, supervisory and communication skills. Once this identification process has been completed, a training schedule should be designed to meet individual requirements to perform their duties successfully.

It is essential that those workers who have completed their emergency response training undertake practical exercises to assess their competence in the training provided. This should be followed up by a written report and, where necessary, corrective actions raised to address any issues identified during the emergency response exercise. This report should include any requirements for additional training or changes to processes or procedures that may improve worker competency identified during the process.

Any actions generated from the report should be followed through to effective completion within a reasonable time frame. The modified processes should then be assessed to provide assurance that the changes have been implemented correctly and training and competency levels have been improved.

While it is important that individual members of the ERT are trained and competent, it is critical that an ERT's competence is assessed as a whole and that teams are trained and tested as a whole. This can be demonstrated by commitments to complete emergency response drills, role playing exercises and simulations. Again as with individual training, post exercise review and feedback is essential to the continued development and improvement of the team's competence.

Emergency situations are non-routine in nature and operators should be aware that the skills and capability to deal with these types of events can easily be eroded over the course of time if not regularly practiced. Provisions must therefore be made within training and competency programs to take account of any decline in skills and ability. The safety case needs to include details of how the operator intends to ensure competency is maintained over time. Details of regular refresher training and assessment of competency through the use of emergency drills and exercises that involve role play as well as theoretical desktop exercises should be summarised in the safety case.

This training and competency requirement should also include managers and decision-makers who may be outside the normal ERT structure, but should be fully aware of emergency response requirements and should participate in drills and exercises to ensure their knowledge remains current.

3.3 Medical and pharmaceutical supplies and services

WHS PAGEO Regulations r. 40

Medical and pharmaceutical supplies and services

The safety case must contain a description of the medical and pharmaceutical supplies available and maintained at a facility for an emergency situation. This should include location, quantity and storage arrangements for the supplies and contain sufficient information to demonstrate that the supplies provided are sufficient for emergency situations.

The description also needs to include details of medical services available, whether included within the facility or within a reasonable distance from the facility. For example, offshore facilities would be expected to have a medical centre and associated equipment available on site, whereas onshore facilities may be in close proximity to public hospitals, ambulances, etc. that can provide any emergency services over and above first aid requirements. The safety case should specify these details and identify which services are available, their location and response time to the facility.

3.4 Emergency response machinery and equipment

WHS PAGEO Regulations r. 41

Machinery and equipment

Emergency response equipment should be clearly identified within the safety case. This equipment should also be identified as safety critical elements for the control of MAEs and be subject to regular inspection and testing.

Operators need to provide an adequate description of an assurance process in the safety case for emergency response equipment. This should include where it is located, the inspection regime and any other process in place to ensure it is fit for its intended purpose in emergency response. This information should also include details of reliance on external support such as fire brigade, medical and pharmaceutical supplies and services.

4 Emergencies

WHS PAGEO Regulations r. 43

Emergency analysis

WHS PAGEO Regulations r. 51

Safety case to be submitted to regulator

The following sections cover details of emergency response requirements that must be summarised within the safety case before submission to the regulator for review and acceptance.

4.1 Fire and explosion risk analysis

WHS PAGEO Regulations r. 53

Fire and explosion risk analysis

The emergency response section of a safety case must contain a detailed description of the FERA conducted on the facility.

The description of a FERA in a safety case for a facility must:

- identify the types of fires and explosions that could occur at the facility
- consider a range of measures for detecting those fires and explosions in the event that they do occur
- consider a range of measures for eliminating those potential fires and explosions, or for otherwise reducing the risk arising from fires and explosions
- consider the incorporation into the facility of both automatic and manual systems for the detection, control and extinguishment of:
  - outbreaks of fire
  - leaks or escapes of petroleum
- consider a range of means of isolating and safely storing hazardous substances, such as fuel, explosives and chemicals, that are used or stored at the facility
- consider the EERA, in so far as it relates to fires and explosions
- make sure that the technical and other control measures identified reduce the risks associated with fires and explosions SFAIRP.

This description must provide sufficient details for the regulator to understand the scope and process for undertaking the FERA including sources of data and rationale for excluding or discounting items from consideration. It is not expected that the full FERA document will be included in the emergency response section of the safety case. When summarising the findings of the FERA in the safety case, the document title, version and document number should be quoted as a reference.

Results of the FERA should also be an input into the EERA.

