GUIDELINE

Submission of a petroleum pipeline safety case
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Foreword

This guideline is issued by Resources Safety under the Petroleum Pipelines Act 1969. It covers the requirements for a safety case under the Petroleum Pipelines (Management of Safety of Pipeline Operations) Regulations 2010.

The Act

The Petroleum Pipelines Act 1969 relates to the construction, operation and maintenance of pipelines for the conveyance of petroleum and related purposes.

Regulations

The Petroleum Pipelines (Management of Safety of Pipeline Operations) Regulations 2010 and Petroleum Pipelines (Occupational Safety and Health) Regulations 2010 provide more specific requirements for a range of activities. Like the Act, regulations are enforceable and breaches may result in prosecution, fines, or directions to cease operations and undertake remedial action.

Guidelines

A guideline is an explanatory document that provides more information on the requirements of legislation, details good practice, and may explain means of compliance with standards prescribed in the legislation.

Compliance with guidelines is not mandatory but the content could have legal standing if it was demonstrated that it reflects established industry practice.

Application

The provisions of this guideline apply to all pipeline operations as defined in section 4 of the Act.

Acknowledgement

Parts of this guideline are based, with permission, on guidance material published by the National Offshore Petroleum Safety Authority (NOPSA).
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1 INTRODUCTION

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1 Introduction

1.1 Safety case legislation

Overview

The Petroleum Pipelines Act 1969 is the primary legislation in Western Australia that applies to onshore petroleum pipelines. The Act requires licensees to operate pipelines in a proper manner, and secure the safety, health and welfare of those engaged in the pipeline operation [s. 36A]. It also provides for regulations that allow safety measures to be specified [s. 67(1)(a)] and conditions to be imposed on pipeline licences [s. 12].

Under the Petroleum Pipelines (Management of Safety of Pipeline Operations) Regulations 2010 (“Management of Safety Regulations”), a licensee is required to prepare a safety case.

The safety case is a detailed document that outlines the types of safety studies undertaken, the results of those studies and the safety management arrangements to address the findings of those studies. It should emphasise consultation, employee participation and a goal-setting approach to safety, rather than prescriptive rules.

In effect, the licensee is advising the safety regulator about the nature of the pipeline operation and demonstrating that all hazards with the potential to cause a major accident have been identified and assessed, and measures have been taken to ensure that the risks to people are eliminated or minimised to a level that is as low as reasonably practicable.

Delegation of powers and functions

The authority and powers of the Minister under various sections of the Petroleum Pipelines Act 1969, including those authorising the regulatory activities associated with the Management of Safety Regulations and OSH Regulations, have been delegated to the offices of:

- Executive Director, Resources Safety
- Director, Petroleum Safety Branch, Resources Safety.

Although much of a licensee’s dealings with Resources Safety will be through an allocated case manager, the authority for decisions and feedback (see Chapter 6) about the safety case resides with the people holding the above offices.

Note: References to the Minister throughout this guideline should be taken to mean the delegated office.

Acceptance of a safety case

Under the current Management of Safety Regulations, the Minister for Mines and Petroleum is responsible for safety case matters, which have been delegated, as indicated in Section 1.2, to offices of the Department.

The Minister is obliged to accept a safety case if:

- it is “appropriate to each pipeline operation in respect of which the safety case is submitted” [r. 29(1)(a)];
- the safety case complies with specific requirements of the regulations [r. 29(1)(b – c)]; and
- the Minister requested an element or elements of the safety case to be validated and this validation is complete [r. 29(1)(d)].

In addition to demonstrating compliance with these regulations, the safety case may also be used to demonstrate compliance with the Petroleum Pipelines (Occupational Safety and Health) Regulations 2010 (“OSH Regulations”) where appropriate, as discussed in Section 5.1.
Regulatory duties

The Management of Safety Regulations introduce penalties for not implementing or complying with a safety case. There are also specific duties associated with “other protected persons” (see Section 1.2) and record keeping (see Section 5.6).

It is a breach of duty under the regulations to undertake a pipeline operation not covered by a safety case that has been accepted by the Minister. The regulations can be breached by:

- undertaking a pipeline operation not included in the current safety case or where an accepted safety case is lacking [r. 5];
- continuing a pipeline operation where a new risk to safety or health, or a significant increase to an existing risk, occurs [r. 6]; or
- an individual working against the requirements of the accepted safety case [r. 7].

1.2 Roles

Licensee

Under the Management of Safety Regulations, the licensee has many obligations from the preparation, submission and implementation of the safety case through to requirements under specific safety measures for pipeline operations covered by the licence.

In some circumstances, the knowledge and expertise of specialist consultants may enhance the safety case process but licensees should ensure that they understand the consultants’ input and remain in control of the development process.

The licensee must submit the safety case to Resources Safety for assessment.

Once the safety case has been accepted, the licensee has a responsibility to undertake the pipeline operations in accordance with the accepted safety case, and to review and revise it as necessary.

Under the regulations, the licensee may nominate an experienced pipeline operator to take on all aspects of the pipeline’s operation, including ensuring compliance with licence conditions but this commercial arrangement does not transfer the safety case obligations from the licensee to the operator. Even where licensees use operations and maintenance contractors and effectively have no staff working on the pipeline, the safety case still needs to show how the licensee will fulfil their obligations.

Within the Management of Safety Regulations, the licensee is responsible for:

- providing consent to other protected people to access the pipeline [r. 8] (see Section 1.2);
- maintaining records [r. 9] (see Section 5.6);
- ensuring compliance with duties under the Act [r. 10(4)(a)] (see Section 5.1);
- establishing performance standards to mitigate against major accident events [r. 10(4)(k)] (see Section 5.1);
- ensuring the offices of the person in charge and emergency coordinator are continuously filled by personnel with the necessary skills and training [r. 13(3)] (see Section 5.2);
- ensuring competency of all persons engaged in the pipeline operation [r. 14] (see Section 5.2);
- establishing and maintaining a permit to work system [r. 15] (see Section 5.2);
- demonstrating, via documented evidence, that the workforce has been consulted and has participated during development of the safety case [r. 16] (see Section 2.2);
- demonstrating, via documented evidence, that the safety case allows for the workforce to establish informed opinions about the risks and hazards to which they may be exposed [r. 16] (see Section 2.2);
- controlling therapeutic drug abuse by, and preventing intoxication of, persons engaged in a pipeline operation [r. 19] (see Section 5.2);
- reporting weekly to the Minister during construction [r. 20] (see Section 5.4);
- ensuring escape drill exercises and fire drill exercises take place [r. 24(3)] (see Section 5.3);
- submitting safety cases [rr. 27, 32, 35] (see Section 6.3);
- providing responses to requests for additional information by the Minister in a timely manner [rr. 28, 35] (see Section 6.3); and
- providing validations in a timely manner to the Minister when requested [r. 41] (see Section 6.1).
Workforce

The workforce has duties under the OSH Regulations and must be involved in safety case development (see section 2.3). The workforce therefore has an important role in the preparation of a safety case that is accepted.

Department of Mines and Petroleum

Petroleum pipeline licensees may interact with three functional areas in the Department of Mines and Petroleum:

- Petroleum Division
- Environment Division
- Resources Safety Division.

Role of other protected persons

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<th>Duty for other protected persons [r. 8]</th>
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<td>A person who is at or near a place where a pipeline operation is being carried on at the invitation of, or with express or implied consent of, a licensee for, or a person in control of a part of, the operation must comply with each provision of the safety case in force for the operation that applies to the person.</td>
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Other protected persons (see above) have an obligation to comply with the safety case provisions. However, it is recognised that it might not be practical for these people to be made aware of the safety case itself. For example, the general public who have access to public open space above the pipeline could not practically be made aware of the safety case and any provisions they need to comply with. In this situation, the licensee needs to ensure that either:

- the public does not need to take specific actions to remain safe from the pipeline operation; or
- signage communicates any actions the public might need to take.

1.3 Using this guideline

The main aim of this guideline is to describe the safety case requirements for which the licensee is responsible.

Chapter 2 addresses aspects that affect the safety case as a whole. The three main components of a safety case — the facility description, formal safety assessment description and safety management system (SMS) description — are covered in Chapters 3, 4 and 5, respectively.

The Management of Safety Regulations provide a framework for safety case validation, revision and submission by the licensee. There are also requirements of the Minister in relation to the review and decision making process when accepting a safety case or allowing activities outside the safety case in force. These matters are covered in Chapter 6.

Some of the terms used in this guideline are defined in Appendix 1.
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2 Safety case contents and considerations

2.1 Introduction

The safety case document should have an integrated structure with clear links between:

- the causes and consequences of hazards and major accident events and their associated risks;
- the selection of strategies and measures to control the risks; and
- the performance required from specific measures to maintain risk levels to as low as reasonably practical (ALARP).

Figure 1 shows the main elements of a safety case — facility description, formal safety assessment description and SMS description — and their relationships as set out in the Management of Safety Regulations.

To achieve the overall linkage between elements and ensure consistency, the process of developing the safety case should be iterative, involving several review loops to close gaps and ensure a coherent document. Duplication of information can be avoided by using effective internal cross-referencing within the safety case document. For example, something may be identified as a physical control measure in several places but there should only be a single description of the control — usually this will be in the facility description section.

2.2 Safety case must be appropriate

<table>
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<th>Safety case acceptance criteria [r. 29(1)(a)]</th>
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<td>The Minister must accept a safety case if the safety case is appropriate to each pipeline operation in respect of which the safety case is submitted.</td>
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<tr>
<th>Workforce involvement to allow for informed opinions [r. 16(1)(b)]</th>
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<tr>
<td>A licensee for a pipeline operation must demonstrate to the Minister, to the reasonable satisfaction of the Minister, that the safety case provides adequately for effective consultation with, and the effective participation of, the members of the workforce, so that they are able to arrive at informed opinions about the risks and hazards to which they may be exposed when engaged in the operation.</td>
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To meet acceptance criteria, descriptions within the safety case must include sufficient detail to accurately explain:

- the physical characteristics of the pipeline;
- its operating envelope;
- the management systems in place; and,
- the activities that take place at or in connection with the pipeline.

The licensee should consider carefully what activities are included in the safety case. The definition of pipeline operation is broad, and any activity that can be considered a pipeline operation must be covered by an accepted safety case.

There are regulatory requirements for specific information and consideration of a range of topics in the safety case. When determining the level of information to be provided, the licensee should consider:

- how the workforce will arrive at informed opinions about the risks and hazards to which they may be exposed while working [r. 16(1)(b)];
- what practical steps can be taken to ensure they and other duty holders fulfil their obligations [r. 10(4)(a)]; and
- the Minister’s requirements when making a decision about a safety case [rr. 29, 36].

During their review of the safety case for the Minister’s decision (see Section 6.3), the Department’s officers will consider the above points where the regulations are not specific about what must be included.
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Part 2

Facility description

- Activities and operating parameters
  - Activities that will, or are likely to, involve the pipeline operation, and operational boundaries

- General description
  - Layout of the pipeline operation

- Machinery and equipment

Description of technical controls including:

- Safety measures
  - Standards, medical and pharmaceutical supplies and services, machinery and equipment

- Emergencies
  - Communication systems (pipeline operations and support providers), control systems (power, lighting, alarms, emergency shutdown)

Formal safety assessment description

- Hazard identification (HAZID)
  - Define all hazards having the potential to cause a major accident event

- Risk assessment
  - Likelihood and consequence of each potential major accident event

- Emergencies
  - Evacuation, escape and rescue analysis, fire and explosion analysis

- Identification of control measures
  - Measures necessary to reduce risk to ALARP

Safety management system description

- Scope
  - Activities that will, or are likely to, involve the facility

- Comprehensive and integrated description of procedural controls including:
  - OHS risk management
    - Coping HAZID and risk management to ALARP
  - Maintenance
    - Inspect, test and maintain physical control measures
  - Communications
    - With relevant pipeline operations and support providers
  - Safety measures
    - Design, construct, install, maintain, modify command structure, workforce competency, permit to work system, workforce involvement, drugs and intoxicants
  - Emergencies
    - Emergency preparedness plans, performance standards, implementation, drills and exercises, procedures for emergency shutdown and testing of pipelines

Performance standards

- Specify the performance standards that apply

Monitor, audit and review

- Implement and improvement of the SMS
  - Demonstration of implementation, continual and systematic identification of deficiencies, continual and systematic improvement

Implemented and functional?

Corrective and preventative actions

Figure 1  Graphical representation of the main elements of a safety case under the Management of Safety Regulations
2.3 Workforce involvement in safety case preparation

**Requirement for workforce participation [r. 16(1)(a)]**

The licensee for a pipeline must demonstrate to the Minister, to the reasonable satisfaction of the Minister, that in the development or revision of the safety case for the operation, there has been effective consultation with, and participation of, members of the workforce.

**Documentation of workforce participation [r. 16(3)]**

A demonstration for the purposes of subregulation (1) must be supported by adequate documentation.

**Workforce definition [r. 16(2)]**

In this regulation members of the workforce includes members of the workforce who are:

(a) identifiable before the safety case is developed; and

(b) engaged in, or likely to be engaged in, the pipeline operation.

Licensees should consider carefully what level of workforce involvement is necessary not only to comply with regulation 16, but also produce a safety case that accurately reflects the activities and operations on the pipeline. The workforce has a practical knowledge that may be useful in identifying hazards, assessing risks, and determining the most appropriate control measures to adopt.

When developing or revising a safety case, the licensee must demonstrate, to the Minister’s satisfaction, that there has been effective consultation with the workforce. It is not a regulatory requirement that this demonstration be included in the safety case, but it must be supported by adequate documentation. However, as the key occupational health and safety document for the pipeline, the safety case may be the best place to document the consultation process.

Resources Safety’s 2009 publication *Consultation at work – code of practice*, while aimed at the minerals industry, may be a useful aid when planning the consultation strategy.

The Minister recognises that in some instances a safety case may be developed before the entire workforce is recruited. This means that consultation with “members of the workforce” may be difficult to achieve. In such cases it is incumbent on the licensee to consult as much as is reasonably practicable. Options include:

- consulting with those members of the workforce who are available; and
- seeking input from an organisation that typically employs or represents the workforce.

The licensee should ensure that they satisfy the Minister’s expectations by describing the results achieved and any remaining steps they intend to take once the full workforce is available for consultation.

2.4 Self-contained document and provision of evidence

**The safety case for a pipeline operation must contain a detailed description of:**

- the formal safety assessment for the operation providing evidence that the assessment complies with regulation 10(3) [r. 10(1) (b)]; and
- the safety management system providing evidence that the system complies with regulation 10(4) [r. 10(1)(c)].

Evidence of the formal safety assessment and SMS must be included in the safety case. Where these are separate documents, the safety case should include:

- a description of how the external document demonstrates compliance; and
- sufficient information to identify the external document within the licensee’s document control system.
Example of reference to external document used as evidence for the formal safety assessment

The following example describes the documents used to identify major accident events for a formal safety assessment.

The major accident events for the pipeline were identified through several risk assessment workshops. These risk assessments are:

- AS 2885 Safety Management Study, Rev 2, July 2009 (Document Number: RA0001) identified threats to the pipeline using the process included in AS 2885.1-2007. During this process, where a threat could result in a major accident event, the threat was tagged for inclusion in the formal safety assessment. The major accident events identified are third-party-caused rupture (see section A.B.C), corrosion rupture of the meter station (see section B.C.D), and gas release in the valley (see section C.D.E).

- Operations HAZAN, Rev 1, October 2009 (Document Number: RA0002) identified hazards to employees and contractors. During this process, where a hazard could result in a major accident event, the hazard was tagged for inclusion in the formal safety assessment. The major accident events identified are passing of valve in pig launcher while loading pig (see section D.E.F), and pipeline rupture (see section E.F.G).

Example of reference to external document used as evidence for the SMS

The following example describes the permit-to-work system used to meet the requirements of regulation 15.

The work permit system applies to specific activities and sets the requirements for supervision and competency based on the work to be undertaken. The work permit system includes a guidance document, Document Number WPS-G-001, that employees and contractors are advised about through the intranet and induction. WPS-G-001 guides the person undertaking the work, or leading the workgroup, through the process of obtaining authorisation, organising the required supervision, undertaking the job hazard analysis and ensuring the competencies required are held by the personnel involved.

Authorisation is typically by the operations manager, with the exception of electrical permits, which are authorised by the lead electrician and operations manager.

Supervision is typically done by a permit officer, with the exception of undertaking a permitted activity for the first time and confined space entry. When personnel are undertaking any permitted activity for the first time, a senior technician with experience in that activity must supervise. Confined space entry activities are to be supervised by a confined space entry officer, who is a permit officer who has undergone additional training for confined space entry rescue.

The operations manager and permit officers are responsible for monitoring changes to broader location and conditions of work than the permit carrier. The permit carrier is responsible for monitoring the immediate work environment. Before authorising a permit, the operations manager is required to review existing open permits and work activities in the area to ensure the proposed work is compatible.

Should the operations manager become aware of changes that jeopardise those working under a given permit, the operations manager must cancel the permit and stop the work. The permit officer has a similar responsibility but only for the local area they can observe. Before signing on to a permit, the permit officer must review the area and conditions local to the work. Should the location change and potentially jeopardise persons working or themself, the permit officer must cancel the permit and stop the work. The permit officer can be identified by the yellow hard hat they are required to wear.

Upon completion of work under the permit, the permit carrier asks the permit officer to sign off the permit, contacts operations to verbally close the permit, and returns the paper copy of the permit when next in the office.

Permit carriers are entitled to stop work at any time should it not be achievable in a safe manner, as per the company’s safety policy.

Once signed off by the operations manager, permits are displayed on the permit board outside the operations manager’s office. Once the permit officer signs on to the permit, must be displayed on the windshield of the work vehicle.

The minimum requirements for works requiring a permit are training in the work permit system and applicable trade licences. The competency requirements vary depending on the risk associated with the work.

Given the different levels of authorisation, supervision and competencies required for the various types of permitted work, a suite of procedures is included in the work permit system:

- WPS-P-001 Hot Work
- WPS-P-006 Cold Work Impacting Safety/Critical Systems
- WPS-P-004 Electrical Work
- WPS-P-003 Confined Space
- WPS-P-005 Working at Heights
- WPS-P-002 Excavation.

The work permit system guidelines and procedures can be found on the intranet (in the “procedure” drop-down menu) and in the work permit system folder in each site’s procedure library.
2.5 As low as reasonably practicable

Under the safety case regime, a general expectation for performance is set externally but the licensee is responsible for detailed interpretation of the performance benchmarks and how to achieve them. Engineering assessment and judgement, together with risk-based methods of safety assessment, such as quantified risk analysis, can be used to provide reasoned arguments and evidence of the safety of pipelines and the robustness of safety-related decisions.

This goal-setting approach gives the licensees the flexibility to devise health and safety solutions that manage risks under conditions that best suit the pipeline and circumstances. The safety objectives of the safety case can be achieved in many different ways and licensees can — and are encouraged to — find their own solutions.