4.1.1 Types of fire and explosion

There are a variety of fires and explosions that may be experienced at a facility; however, while the FERA will normally primarily focus on hydrocarbon-related fires, other types of fire that have the potential to escalate into an MAE should also be taken into consideration. As the type of fires expected on a facility can vary according to several variables, a risk assessment is required to enable a comprehensive and systematic assessment to be undertaken which prioritises those events that could cause an MAE. Examples of the types of fire and explosions that may be encountered are shown in the following table.

Table 1 Types of fire and explosion

	Fires	Explosions
Process hydrocarbon	• Blowouts • Jet fires • Two phase fires • Pool fires • Flash fires • Cargo tank fires • Sea fires • Loading/offloading	• Ignited blowouts (e.g. moonpool) • Confined explosions • Semi-confined explosions • Unconfined explosions • Atomised sprays/mists
Non process hydrocarbon	• Engine room/machinery room/ pump room/ workshops/ store rooms • Lube oil • Diesel/fuel oil • Paints • Heli-fuel • Bottled gas • Solvents	
Non hydrocarbon	• Accommodation/laundry/kitchen • Electrical equipment (e.g. circuit boards, switchgear room, etc.) • Inhibitors • Cables • Cellulosic • Explosives • Batteries • Chemicals	

Refer to the guides *Hazard identification, Risk assessment and Identification of major accident events, control measures and performance standards* for further information on hazard identification, risk assessment and control measures.

4.1.2 Control measures

WHS PAGEO Regulations r. 45

Control systems

There are precursors to fire and explosions that can be identified and must be considered in the FERA; for example:

- leakage of combustible fluids or chemicals
- ignition sources
- accumulations of combustible/explosive fluids.

Detection methods associated with these precursors include:

- leak prevention via equipment integrity (welded joints, corrosion monitoring, selection of appropriate materials)
- leak detection
- ignition control (rated equipment (e.g. EX), management of open flames, hot surface and rotating equipment, welding, cutting, sparks)
- gas detection
- heating, ventilation and airconditioning
- likely gas dispersion patterns
- procedural controls (e.g. trained workers).

Mitigating and reductions methods must also be considered within the FERA and may include:

- isolation/electrostatic discharge (ESD) systems in place once leak detected
- blowdown/pressure relief
- fire pumps/deluge systems
- process alarms to alert workers of the fire/explosion
- automatic or manual systems for isolation and shutdown of equipment.

The control measures should be considered for their suitability to control an event and any limitations should be recognised so that other control measures can be considered.

The intended function of control measures identified in the FERA as controls for MAEs must be clearly described in the emergency response section within the safety case. Details of the adopted controls must also be included in either the operations description section or in the SMS description in the safety case as appropriate. For MAE controls, the SMS must specify the performance standards that apply.

4.2 Evacuation, escape and rescue analysis (EERA)

WHS PAGEO Regulations r. 52

Evacuation, escape and rescue analysis

The EERA must also be summarised in the emergency response section of the safety case.

The content and level of detail in the emergency response section needs to be sufficient to enable the regulator to assess the scope and process for undertaking the EERA including source data and rationale for excluding or discounting items from consideration. It is not expected that the full EERA document will be included in the FSA. When summarising the findings of the EERA in the FSA, the document title, version and document number should be quoted as a reference.

Control measures identified in the EERA must be clearly described in the operations description and the SMS of the safety case. It must include:

- the types of emergencies that may take place on a facility
- the evacuation routes and alternate routes available if the primary route is not freely passable
- procedures and equipment
- estimated time to evacuate the facility
- any temporary refuge that may be available on the facility and a means of emergency communication in that refuge
- any lifesaving equipment available.

Refer to the guides *Hazard identification, Risk assessment and Identification of MAEs, control measures and performance standards (including bowtie diagrams)* for further information on hazard identification, risk assessment and control measures.

4.3 Emergency communications systems

WHS PAGEO Regulations r. 52

Evacuation, escape and rescue analysis

It is critical to have good communications between all parties in an emergency. Communication systems must provide adequate means for communicating between all parties involved in the emergency response both internal and external to the facility.

Operators need to have a communications system available that:

- has sufficient means of communication that allow for successful emergency response
- is capable of handling all MAE and non-MAE emergency scenarios that are likely to occur
- is adequately protected against the MAEs identified in the FSA.

Prior to determining a suitable means of communication during emergencies, licensees and operators need to consider:

- what information needs to be shared during an emergency
- who needs the information and why.