The regulations require that risks to the safety and health of those involved in pipeline operations are reduced to a level that is ALARP. Reducing risks to ALARP requires the adoption of suitable control measures until a point is reached when the incremental benefit of further risk control measures is outweighed by other issues such as degree of difficulty of implementing the measure or cost. Section 4.5 outlines how a licensee might demonstrate in a safety case that a risk is ALARP.

2.6 Major accident events

Onshore activities associated with petroleum pipelines have the potential for major accident events, the consequences of which may be loss of life. The relative rarity of events with catastrophic consequences may give rise to the situation where, compared with day-to-day operational issues, potential major accident events receive little attention. The safety case regime is a regulatory initiative focused on addressing the potential for major accident events while continuing to address occupational health and safety.

Under the regulations, licensees are required to focus on major accident events, risks to the safety or health of persons associated with pipeline operations, and the integrity of the pipeline. It is not intended that the safety case regime should diminish attention on occupational health and safety issues, which are generally less dangerous but more frequent. Adequate attention should be paid to both major accident event prevention and occupational health and safety at pipelines (Figure 2).

An emphasis on major accident events is achieved in the regulations by requiring a description in the formal safety assessment [r. 10(3)] of how ALARP will be achieved for major accident events, whereas the processes for managing occupational health and safety risks to ALARP are included in the SMS description [r. 10(4)(f)].

Figure 2  Primary focus of the Management of Safety Regulations is on high consequence, low frequency events


2.7 **Structural integrity**

**Requirement for maintaining structural integrity [r. 18]**

The safety case for a pipeline operation must describe the means by which a licensee for the operation will ensure that the pipeline, and the machinery, electrical systems and instrumentation controls to be used in the operation, are kept in good condition and fit for purpose.

The minimum requirements for ensuring structural integrity must be the nominated standards, such as Australian Standard AS 2885 *Pipelines – Gas and liquid petroleum*, and the pipeline licence. Using AS 2885, integrity is maintained by a combination of the risk management process and prescription on those matters for which there is industry consensus. Pipeline licences now require that a pipeline undergoes a baseline intelligent pigging within two years of becoming operational.

The licensee must establish a program for monitoring, and rectifying if required, integrity based on the potential threats to the pipeline, and describe this program within the safety case. The following recommendations show how each section of the safety case might include a description of matters relating to integrity:

- facility description should cover the physical measures for verifying and maintaining integrity (see Section 3.4);
- SMS should include a description of the procedural aspects of integrity management (see Section 5.2); and
- formal safety assessment should capture the assessments of integrity and be used to support the reasoning behind the particular physical and procedural systems used (see Section 4.6).

*Note: Regulation 18 specifies machinery, electrical systems and instrumentation controls in addition to the pipeline itself. Consideration for each of these must be evident in descriptions of how pipeline integrity is managed.*

2.8 **Construction safety cases**

**Requirement of construction safety cases [r. 10(5)]**

If a licensee submits to the Minister a safety case for a pipeline operation that is an operation in connection with the construction of a pipeline, the safety case must contain the matters mentioned in subregulation (1) in relation to —

(c) the construction of the pipeline; and

(d) to the extent that it is practicable — the operation of the pipeline on completion of its construction

For construction of a new pipeline, the safety case must address as much about the operation of the pipeline as is practicable. As a pipeline licence would already have been issued, “practicable” includes information from the licence application and any matters related to major accident events during commissioning and operations that have previously been identified.

Safety cases that cover construction activities must include provisions for weekly reporting to the regulator (see Section 5.4).

2.9 **Risk management in development of the safety case**

Regulation 10(3) includes a requirement for risk assessment to be part of the formal safety assessment. The Australian/New Zealand Standard AS/NZS ISO 31000:2010 *Risk management – Principles and guidelines* provides a generic framework for establishing the context and identifying, analysing, evaluating, treating, monitoring and communicating risk. The predecessor to this standard is AS 4360:2004, which is referenced in AS 2885, the main petroleum transmission pipeline standard applied in Australia.

The safety case must capture the risk management process. Table 1 lists the essential elements for an acceptable safety case. It is a regulatory requirement that the safety case includes a description of the risk management framework and process, as well as the results of the process. As shown in Appendix 2, AS/NZS ISO 31000:2010 provides a risk management framework and process model that can be applied. Appendix 3 summarises how the regulations interact with each element of this model.
### Table 1  
**Essential elements of the risk management process for an acceptable safety case**

| Hazard identification | • Identify major potential accident events  
|• Identify hazards and outcomes |
|---|---|
| Risk assessment | • Assess the potential consequences for each hazard which could lead to a major accident event  
|• Assess the likelihood of each hazard which could lead to a major accident event  
|• Determine the risk for the major accident event, taking into account the controls in place  
|• Compare the risk with the operator's risk acceptance criteria  
|• Assess the level of risk posed by each potential major accident event assuming mitigation actions are in place  
|• Ensure all reasonably practicable steps to reduce the risk associated with each major accident event have been considered (i.e. risk reduced to ALARP) |
| Control measures and performance standards | • Identify and select control measures  
|• Identify potential additional controls  
|• Identify performance indicators and performance standards |
| Safety management system | • Document the SMS (includes policy, planning, implementation, measurement and review documents)  
|• Train employees in SMS documentation and processes  
|• Use the SMS in operations to reduce risks  
|• Monitor and review the performance of the SMS |
| Evidence of ALARP | • Provide transparent and detailed information about the adopted control measures  
|• Provide performance monitoring information for controls (e.g. performance indicators, performance standards)  
|• Demonstrate the SMS is comprehensive and integrated for all aspects of the control measures  
|• Provide evidence of compliance with the regulations, standards and codes |

### 2.10 Practical considerations for safety case contents

To be considered sufficient, the safety case must include a description of the pipeline, a detailed description of the formal safety assessment and a detailed description of the SMS.

In practice, the following basic principles apply for an effective and well-crafted safety case that demonstrates the licensee has a clear understanding of the factors that influence risk and the controls that are critical to managing risk to their pipeline:

- A level of detail that is proportionate to the extent of potential risks and the complexity of the installation, process or system involved.
- A coherent, integrated structure, with a logical flow creating strong links between the causes and consequences of major accident events, their associated risks, the selection of strategies and measures to control the risks, and the performance required from specific measures to reduce risk level to ALARP.
- Descriptions of the safety case elements (not copies of the documents themselves). The description should distil the points of value, the best features of the elements, as well as any potential deficiencies and how these may be overcome. It should outline the reasoning behind the development of the element in question, and explain how it is connected to other elements.

Important elements of the safety case include:

- linkages between facility description, SMS and formal safety assessment, with the risks and control measures identified by the formal safety assessment described within the facility and SMS descriptions as appropriate;
- identification of key performance standards and indicators for control measures and those elements of the SMS that are required to ensure satisfactory performance of the control measures;
- development of performance standards and indicators, and an SMS based on the formal safety assessment, enabling the licensee to monitor performance against set standards; and
• periodic auditing to confirm that monitoring is being carried out and any non-compliance is being rectified. Management review ensures controls and performance standards are improved when practicable.

The formal safety assessment process is driven by the requirements of the safety case regime to:
• understand the risks associated with major accident events; and
• evaluate the adequacy of control measures for those risks in a way that is robust and transparent.

The requirement to understand the risks extends to the workforce. The workforce should be able to identify which are the major contributing factors to the risk, and which are the critical activities or measures that can significantly influence risk levels. This is best achieved through appropriate participation in the formal safety assessment process.

Having understood the risks and identified the critical control measures, the licensee must define the required performance standards (e.g. functionality, availability, survivability, reliability) of each control measure. These performance standards should be embedded in routine maintenance tasks and the procedural controls incorporated in operational tasks. Again, the workforce must be involved in determining performance standards in order to be knowledgeable and informed on the risk controls, the control effectiveness and their vulnerabilities, and the importance of monitoring control degradation. The performance standards, if correctly set, maintained and monitored, are the basis for satisfying the overall reduction of risks to a level that is ALARP.

As part of the identification of control measures that reduce risks to a level that is ALARP, the licensee must make a convincing case that the identified control measures and their performance standards are applicable, relevant and contemporary, or that it is not practicable to rectify shortfalls. The safety case process often results in licensees discovering gaps in their procedures, which then leads to improvement. Implementation of these improvements is essential if the safety case is to achieve its objectives.

In ongoing operations, the SMS must safeguard maintenance of performance standards. The detailed description of the SMS in the safety case must describe the key means by which the licensee implements, monitors and reviews all of the defined performance standards (e.g. engineering, management).

The elements of an SMS should reflect the nature of the business and its risks, but must also contain elements managing occupational health and safety matters as well as major accident event safety. There is no universal ideal model of an SMS, and it is critical that the licensee implements a system appropriate to their particular pipeline and the activities conducted at the pipeline.

2.11 Common weaknesses in safety case submissions

The most common problems in pipeline safety cases relate to the content and level of detail in the submission.

Insufficient detail

Simply listing elements or referencing documents does not provide sufficient detail. Common examples include:
• details in relation to the formal safety assessment limited to either a reference to a study performed or, in some cases, simply a commitment to conduct a study;
• details provided in the summary of an SMS limited to a listing of policies and procedures;
• facility description limited to physical plant and equipment, with little or no detail on the activities that will, or are likely to, take place at or in connection with the pipeline; and
• only partial details provided of the technical or other control measures identified as a result of the formal safety assessment.

Too much detail

Submitting complete stand-alone documents within the safety case does not necessarily provide evidence that it complies with the regulatory requirements. Common examples include:
• complete pipeline safety management system, or parts thereof
• actual emergency plan
• fire and explosion analysis.

The regulations explicitly require the safety case to contain a description rather than the actual system, study or plan.
For example, the pipeline management of change procedure should not be reproduced in the safety case in full, but the management of change systems should be referenced and described, including features such as:

- scope of changes managed by the system;
- manner in which hazards are identified;
- how recommendations to reduce risk are managed through allocation of responsible parties; and
- provision of resources.

In other words, the safety case documents the main features of the management of change system and associated commitments to reduce the risk to ALARP.
3 FACILITY DESCRIPTION

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3 Facility description

3.1 General considerations

<table>
<thead>
<tr>
<th>Requirement for a facility description [r. 10(1)(a)]</th>
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<tr>
<td>The safety case for a pipeline operation must contain a description of the operation that complies with subregulation (2).</td>
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</table>

The facility description structure need not be constrained by the order of elements as they are laid out in the regulations or guideline. Provided all the elements are covered, licensees are encouraged to structure the facility description such that the description “tells the story” in a sensible format.

The facility description must document the factual information about the pipeline that provides the basis of the formal safety assessment and SMS. Development of the formal safety assessment and SMS may result in a decision to modify the physical pipeline, so the facility description also documents some of the outputs of the formal safety assessment and SMS development processes.

Scope of the safety case

The facility description fixes the envelope or range within which the licensee is undertaking the pipeline operation or operations covered by the safety case. The following are defined in the description:

- intended range or scope of operation of the pipeline;
- physical arrangements of the pipeline;
- activities associated with the pipeline operation;
- interconnected pipelines and petroleum facility activities; and
- reasons for, and numbers of, people present.

It is important to clearly specify the scope because operations outside it will not be covered by the safety case and hence are not permitted without a revision of the safety case. For example, naming a safety case after a single pipeline limits the scope of planned activities and is inappropriate if several pipelines will be operated under the safety case.

To provide an effective basis for, and documentation of the output of, the other parts of the safety case, the design basis and philosophy of the pipeline should be described, rather than just the output of the design process. These descriptions should thoroughly address potential uses of the pipeline — that is, what the pipeline is physically capable of. This may identify residual risks and controls that need to be discussed elsewhere in the safety case.

The facility description must incorporate all the factual information necessary to understand:

- the potential major accident events that have been identified and assessed in the formal safety assessment;
- the arrangements for controlling the risks of those major accident events;
- the physical controls that mitigate risk from all identified hazards; and
- the interaction between those safety controls and the SMS.

This information should be sufficient to provide a full appreciation of the major accident events and risk management strategies covered in the formal safety assessment. Any novel or unusual conditions, engineering solutions or technologies involving the pipeline should be highlighted.

The facility description covers the design and operating envelope for pipeline systems, taking into account that the safety case covers normal operations anywhere within the set of conditions described. The facility description also includes the physical systems in place to ensure that the design envelope is not breached or, if it is, to bring the situation under control.

The battery limits of the pipeline, discussed in Section 3.2, may assist in defining the scope of the safety case.
Level of detail

Preparation of the facility description requires a balance between providing a readable document that contains useful information, and including so much detail that the document is quickly out of date or requires frequent revision.

The facility description is not intended to be a simple list of technical specifications. The safety case must explain how the pipeline works and why particular safety design solutions were adopted. This means that the facility description must:

- describe the design and operating philosophies for the pipeline, which are unlikely to be subject to frequent change; and
- indicate the design standards that have been used.

The description may include text, data, drawings, schematics, photographs or other means of conveying information about the pipeline and activities to be conducted at the pipeline. Using illustrations in the facility description can be helpful and, in some cases, more appropriate than descriptive text. However, adequate linkages should be provided between illustrations and descriptions provided in the rest of the facility description. For example, it is not sufficient to include drawings without an accompanying description of the parts of the pipeline shown in those drawings. Care must also be taken to ensure any illustrative material is clear and legible.

Licensees are encouraged to minimise details such as tag numbers and line or valve numbers within safety case documentation. These details should be maintained within databases and hazard registers, which the Minister (or delegate) will audit against up-to-date printouts of the databases and registers during pipeline inspections.

Example of description — pipeline separator

The coalescing filter at the head of the pipeline has been designed to the maximum allowable operating pressure of the pipeline. The separator is provided with full flow relief against failure of level controls or activation of process isolation valves.

Rather than a simple listing of the design pressures of various parts of the process system, a description such as that above provides a much better context for the formal safety assessment, and can lead to a discussion of the potential for overpressure of the tanks and associated controls.

3.2 Detailed description of the pipeline

Pipeline configuration and operations

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<th>Requirement for pipeline configuration [r. 10(2)(b)]</th>
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<tr>
<td>The description of the pipeline operation must give details of the configuration of the pipeline or the proposed pipeline.</td>
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The description of the pipeline layout should provide an effective overview of the relative location of key physical elements of the pipeline. Internal measurement systems may be used.

The details of the pipeline layout should include descriptions of:

- structure
- processing equipment or packages
- compressors
- isolation valves
- offtakes
- tie-in points
- control room
- hazardous areas
- safety systems (e.g. deluge, fire and gas detection)
- utility equipment or packages (e.g. main, emergency and UPS power supplies)
- pipeline buoyancy control
- crossings (e.g. gas pipelines, waterways, areas of inundation)
- cathodic protection beds
- accommodation
• heavy construction equipment
• laydown yards
• lifting equipment
• emergency and evacuation
• heavy construction equipment.

An estimate of the personnel distribution in relation to the pipeline layout can be helpful in understanding the exposure of people to risks.

The pipeline configuration should address production, utilities and lifting operations, and battery limits. The content and level of detail should be sufficient to gain an appreciation of the hazard potential of the systems to people at or near the pipeline.

**Production operations**

The facility description should describe any hydrocarbon production systems and their operation, including design data that have been incorporated into the pipeline licence. Information could include:

- process flow diagrams or utility flow diagrams
- stream data and mass balance information
- inventory data, including volumes of isolatable sections
- pressure vessel specifications
- equipment specifications (e.g. pumps, compressor)
- cause and effect charts
- process control
- related hazardous substances inventory data, including volumes of isolated and isolatable sections.

**Utility operations**

The facility description should describe the utility systems and their operation, including design data. Information could include:

- power generation and distribution
- waste processing and disposal
- lighting
- communications (e.g. internal and external, voice and data)
- drains and sumps
- consumable production (e.g. portable water, nitrogen, compressed air)
- heating, ventilation and air-conditioning
- laundry, galley and mess
- fuel storage and distribution
- related hazardous substance inventory, including volumes of isolated and isolatable sections.

This information is required to give an understanding of any dependencies between safety systems and general utility systems that may be important in an emergency.

**Lifting operations**

The facility description should describe the lifting systems and their operation, including design data. Information could include:

- fixed lifting appliances
  - process train gantry cranes
  - stores cranes
  - construction cranes
  - utility winches
- portable and re-locatable lifting appliances (e.g. cherry picker, forklift)
- related hazardous substance inventory, including volumes of isolated and isolatable sections.
Battery limits

The facility description should describe any auxiliary systems connected to the pipeline and their operation, including design data. Information could include:

- numbers, locations and battery limits
- diameters and lengths
- construction details (e.g. materials, wall thicknesses, pressure rating and schedule)
- process conditions across the expected range of production modes
- pressures and temperatures
- fluid compositions
- flow rates
- related hazardous substances inventory data, including volumes of isolated and isolatable sections.

Describing battery limits is important in demonstrating the scope of the safety case (see Section 3.1). For example, if pipeline operation includes production export in the pipeline licence, then battery limits must include the tanker operations for exporting oil and condensate.

*Note: Regulation 25 contains specific requirements for controls associated with connected pipelines (see Section 5.3).*

Provision of drawings

Drawings can enhance the description of a pipeline. The drawings provided should be sufficiently comprehensive and detailed to enable the Minister’s assessment, but need not contain all engineering details. A typical set of drawings could include:

- location map
- alignment charts
- piping and instrumentation diagrams
- major equipment and above-ground facilities layout
- fire and blast protection
- fire and safety equipment
- hazardous area drawings
- temporary refuge
- process schematic
- emergency shut-down logic.

Other drawings may be necessary to illustrate complex or novel designs but should only be included if required to provide an understanding of the system from a safety or structural integrity perspective.

Applicable standards

**Requirement for documenting applicable standards [r. 12]**

The safety case for a pipeline operation must specify the principal Australian and international standards apply in relation to the operation and plant used in connection with the operation.

Nomination of standards for the design, construction, testing, maintenance and operation of a pipeline is required. The licensee should take care to justify the applicability of the standards and recognise any limitations. AS 2885 is the dominant standard governing pipeline operations because compliance with this standard introduces compliances with many other standards.

The descriptions of systems, plant and equipment in the facility description should refer to the standards that have been applied so the specified standard is seen in context. Simply providing a list of standards without discussing their application does not demonstrate the appropriateness of the control measures to which they apply.

References to the standards nominated should include the version or edition and year or publication for external design standards or internal design philosophies. Alternatively, licensees may maintain components of the pipeline to the most recent standard and this should be stated in the safety case.
Performance standards

Although the SMS is required to specify the performance standards that apply (see Section 5.1), it is recommended that specific performance standards be referenced where appropriate in the facility description, particularly where a physical control that prevents or mitigates a potential major accident event has been described.

3.3 Activities, machinery and equipment

General considerations

Activities

Requirement for details about pipeline operations [r. 10(2)(a)]

The description of the pipeline operation must give details of the operation.

A pipeline operation has a broad definition that includes activities connected with the construction, operation, inspection (by a person other than an inspector), maintenance, repair, alteration and reconstruction or decommissioning of a pipeline, and carried out within the licence area [r. 4; Petroleum Pipelines Act, Schedule 1]. The safety case should list all the activities likely to take place over the stages for which it is being submitted. The list must be specific and the licensee must try to anticipate the various work activities that might reasonably be expected. This means the safety case must not only describe the functions for which the pipeline is designed, but also any unplanned, unusual or contingency activities that might be reasonably expected during operations.