There are various techniques that can be used to analyse an emergency response communication structure, depending on the complexity of the facility or operation. Figure 2 is an example of the technique that could be employed to identify the requirements.

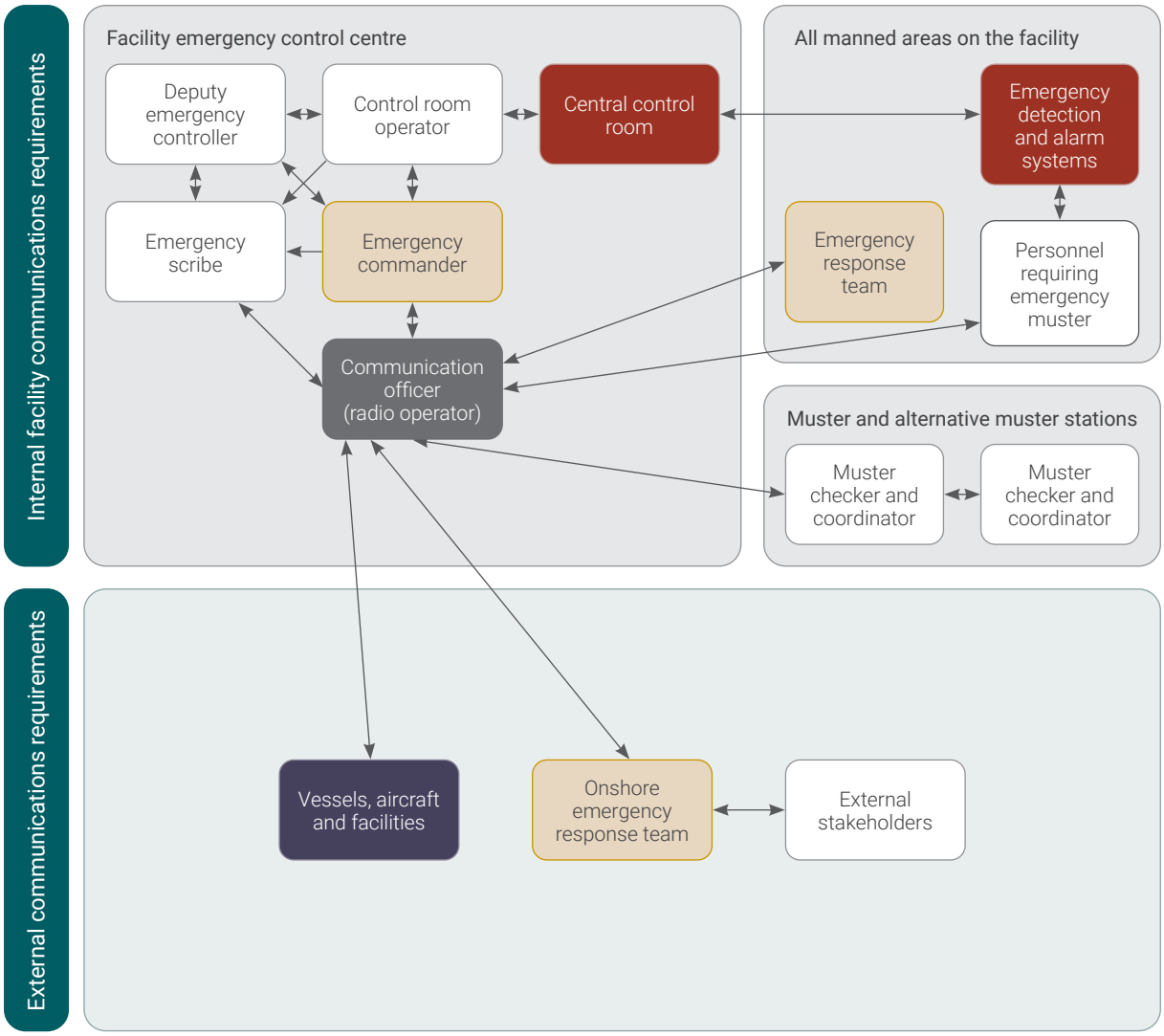

Figure 2 Facility emergency response communication network

4.4 Control systems

WHS PAGEO Regulations r. 45

Control systems

Details of the control systems available should be summarised in the operations description of the safety case. These descriptions should include sufficient detail to demonstrate that they are adequate to meet the requirements in the event of an emergency.