A safety case that addresses all reasonably foreseeable activities limits the need for future revisions. The formal safety assessment must also give due consideration to the potential for major accident events.

If the safety case does not cover a particular activity that may cause a major accident event, that activity cannot be conducted until the safety case in force addresses it.

Upgrades and modifications

Licensees should consider the potential for upgrading or modifying the pipeline while in operation — that is, construction activities during operation. This is not necessary if there is no possibility for laterals or additional meter stations to be introduced to the pipeline. However, such activities should be included for a new pipeline or during a safety case revision if such works are possible in the next five or so years. If they are not described in the safety case that is in force, the licensee must prepare and submit a revision to the safety case.

For pipelines with many existing or potential off-takes, the licensee must have an established process to install additional off-take facilities that is covered in the SMS description. To allow future off-takes to be included in the current safety case, the activities involved in the upgrade or modification must also be included in the facility description. That is, there needs to be a provision to add descriptions so they can be included in a revised safety case.

The need to incorporate these potential activities into the facility description is limited to pipelines that the licensee intends to upgrade or modify regularly.

Note: This guidance regarding upgrade and modification relates to safety cases only. It does not satisfy the requirement for pipeline licence variations. When contemplating upgrades or modifications, the licensee should consult the current requirements for licensing.

Machinery and equipment

Requirement for specification of machinery and equipment [r. 17(1)]

The safety case for a pipeline operation must specify the principal equipment required for the operation (including process equipment, machinery and electrical and instrumentation systems) that relates to, or may affect, the safety or health of persons engaged in the operation or other protected persons.

The facility description must specify any equipment required on the pipeline that may affect safety at or near the pipeline. This is one of the fundamental purposes of the facility description, which is to provide all the factual information necessary to gain an understanding of the activities associated with the pipeline.
If machinery and equipment that could introduce hazards are not appropriately described within the safety case, they cannot be used until there is a safety case in force in which they are appropriately addressed. The safety case must be revised and re-submitted to assure the Minister that the pipeline, as described in the safety case, incorporates the necessary measures to protect the health and safety of people at or near the pipeline.

**Requirement for appropriate equipment [r. 17(2)]**

Without limiting subregulation (1), the safety case for a pipeline operation must contain evidence showing that the required equipment is fit for its function or use —

(a) in normal operating conditions; and

(b) in an emergency (to the extent that it is intended to function, or be used, in an emergency).

The facility description must describe the design and operating envelope for pipeline systems and the physical systems in place to ensure that the design envelope is not breached or, if it is, that the situation can be brought under control. The requirements of regulation 17 are also linked to the performance standards required under regulation 10(4)(k) (see Section 3.2). Licensees may wish to conduct survivability studies for key equipment and systems to provide evidence that the requirements of regulation 17(2)(b) are met (see Section 4.6).

### 3.4 Technical and other control measures

**General considerations**

**Requirement for control measures [r. 10(2)(c)]**

The description of the pipeline operation must give details of the measures identified as a result of the formal safety assessment as mentioned in subregulation (3)(c).

The facility description must describe the technical and other control measures, and should include details of their operation and design.

The regulations do not specify the level of detail required for each control within the facility description, but it should be sufficient to determine that the control will either eliminate or mitigate the risk for which it was identified.

The content and level of detail should be sufficient to gain an appreciation of the control measures identified in the formal safety assessment and, in general, should include:

- types of equipment used;
- specification of the individual elements;
- location of the equipment;
- activation — under what conditions the various elements of the system are activated and how are they activated (e.g. automatically, manual activation of emergency shutdown, local manual activation); and
- conditions limiting the reliability or use of the equipment.

Special cases or unusual arrangements, including interdependencies among control measures, should be discussed.

*Note: Procedural control measures should be described in the SMS (see Chapter 5).*
Fire and explosion related systems

The following considerations may contribute to the emergency survivability analysis, which is used to demonstrate the suitability of equipment identified in the fire and explosion analysis (see Section 4.6):

- loss of containment prevention
- detection systems (e.g. fire, gas, smoke)
- ignition prevention (e.g. hazardous area equipment, shutdown on gas detection)
- flammable atmosphere prevention (e.g. layout, congestion, ventilation)
- fire and explosion protection – both passive and active (e.g. structural coatings, deluge, water curtain, water mist, CO2, portable fire extinguishing equipment)
- emergency shutdown, blowdown, depressurisation and isolation
- pipeline isolation

Escape, evacuation and rescue

The following considerations are covered by the outcomes of emergency response analysis (see Sections 4.6 and 5.3):

- escape routes
- muster points
- temporary safe refuges
- communications systems.

Chain of responsibility

Requirement to identify the persons in the chain of responsibility [r. 13(3)(c)]

The safety case for a pipeline operation must describe, in detail, the means by which a licensee for the operation will ensure that, as far as is reasonably practicable, the identity of the persons who hold each office or position, and the chain of responsibility can, at all times, be readily ascertained by any person engaged in the operation.

The safety case must provide a description of the command structure that allows people involved in any pipeline operation to identify who is currently fulfilling each position in the command structure. The facility description is an appropriate location for the description of how personnel find out who is in charge of operational and emergency situations. The chain of responsibility is discussed further in Section 5.2.

Emergency communication systems

General requirement for emergency communications systems [r. 22(1)]

The safety case for a pipeline operation must provide for communications systems that, in the event of an emergency, are adequate for communication between the relevant areas of the operation including transport and other support facilities.

Specific requirements for emergency communications systems [r. 22(2)]

In particular, the safety case for a pipeline operation must provide for the communications systems for the operation to be –

(a) adequate to handle a likely emergency; and
(b) protected so as to be capable of working in an emergency to the extent specified by the formal safety assessment for the operation.

The facility description must provide a description of the emergency communication systems, and should include details of their operation and design. The content and level of detail should be sufficient to gain an appreciation of the control measures identified in the formal safety assessment. The types of communication systems could include:

- radio (e.g. VHF, UHF, GMDSS)
- satellite
- internal telephone and public address
• data
• voice over internet protocol (VOIP).

The regulations also require that protection arrangements for emergency communication systems are described. The description must be consistent with the requirements specified in the formal safety assessment. The information must be appropriate to the pipeline and attendant activities, and could address:

• provision of independent systems (fixed and/or portable)
• redundancy of systems (internal and external)
• passive and active protection
• location and extent to which the location provides protection to the system.

**Emergency control systems**

<table>
<thead>
<tr>
<th>Requirement for emergency control systems [r. 23]</th>
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<tr>
<td>The safety case for a pipeline operation must make adequate provision for the operation in the event of an emergency, in respect of –</td>
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<tr>
<td>(a) back-up power supply; and</td>
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<tr>
<td>(b) alarm systems; and</td>
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<tr>
<td>(c) isolation and emergency shutdown systems.</td>
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</table>

The facility description must describe the above control systems, and should include the operation and design data. The content and level of detail should be sufficient to gain an appreciation of the control measures identified in the formal safety assessment. The information must be appropriate to the pipeline and attendant activities, and could address:

• redundancy
• black start capabilities
• battery-powered capabilities
• emergency power distribution (including what equipment is on the emergency switchboard)
• utility systems reliance and reliability.
Isolation

Requirement to isolate from connected pipelines during an emergency [r. 25(1)]

The safety case for a pipeline operation concerning a pipeline (pipeline A) that is –
(a) connected to one or more other operational pipelines or facilities; or
(b) proposed to be connected to one or more other operational pipelines or facilities, must specify adequate procedures for shutting down or isolating, in the event of an emergency, each pipeline or facility connected to pipeline A, so as to stop the flow of hazardous substances through the pipeline.

Specific requirements of isolation measures [r. 25(3)]

The procedures specified in the safety case must include –
(a) effective means of controlling and operating all relevant emergency shutdown valves for a pipeline or facility; and
(b) a fail-safe system of isolating a pipeline in the event of failure of other safety devices for the pipeline or facility.

The safety case must describe pipeline risk mitigation controls, and should include details of their operation, design data, and inspection and testing frequencies of emergency shutdown valves. The content and level of detail should be sufficient to gain an appreciation of the control measures identified in the formal safety assessment. The descriptions are best placed in the facility description, with information appropriate to the pipeline and attendant activities, such as:

• emergency shutdown arrangements
• main line isolation valves
• failure states of valves involved in isolating sections of the pipeline
• details about how valves involved in isolating section of the pipeline are activated
• planned inspection schedules.

Structural integrity

To comply with regulation 18 (see Section 2.7), the physical systems that either maintain or monitor structural integrity should be described in the facility description. These are the controls identified in the integrity management plans and threat assessments required under AS 2885. For example, cathodic protection and external coatings descriptions should capture their role in managing the integrity of the pipeline.

3.5 Common weaknesses in facility descriptions

The most common weaknesses in facility descriptions are:

• inclusion of vague statements, rather than specific facts about the pipeline;
• lack of alignment with the formal safety assessment;
• inclusion of assertions, independent of the risk assessment, about the overall acceptability of the pipeline design features;
• provision of too much operational detail so the currency of the document is difficult to maintain;
• discrepancies in facts provided;
• discrepancies between written descriptions and figures or drawings;
• poor cross-referencing within the document;
• lack of review or quality assurance processes; and
• illegible drawings or figures.
FORMAL SAFETY ASSESSMENT DESCRIPTION

4.1 General considerations
4.2 Hazard identification
4.3 Risk assessment
4.4 Control measures
4.5 The ALARP argument
4.6 Safety measures
   Fire and explosion risk analysis
   Emergency response plan
   Isolation
   Survivability studies
   Structural integrity
4.7 Supporting documentation
4.8 Common failings in formal safety assessment
   Insufficient detail
   Too much detail
   Hazard identification stage
   Risk assessment stage
   Control measure identification
   Evidence of ALARP
4  Formal safety assessment description

4.1  General considerations

The formal safety assessment description in the safety case describes the methodologies employed and summarises the results, providing a list of potential major accident events and their controls. The descriptions of the controls must then be included in the facility description or the SMS description, as applicable.