4.4.1 Back-up power supply

A description of how the operator provides adequate security of electrical power supply to the emergency control systems is required in the operations description of a safety case.

It is not expected that a failure of an individual supply route would result in a failure in supply. There is an expectation that backup power supplies will be provided and suitably described for emergency systems. The description should include the emergency supply system including batteries and generators and should also be aligned with the controls identified in the FSA.

4.4.2 Lighting

Operators need to demonstrate that their emergency lighting is adequate to ensure fast, effective emergency response.

The EERA and FERA should both include the requirement for emergency lighting systems. These analyses should consider a range of emergency lighting goals including the ability to:

- enable workers to easily identify escape routes
- provide adequate illumination to enable fast effective traverse along the escape routes
- provide adequate illumination of relevant equipment that may be required to be used in an emergency. Emergency escape breathing devices, manual shutdowns, fire hoses, smoke hoods, eyewash stations should all be adequately illuminated so that they can be easily found and used in an emergency
- provide adequate illumination for the ERT to effectively function in their assigned roles; for example, adequate lighting within the area(s) from which emergency response is coordinated
- provide safe illumination during all emergency types that could occur on the facility; for example, it should be capable of safe operation in a hydrocarbon gas filled environment if located external to the accommodation on any facility working in proximity to hydrocarbons.

The operations description of the safety case needs to contain a description of the lighting systems chosen as a result of analysis and include sufficient detail to demonstrate adequacy, which may include the system's key performance standards; for example, the ability to independently function on loss of power.

4.4.3 Alarm systems

An emergency alarm can be defined as any alarm that indicates immediate danger to workers.

Selection of appropriate alarm systems will depend on the size and complexity of the facility and whether it is offshore or onshore.

Prior to any alarm being activated, the emergency situation needs to be detected. Detection systems are an essential part of any alarm system and may be either manual or automatic. Manual detection relies on observation by workers and uses suitably located communications equipment and systems that provide for the ability to raise the alarm, for example telephones, manual alarm call activation points and radio systems. Automatic detection systems are independent of any human interaction, for example fire and gas detection systems, and will trigger automatically when required to do so. These detection systems should be described in the operations description of the safety case as part of an overall alarm system.

The alarm system should be capable of providing adequate data that meets the ERT needs, for example the type of alarm, location and its significance. Some of the characteristics that should be considered in the establishment of a good control centre alarm system are:

- relevant – not spurious or of low operational value
- unique – not duplicating another alarm
- timely – not long before any response is needed or too late to do anything
- prioritised – indicating the importance the problem is dealt with
- understandable – having a message which is clear and easy to understand
- diagnostic – identifying the problem that has occurred
- advisory – indicative of action to be taken
- focusing – drawing attention to the most important issues.

4.4.4 Ballast systems

A description of a ballast control system in the operations description of the safety case is necessary where ballasting is a control measure which reduces risk (i.e. for floating facilities).

Ballast systems play a critical role in emergency response in stability or buoyancy emergencies for floating facilities.

Further details of this requirement for offshore facilities can be found in the NOPSEMA *Emergency Planning guidance note*.

4.4.5 Emergency shutdown systems (including blowdown)

The operations description of the safety case must include a description of the emergency shutdown systems, including blowdowns. The description should be aligned with the controls identified in the FSA to reduce risk SFAIRP.

Further details of this requirement for offshore facilities can be found in the NOPSEMA *Emergency Planning guidance note*.

4.5 Pipelines

WHS PAGEO Regulations r. 47

Pipelines

Operators must ensure adequate means of protection is in place to prevent large inventories of hydrocarbons being able to enter a facility from pipes during an emergency. All offshore hydrocarbon production facilities and onshore facilities, including pipelines licensed under the *Petroleum Pipelines Act 1969*, must comply with this requirement.

The most effective means of controlling and mitigating the escalation of a hydrocarbon loss of containment in an emergency is to shut down and isolate the source of the hydrocarbons. The operations description of a safety case must specify adequate procedures for shutting down or isolating a pipe's inventories in order to stop flow into a facility.

The operations description of a safety case should:

- provide a detailed description of the pipe shutdown arrangements, including descriptions of the shutdown equipment, philosophy, automatic and manual operation functions and locations of the control systems
- include a failsafe isolation device which is capable of isolation if other safety devices fail; for example, a subsurface isolation valve that closes on loss of topside communication (without dependency on any other system) may provide suitable failsafe isolation of a well if the primary shutdown devices on a well tree were rendered inoperable
- recognise the criticality of hydrocarbon inventory isolation and therefore have an identified requirement to specify what maintenance and inspection will be completed to ensure the pipe shutdown systems will function in an emergency.