The steps for developing a safety case are integrally linked and the process is not strictly linear, with some steps overlapping. For example, identifying and assessing control measures applies across all areas of the formal safety assessment process, as shown in Figure 3.

Because of this overlap, it is particularly important to organise and construct linkages through the process. This is best done at the hazard identification phase, as this phase sets the scene for the later steps of formal safety assessment development. Getting the structure right in the early stages will enhance a licensee’s ability to present evidence in a robust way that others can follow and understand.

When determining the types of hazard identification and risk assessment techniques to use, the International Standard ISO/IEC 31010:2009 Risk management – Risk assessment techniques details what should be considered and the benefits of various techniques.

Before the Management of Safety Regulations were introduced, the following risk assessment techniques were typically used for petroleum pipelines:

- hazard and operability studies (HAZOP) – to identify hazards and determine control measures for hydrocarbon transmission or processing;
- hazard analysis (HAZAN) or hazard identification (HAZID) studies – to identify the hazards, assess the risks and determine controls for risks associated with constructing, operating and maintaining the pipeline;
- AS 2885 safety management study – to identify threats to pipelines, assess the risks and determine controls to prevent or mitigate those threats; and
- quantitative risk assessment (QRA) – to quantify the risk of the pipeline, principally to ensure public risk is not excessive.

The emphasis in the Management of Safety Regulations is now on qualitative or team-based risk assessment methods such as HAZOP, HAZAN, HAZID and AS 2885 safety management studies, with each playing a role in identifying, assessing and determining remedies for major accident events. However, there is still value in quantifying consequence and risk. For example, the AS 2885 safety management system requires the quantification of consequences under section 2.3.4.3. Also, quantification of potential failures for the remaining workshop-based risk assessments may assist those less familiar with the consequences of pipeline failure.
The regulations do not require a QRA for land-use planning or to ensure the pipeline operation does not impose an unreasonable risk for the public. However, under Schedule 1, clause 7(1) of the Petroleum Pipelines Act 1969, there is a duty of care for other protected persons, including the public. A QRA using criteria established for land-use planning, such as the Environmental Protection Authority’s Guidance for the assessment of environmental factors, No. 2 Guidance for risk assessment and management: off-site individual risk from hazardous industrial plant, published in July 2000, could be used to demonstrate that the pipeline is designed such that the risk to public is ALARP.

Note: A QRA finding the risk imposed on the public is ALARP is not sufficient to comply with the duty of care to other protected persons, as this includes visitors to petroleum pipeline operations. Inclusion of other protected persons in the workshop-based assessment methods would be needed.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Hazard identification</th>
<th>Risk assessment</th>
<th>Control measures</th>
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<tr>
<td>Identify hazards and causes</td>
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<td>Assess likely consequences and frequency of each hazard without assessing controls in place</td>
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<tr>
<td>Identify major accident events</td>
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<td>Identify existing control measures</td>
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<td>Conduct the initial risk assessment to assess the level of risk posed by each major accident event, taking existing controls into account</td>
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<td>Identify potential additional controls</td>
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<tr>
<td>Assess adequacy of controls for each major accident event</td>
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<tr>
<td>Ensure all practicable steps to reduce risk associated with each major accident event have been considered</td>
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<td>Identify and select potential additional controls</td>
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<td>Conduct the final risk assessment – assess the level of risk posed by each hazard, assuming improvement actions are in place</td>
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<tr>
<td>SHOW RESIDUAL RISK ALARP</td>
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<tr>
<td>Prepare performance standards and ensure procedures and audits are in place</td>
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**Figure 3**  Schematic diagram showing formal safety assessment process
4.2 Hazard identification

Licensees must apply appropriate hazard identification techniques to identify all major accident events that could occur. In most cases a combination of techniques will be required. The methodologies employed should be described.

The hazards should be described in enough detail to allow differentiation between their impacts on different parts of a pipeline operation. That is, there must be sufficient links between hazards and a major accident event to show the paths by which a major accident event could be realised. Those hazards applying to many aspects or areas of a pipeline (e.g. corrosion of pipework) may be grouped where appropriate. However, the hazards should be detailed separately where their control measures differ.

For any incident, there may be several independent hazards or combinations of hazards that could result in that incident, as well as several control measures that may be particularly critical because they impact one or more of those hazards. The description for the formal safety assessment should give an understanding of the likelihood of each incident, and the relative importance of each hazard and control measure. In addition to major accident events, the formal safety assessment should also cover potential fire and explosion events, as discussed in Section 4.6. The licensee may consider using a matrix, such as that required by AS 2885, to show these inter-relationships.

A key output of hazard identification is the documentation, such as a hazard register, listing all potential major accident events and hazards, as well as the underlying causes, levels of risk of the control measures, and any assumptions. This documentation should contain sufficient information to support the later steps of the safety case development, which will be especially important in cases where:

- the complexity of a particular hazard is high;
- there is uncertainty as to the underlying causes of an incident;
- there is little or no operating experience in relation to the identified hazard; or
- the potential consequences of the identified major accident event are high.

For most pipelines, the hazard register is a very detailed document and should not be included in the body of the safety case. However, the information that is contained in the safety case must:

- identify all major accident events that could occur in association with the pipeline operation (irrespective of likelihood or existing control measures);
- provide evidence that the licensee and workforce have sufficient knowledge, awareness and understanding of the causes of major accident events to be able to prevent and deal with emergencies;
- provide a basis for identifying, evaluating, defining and justifying the selection (or rejection) of control measures for eliminating or reducing risk;
- show clear links between hazards, causes and potential major accident events; and
- provide a systematic record of all identified hazards and major accident events, together with any assumptions made.

There is potential for conflict between the requirements of regulation 10(3) and AS 2885.1. The Australian Standard allows threats to the pipeline to be recorded only, and does not require controls if “the frequency of occurrence is so low that it does not exist for any practical purpose at that location”. It also does not require a risk assessment for those threats that can be controlled to prevent failure. However, it is possible that, following the application of AS 2885, threats that do not need controls or risk assessment, will be major accident events.

The regulations require all major accident events be assessed for severity and frequency, and for adequate controls to be determined and implemented. There is no allowance for an extremely low probability of occurrence to be used to exclude a major accident event from needing controls or risk assessment. Nor is there an allowance for major accident events to be excluded from risk assessment where existing controls are believed to prevent failure. To ensure legislative compliance, the test for a potential major accident event should be done early, so that if a hazard is a potential major accident event it is not discarded through the process outlined in the Australian Standard.

Note: When identifying potential hazards, some may be outside the combined experience of the personnel involved and therefore not recognised. Other sources of information to consider include industry and government safety bulletins, information from observational hazard reporting, and investigations of the operation by Resources Safety officers.
4.3 Risk assessment

The risk assessment not only provides an important link between the identified hazards, the adopted control measures and the demonstration of ALARP within the safety case, it is also a means of generating an understanding and knowledge of the risks.

Whichever approach is used, it must be detailed and systematic. “Detailed” is taken here to mean that the risk assessment identifies all hazards, potential major accident events, and the parts of the pipeline that would be affected by them (which will have been identified in the hazard identification), and must address all aspects of risk for each hazard and incident (e.g. nature, likelihood, consequence). The requirement to be systematic relates to the need to compare the range of incidents and identify which are the most important contributors to the overall risk profile of the pipeline.

The risk assessment should use those methodologies (quantitative, qualitative, or both) that are appropriate for the hazards being considered. This means that the tools employed should be selected according to the nature of the risk. A tool that does not address any variability and uncertainty in the nature of the hazards and incidents identified will not generate the necessary understanding, nor provide the basis for differentiating (and selecting or rejecting) control measures.

Regardless of the methodologies employed, licensees must clearly understand and describe the uncertainty present in the risk assessment. Uncertainty cannot be eliminated, and it will be necessary to make assumptions in some areas. In the context of the safety case, the keys to understanding the uncertainty and managing it are to:

- record any assumptions made, and the basis for the assumption;
- explicitly recognise the main gaps or uncertainties; and
- seek to reduce the level of uncertainty (e.g. test assumptions, conduct more detailed studies).

Testing existing assumptions may trigger revision of the safety case (see Section 6.2) if the assumptions are no longer valid and the technical knowledge used to evaluate the risk is outdated [r. 32(1)(a)]. These aspects should be clearly described in the safety case. Where the level of uncertainty is high, licensees should consider using a sensitivity analysis to test the robustness of the risk assessment results against variations within the key areas of uncertainty.

When developing risk criteria, the licensee should consider how the results of identifying significant new, or increases to existing, safety or health risks will be flagged. Such changes in the risk profile may require the suspension of pipeline operations until the risk is managed [r. 6(a)] or trigger revision of the safety case [r. 32(2)].

If risk criteria are used in the assessment process, licensees need to justify the selection of the risk criteria and show a clear linkage between the criteria and the arguments made that the adopted controls are appropriate to reduce risk to a level that is ALARP.

It is important that the safety case shows that the risks associated with each hazard are considered both individually and cumulatively. Consequently, the demonstration that the risks are eliminated or reduced to ALARP may need to be made for control measures individually, in groups and as a whole, as discussed below.

- The effects of several hazards occurring in combination must be considered (i.e. any chain of events, causes and contributing factors leading to an incident). In relation to this, the licensee must consider the possibility of common mode failure mechanisms that can cause several hazards or failures to occur simultaneously, significantly increasing the chances of a major accident event.
- For any major accident event there may be several independent hazards or combinations of hazards, each of which could lead to that event, and several control measures that may be particularly critical because they may impact on one or more of those hazards. The risk assessment should give an understanding of the likelihood of each major accident event and the relative importance of each hazard and control measure.
- The potential for escalation of major accident events needs to be considered (i.e. the cumulative consequences of apparently separate events, which may be triggered by each other).
- A pipeline will typically have a range of hazards and potential major accident events. Both the highest risk events and the overall profile of risks from all of these incidents must be determined, in order to understand which are the most important overall contributors to the risk profile, and whether overall risks are adequately controlled.

Overall, the information that is contained in the safety case with respect to risk assessment must provide evidence that:

- the risk assessment addresses all potential major accident events and hazards that could cause or contribute to causing those major accident events;
- the risk assessment supplies the information necessary to determine which control measures to adopt and the necessary functioning of the SMS with regard to major accident events;
- the risk assessment is detailed, systematic, rigorous and transparent;
- an appropriate group of members of the workforce is actively involved;
• the assessment is kept up to date, through necessary processes of review and revision;
• the information is provided to those who require it in order to work safely, and respond and react appropriately during an emergency; and
• the risk assessment is used as a basis for adoption of control measures, including emergency planning.

Major accident events should be assessed in a consistent manner and, as far as possible, using a common methodology. In this way the measure of risk will be expressed in common terms and the licensee will be better able to make meaningful comparisons and objective decisions about the allocation of resources for risk reduction.

4.4 Control measures

As discussed in Chapter 3, the physical description of plant and equipment indentified in the formal safety assessment should be covered in the facility description section of the safety case and not repeated in the formal safety assessment section. The formal safety assessment should cross-reference the appropriate facility description section. Similarly, the formal safety assessment section should cross-reference the SMS section of the safety case for detailed descriptions of procedural controls, as discussed in Chapter 5.

The identification of technical and other control measures that are necessary to reduce the risk to ALARP should include discussion of the selection of control measures (including how they contribute to reducing the risks), those considered and rejected, and the reasons for not adopting them.

In relation to technical control measures, the safety case should:
• provide evidence that control measures and their effects on risks are explicitly addressed;
• provide evidence that a range of control measures has been considered, including existing and potential new control measures;
• include sufficient detail to describe the circumstances in which control measures will be effective, including any associated limitation. For example, a deluge system may only be suitable and effective for certain fire scenarios. It may be the limitations of the control measures that most influence the emergency response to any given scenario so it is important to have a good understanding of any shortcomings;
• include discussion on the robustness of control measures, such as fault tolerance or safety integrity levels where appropriate;
• include sufficient detail of the main steps in the description of procedural controls to describe how the process contributes to reduction of risk; and
• reference applicable standards, including performance standards.

The regulations require the licensee to commit to ongoing improvement of all aspects of the SMS. Further, the regulations require the licensee to implement control measures that reduce risks to ALARP (see Figure 4). During the assessment process, the Minister will consider whether the licensee has made practicable improvements to address all safety issues identified during preparation of the safety case.

![Figure 4](image-url) Reduction of level of risk to ALARP and continuous improvement in safety through the development and implementation of the safety case
4.5 The ALARP argument

The concept of “reasonably practicable” is central to the safety case regime. It allows licensees and the Minister to establish goals for safety performance, rather than being prescriptive. Determining whether a measure is reasonably practicable requires the licensee to weigh the benefit of removing or reducing risk against the cost, time and difficulty of doing so.

Descriptions within the formal safety assessment must provide evidence that the control measures reduce risk of major accident events to a level that is ALARP [r. 10(3)], and that the SMS provides the mechanism for reducing occupational safety and health risks to ALARP [r. 10(4)(f)].

There is no prescribed methodology for demonstrating that the necessary control measures have been identified to reduce risks to ALARP. However, basic approaches to support a licensee’s provision of justification within the safety case include:

- case law
- risk acceptance criteria
- comparative assessment of risks, costs and benefits
- comparison with recognised codes and standards
- benchmark against good practice
- best available technology
- technical analysis
- clear description and justification for rejection of control measures
- performance
- layers of protection analysis (LOPA)
- engineering judgement approach
- practical tests.

In practice, most pipelines will require a combination of approaches.

The Minister will evaluate the licensee’s approach to achieving a level of risk that is ALARP in terms of its robustness, transparency and appropriateness to the pipeline. The licensee should therefore define the underlying rationale, criteria and decision-making basis used.

The description must be convincing and should state all assumptions made and conclusions drawn. Where appropriate, it should present the results of supporting studies. It should also provide evidence that the process was systematic and within a fixed and pre-established scope. Finally, the degree of analysis in support of the demonstration of ALARP should be proportionate to the risk and to the complexity of the pipeline, hazards, control measures and risk criteria used by the licensee.

4.6 Safety measures

Many types of risk study can be carried out in support of a safety case (e.g. survivability studies, human factors, dropped object analysis) but the regulations have specific requirements. Licensees should not provide copies of individual risk studies within the safety case, but should describe how the analyses were conducted, what systems are in place, and summarise the key results.

Fire and explosion risk analysis

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<thead>
<tr>
<th>Requirement for fire and explosion risk analysis [r. 21(1)]</th>
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<tr>
<td>The safety case for a pipeline operation must contain a detailed description of a fire and explosion risk analysis.</td>
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</table>

It is recommended that the fire and explosion risk analysis be described in the formal safety assessment.
Fire and explosion risk analysis contents [r. 21(2)]

The description of a fire and explosion risk analysis in a safety case for a pipeline operation must —

(a) identify the types of fires and explosions that could occur during the operation; and
(b) consider a range of measures for detecting those fires and explosions in the event that they do occur; and
(c) consider a range of measures for eliminating those potential fires and explosions, or for otherwise reducing the risk arising from fires and explosions; and
(d) consider the incorporation into the operation of both automatic and manual systems for the detection, control and extinguishment of —
   (i) outbreaks of fire; and
   (ii) leaks or escapes of petroleum; and
(e) consider a range of means of isolating and safely storing hazardous substances, such as fuel, explosives and chemicals, that are used or stored in connection with the operation; and
(f) consider the evacuation, escape and rescue analysis, in so far as it relates to fires and explosions; and
(g) identify, as a result of the above considerations, the technical and other control measures necessary to reduce the risks associated with fires and explosions to a level that is as low as is reasonably practicable.

The analysis of fire and explosions may be a separate study or the licensee may collate information from existing sources, such as AS 2885 safety management studies, and HAZID and HAZOP workshops.

The types of fire and explosions that could occur must be identified [r. 21(2)(a)], and can be broadly categorised for assessment. The categories should cover the range of releases, such as leaks, holes and ruptures.

The fire and explosion analysis need not be a quantitative risk assessment to comply with the regulations but a quantitative analysis of the consequences may be helpful in considering separation distances from hazardous substances [r. 21(2)(e)], defining escape routes [r. 21(2)(f)] and as input to survivability studies (see below).

The fire and explosion risk analysis must demonstrate the suitability of the preventative measures, detection methods, mitigation measures and escape and refuge for each type of fire or explosion. The content and level of detail should be sufficient for the Minister to gain an appreciation of the scope and process of the analysis, including data sources and the rationale for excluding or discounting items from consideration.

Emergency response plan

Requirement for emergency response plan and its implementation [r. 24(1)]

The safety case for a pipeline operation must —

(a) describe a response plan designed to deal with possible emergencies, the risk of which has been identified in the formal safety assessment for the operation; and
(b) provide for the implementation of that plan.

The emergency response plan description must provide enough information to assure the Minister that all the requirements of the analysis, as given in regulation 24, have been met. The information must be appropriate to the pipeline and attendant activities, and address all potential major accident events.

The plan must describe the practical steps for achieving safety following an accident. It should show that there are performance measures in place that are testable during emergency drill exercises. It is a regulatory requirement to undertake emergency response training drills at a sufficient frequency [r. 24(2) and (3)] and a schedule of emergency exercises must be included. When determining the schedule the licensee should consider:

- the number and type of events covered by the emergency response plan;
- the need to test each performance indicator as often as possible; and
- staff turnover.
Isolation

**Requirement to mitigate against risk from connected pipelines [r. 25(4)(a)]**

The safety case for a pipeline operation must also specify adequate means of mitigating, in the event of an emergency, the risks associated with each pipeline or facility connected to the pipeline.

In addition to considering isolation of connected pipelines and other facilities, isolation assessment is required by pipeline standard, AS 2885.1. It is recommended that the isolation plan requirements of AS 2885.1 be used to cover the risks associated with connected pipelines and other facilities.

Survivability studies

To ensure that reliable systems are in place to mitigate, and manage an emergency, the regulations require an analysis of systems in place during and after an emergency. The safety case must provide an assessment of these systems against emergency scenarios. The survivability studies are best described in the formal safety assessment.

**The systems for which the regulations require survivability analysis are:**

- principal equipment required for the operation that relates to, or may affect, the safety or health of persons engaged in the operation or other protected persons; [r. 17]
- communications systems required to function during and after an emergency; [r. 22]
- back-up power supply; [r. 23(a)]
- alarm systems; [r. 23(b)]
- isolation and emergency shutdown systems; [r. 23(c)] and
- measures to isolate from connected pipelines and petroleum facilities. [r. 25]

Procedural requirements and people’s actions also need to be tested for emergencies. The survivability test is usually achieved by running mock exercises. If a licensee proposes different methods, these will be reviewed during assessment of the safety case.