The FSA of a safety case should identify the risks with any pipe or pipes being connected to a facility and have identified the required mitigation control measures to reduce the risk to health and safety SFAIRP.

4.6 Vessel and aircraft control

WHS PAGEO Regulations r. 48

Vessel and aircraft control

For offshore facilities it is important to have a system in place to effectively manage operations that involve vessels and aircraft to ensure safety at and near the facility. This system needs to be described sufficiently for both routine operations and emergency response situations.

Further details of this requirement for offshore facilities can be found in the NOPSEMA *Emergency Planning guidance note*.

5 Emergency response plan (ERP)

WHS PAGEO Regulations r. 46
Emergency preparedness

5.1 Description of the ERP

The operator must prepare an ERP which documents the organisation and arrangements in place for dealing with an emergency at the facility.

It is important for operators to identify all credible emergency scenarios likely to occur at their facility or operations so that effective emergency preparedness and response exercises and training can be put in place. These scenarios and associated documents and training should be reviewed and updated on a regular basis to ensure any system changes are adequately considered and incorporated.

The ERP needs to cover all stages of an emergency response from detection through to completion whereby persons are considered to be in a place of safety. Operators must ensure when developing their ERPs, they are capable of dealing with all types of likely emergencies identified in the FSA of the safety case. Fundamental requirements for creating a good ERP include:

- provision for all potential stages of emergency response including:
  - detection of the emergency
  - alarms
  - muster points
  - assessment and response to the emergency
  - evacuation and escape
  - rescue and recovery
  - place of safety
- have a well-defined command structure detailing key workers, roles and responsibilities and organisation structure
- establishment of clear reliable methods of communications
- be aligned with and capable of addressing all MAEs identified within the FSA
- consideration of the findings of the FERA
- consideration of the findings of the EERA
- integration of the emergency response supplies, services and equipment into the plan, where appropriate, including medical provisions
- consideration of all external parties that may have a role in the emergency response
- provision of contingencies planning; for example, this may include the unavailability of workers with critical roles
- consideration of the location in which the facility will operate and its effect on the ERP
- be simple to comprehend, clear and concise in instruction
- provision for continuous improvement, sources may include audits or lessons learnt from drills, exercises and incidents.

The safety case should only contain a description of the ERP and any associated procedures not a copy of the complete ERP document. The ERP should be referenced with the title of the document, version and the document number.

Operators must demonstrate that their ERP can be executed in a timely and reliable manner according to its commitments. This can be achieved by reference to usable and readily available procedures and processes demonstrating that provisions are in place to allow effective implementation.

The ERP procedures and processes should be created in such a way as to provide assistance to workers to perform reliably and effectively and assist in reducing the likelihood of human error in the way the ERP is implemented. Consideration should be given to the following:

- identification of actions required for each emergency type
- step-by-step prompts or checklists
- provision of decision-making flow charts
- emergency specific standardised announcement transcripts
- documentation and implementation tools readily available in suitable locations.

While preparing emergency procedures, consideration should be given to:

- the structure of the document
- the target audience for each section
- control and distribution
- maintenance and updates.

The SMS of the safety case should include an overview of the key procedures and processes supporting the ERP and these should be listed as reference documents within the relevant section of the SMS.

5.2 SFAIRP risk reduction and performance standards

WHS PAGEO Regulations r. 46(5)

Emergency preparedness

During the development of the ERP, operators should consider whether or not the ERP meets the principles of reducing risks SFAIRP and identify the performance standards that apply. These performance standards should already be available for all technical and other controls that the ERP relies on. For example, communications, competency, fire and gas detection, firefighting systems and evacuation and rescue equipment.

Performance standards are also required for the ERP itself. When identifying the performance standards that should apply, operators should take into account all the steps in the ERP.

The critical requirements on the relevant facility need to be met and, as performance standards for different types of emergency may vary, each type should be independently reviewed. The ERP document itself must specify the performance standards that apply and the description in the safety case should include an overview of the performance standards in place rather than providing each individual performance standard.

For further information, refer to the *Identification of major accident events, control measures and performance standards: Guide*.

5.3 Drills and exercises

WHS PAGEO Regulations r. 46(4)

Emergency preparedness

Undertaking drills and exercises is a critical part of emergency planning. The drills and exercises should be based on possible emergency response scenarios which have been identified in the FSA. These drills and exercises conducted at the facility provide a useful method of demonstrating assurance that the performance standards identified in the ERP will be met and that the ERP will work effectively during an actual emergency, as well as refreshing the training and competency of the ERTs.

The emergency response section of the safety case should describe the system in place to ensure the completion of drills and exercises, how these will be scheduled and the reporting at the completion of each exercise. It may also be beneficial to include observers in the drill or exercise who are independent to the facility, but have the knowledge and experience to provide appropriate feedback at the conclusion of the drill.

The following areas are examples of what should be included in the drills and exercises to achieve a successful result:

- frequency of drills and exercises (these can be scheduled on a critical pathway where the higher the consequence of an event, the more frequently it should be included in drills and exercises)
- provision for all possible scenarios that could arise on the facility should be included in the schedule
- testing for redundancies; for example, multiple failures
- testing of emergency communications and alarm systems
- incorporation and testing of emergency response equipment
- testing emergency response procedures and processes
- testing alternative (backup) response measures
- testing the decision-making framework
- testing individual and team performance
- realistic and unannounced exercises at various times
- measuring and evaluation of ERP execution against performance standards
- interaction with external emergency services
- Interaction with other stakeholders.

The description in the safety case should also include post-drill reviews, reporting on any issues identified and allow for feedback and improvement.

These drills and exercises are also an important area of ongoing training and competency assessment for workers which can:

- provide ongoing assurance that persons are competent in their roles and in relation to tasks that may be given to them for various types of emergency
- refresh and enhance workers' ERP knowledge and skills, including preparedness and confidence
- identify gaps in knowledge and skills of individuals that need to be rectified
- assist in identifying any training system deficiencies.

Feedback of the results of the drills and exercises to the general workforce as well as the ERT members is critical as this enables the operator to keep workers informed of any issues identified and the corrective actions that are being generated to fix the issue, and also provide continual improvement to the ERP and supporting systems.

It also enables the operator to meet the regulatory requirements of worker involvement which subsequently leads to a safer work environment and workers understanding and taking ownership of any proposed changes.

5.4 Mobile facilities

WHS PAGEO Regulations r. 46(6)

Emergency preparedness

Mobile offshore petroleum facilities include:

- floating production, storage and offloading (FPSOs)
- floating storage and offloading(FSO)
- mobile offshore drilling unit (MODU)
- accommodation vessels
- pipelay and construction vessels that could be working independently or related to and alongside or adjacent another facility.

The safety case must describe the systems in place for shutdown and disconnection in the event of an emergency which should be aligned with the FSA and associated control measures and performance standards.

Further details of this requirement for offshore facilities can be found in the NOPSEMA *Emergency planning guidance note*.

Appendix 1 Glossary

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

Key terms	Meaning
Competent person	A person who has acquired through training, qualification or experience the knowledge and skills to carry out the task. The definition of 'competent person' in the Work Health and Safety (General) Regulations prescribes specific requirements for some types of work such as diving.
EERA	Evacuation escape and rescue analysis
ERP	Emergency response plan
ERT	Emergency response team
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.
FERA	Fire and explosion risk 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.
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).
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.

Key terms	Meaning
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	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
SME	Subject matter expert
SMS	Safety management system
WHS Act	*Work Health and Safety Act 2020*
WHS PAGEO Regulations	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 ISO 31000 *Risk management – Guidelines*
- IEC ISO 31010 *Risk management – Risk assessment techniques*
- AS ISO 13702 *Petroleum and natural gas Industries – Control and mitigation of fires and explosions on offshore production installations — Requirements and guidelines*
- AS ISO 15544 *Petroleum and natural gas Industries – Offshore production installations – Requirements and guidelines for emergency response*
- ISO 17776 *Petroleum and natural gas Industries – Offshore production installations – Major Accident Hazard Management during design of new installations*
- AS/NZS 2885.6 *Petroleum – Gas and liquid petroleum – Part 6: Pipeline safety management*
- AS IEC 61882 *Hazard and operability studies (HAZOP studies) – Application guide*
- AS IEC 61511 *Functional safety – Safety instrumented systems for the process industry sector*

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

- National Offshore Petroleum Safety and Environmental Management Authority's (NOPSEMA), Emergency Planning guidance note
- 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

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