**The regulatory requirements for competencies and procedures that must be effective during or post emergency are:**

- the skills and competency of the emergency coordinator [r. 13];
- work force competency during an emergency [r. 14];
- emergency procedures [r. 24];
- procedures involved in isolating from connected pipelines and petroleum facilities [r. 25].

For the first version of a safety case for a pipeline, exercises testing emergency procedures may not have taken place. In this situation, it is sufficient to provide an explanation of how these procedures are expected to work, when such exercises are scheduled and where the resulting reports will be available.

Structural integrity

The formal safety assessment description is the logical place for structural integrity assessments (see Section 2.7). The regulatory requirement for structural integrity [r. 18] would be satisfied by meeting the requirements of AS 2885.

### 4.7 Supporting documentation

Hazards to the safety or health of people engaged in the pipeline operation and other protected persons are managed through the systems described in the SMS description [r. 10(4)(f)]. Although there is no direct regulatory requirement for these hazards to be listed in a register within the safety case, their inclusion would show that accident events were identified from an exhaustive list of hazards and demonstrate that all potential major accident events have been identified [r. 10(3)(a)]. It would also provide evidence of the mechanisms described in the SMS for identifying and managing occupational safety and health hazards [r. 10(1)(c)].
4.8 Common failings in formal safety assessment

Failings in the formal safety assessment can be specific, such as not covering a specific regulation, or broad, such as inconsistent application of risk management.

They include:

- inadequate links to the facility description and layout drawings;
- not addressing all the expected activities at the pipeline;
- not considering potential organisational failure — an effective safety case considers the organisation as a whole, not just the operational engineering aspects, in determining the causes of hazards and risk control strategies. Many safety cases are excessively focused on engineering hardware and systems;
- an assessment comprising separate studies that are weakly linked;
- inadequate links between hazards, risks, control measures and the SMS — since the management system controls risks, the links between the hazards, main risk contributors and measures in place to control them must be detailed and explicit. Some safety cases make very general statements about how risks are controlled, and do not provide links between the formal safety assessment and the SMS; and
- failure to adequately demonstrate that risk is ALARP for major accident events.

Insufficient detail

It is not sufficient to simply list various HAZID and HAZOP workshops held and indicate that the outcomes from these workshops have been addressed. Likewise, it is not sufficient to simply indicate that a risk study will be conducted, other than where these relate to everyday risk assessment tasks such as job safety analysis, job hazard analysis and permits to work.

Too much detail

It is not appropriate to include all of the risk studies in full within the safety case. However, a summary of a risk study within the formal safety assessment must include:

- details of personnel involved in the risk study, clearly demonstrating involvement by members of the workforce (where appropriate) and involvement of personnel with experience and knowledge appropriate to issues being considered; and
- a description of the major outcomes of the risk study, including identification of hazards with the potential to lead to major accident events, and control measures considered and adopted to achieve ALARP or lower levels of risk.

Although a summary of a risk study within a formal safety assessment can identify actions to be completed, it must also address how these items will be appropriately completed before commence operations.

In summary, the description of the formal safety assessment should include a level of detail sufficient for the safety case to be a stand-alone document.

Hazard identification stage

Concerns would be raised about the hazard identification stage for:

- not considering human error as a potential cause of hazardous events;
- failing to consider the hazardous events that may arise during maintenance;
- assuming that events that have never occurred cannot occur; or
- assuming that major accident events are no longer considered major accident events if appropriate risk control measures are in place (e.g. jet fire impinging control room at compressor station).
Risk assessment stage

Concerns would be raised about the risk assessment stage if:

- the risk was underestimated by assuming that all risk control measures function perfectly;
- the results of supporting studies were not presented, where appropriate;
- the description did not provide evidence that the process was systematic (i.e. followed a fixed and pre-established scope);
- there was no evidence that a range of measures for risk reduction had been considered in the fire and explosion analysis; or
- there was no evidence that a range of measures for risk reduction had been considered in the evacuation, escape and rescue analysis.

Control measure identification

There would be concerns about the control measures selected if:

- only trivial or inappropriate risk reduction measures were considered for implementation — risks are not considered to be ALARP until they have been subjected to the ALARP process, which means that additional risk controls must be identified if possible and considered explicitly; and
- there was insufficient workforce involvement — the safety case must address risk controls in the context of working conditions on the pipeline, including the implementation of the SMS, and workforce involvement is essential for this to be effective.

Evidence of ALARP

The demonstration that risk is ALARP would not be accepted if:

- no justification is provided (i.e. licensee has not defined the underlying rationale, criteria and decision-making basis for the case);
- the description is not convincing (i.e. rationale for deciding the completeness of the hazard identification and adequacy of the control measures employed is not supported and accompanied by all assumptions made and conclusions drawn);
- the licensee’s approach to providing evidence is not robust or transparent and appropriate to the pipeline;
- the degree of analysis in support of the demonstration is not proportionate to the risk and to the complexity of the pipeline, hazards and control measures;
- there is an over-reliance on quantitative risk assessment results to show that risks are ALARP, or it is argued that ALARP is achieved because the quantitative risk assessment gives numerical results below a certain number — an argument showing that risk is ALARP requires a broad consideration of risk and safety management issues, not just a numerical calculation; and
- there is an over-reliance on codes and standards as evidence that risks are ALARP — codes and standards are important in managing risk as they represent industry knowledge in order to prevent past accidents from being repeated. However, the role of the safety case is to minimise the potential for all incidents, including those that have not occurred previously and those unique to a particular site or pipeline. Compliance with codes and standards alone cannot address risk management for the full range of things that might go wrong.
5 SAFETY MANAGEMENT SYSTEM DESCRIPTION

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5.1 General requirements

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<th>Requirement for safety management system [r. 10(1)(c)]</th>
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<tr>
<td>The safety case for a pipeline operation must contain a detailed description of the safety management system that provides evidence that the system complies with subregulation (4).</td>
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The safety case must describe the major aspects of the SMS and explain how they contribute to reducing risks at the pipeline. The description should summarise processes specific to the pipeline operations that are in place, or will be in place, such as:

- training and competency
- communications
- hazard identification and risk assessment
- management of change
- permit to work
- inspection, testing and maintenance
- evacuation, escape and rescue
- performance standards applied.

The description should demonstrate that the SMS is comprehensive and integrated, using examples where appropriate.

The safety case should also describe how the SMS will be implemented, and how deficiencies will be continually and systematically identified and addressed to achieve ongoing improvement. It should provide adequate linkages between the hazards identified in the formal safety assessment and the elements of the SMS used to control the risks from those hazards. Applicable SMS documents and performance standards should be referenced.

The content and level of detail should be sufficient for the Minister to gain an appreciation of the coverage and extent to which the elements of the SMS are logically linked. The information must be appropriate to the pipeline and attendant activities, and could include:

- a description of the overall structure of the SMS, including its hierarchical structure, dependencies and key system policies;
- interrelationships and dependencies between the various aspects of the SMS; and
- relationships between the elements of the SMS that address the operational envelope, local and regional areas, and corporate matters.

Example of insufficient coverage in SMS — no management of organisational change

A description of an SMS that includes a detailed description of how changes to hardware and processes are managed to ensure any new hazards are identified, risks assessed and appropriate control measures identified necessary to ensure risks are reduced to ALARP but provides no equivalent process organisational change.

Because both temporary and permanent changes in personnel or positions have a range of implications for the management of safety on a pipeline, this aspect of the SMS is unlikely to be considered adequate.

Example of insufficient coverage in SMS — no integration of contractor’s systems

A safety case for the simultaneous construction of looping and operation of an adjacent pipeline contains a description of the SMS that includes a detailed description of the existing operating pipeline’s SMS. However, it fails to describe the construction contractor’s SMS and, with respect to risk management and emergency response, discuss whether the contractor’s SMS has been reviewed and found to be appropriate.

Not describing the construction contractor’s SMS and the interface between pipeline and contractor operations can result in lack of clarity about roles and responsibilities for safety management. This SMS would not be considered adequate.
Scope of the SMS

Within the regulations there is no statement of scope for the SMS, although the scope is considerable given the specific regulatory requirements. The SMS must describe the hazard identification and risk management process, covered in Chapter 4, that will be implemented to minimise risk to those engaged in a pipeline operation and other protected persons. To achieve this, the SMS should consider all activities that may take place at the pipeline operation.

Where the risk management process identifies procedural controls, the SMS will include those procedures and therefore they must be included in the SMS description. There are also specific regulatory requirements for the SMS regardless of the result of the risk management process. These requirements provide for consistency across the State in some of the procedural controls expected for a pipeline.

Occupational safety and health hazards and risks

The SMS must provide for all hazards and risks to people at the pipeline, not just the risks of major accident events. While specific occupational safety and health risk control measures are not required to be presented in detail in the safety case, evidence must be provided to the Minister that the SMS for a pipeline meets the requirements of regulation 10(4). Licensees should therefore describe the systems in place for effective risk management of occupational safety and health hazards within the SMS description, such as how hazards are identified, analysed, evaluated, treated, communicated and monitored such that the risks are managed to a level that is ALARP. Licensees may provide specific practical examples, but the emphasis should be on the system description rather than the provision of detailed plans or procedures.

The licensees’ duties under Schedule 1 Clause 7(2)(i) of the Petroleum Pipelines Act 1969 include agreement on an occupational safety and health policy that will enable the licensee and workforce to develop measures to ensure safety and health at the pipeline. The policy includes providing adequate mechanisms for reviewing the effectiveness of measures to ensure safety and health. The policy must be available to the workforce and, although there is no regulatory requirement to do so, licensees may wish to include it within the safety case, which is the primary safety document for the pipeline.

Hazard identification and risk management

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<tr>
<th>Requirement for hazard identification and risk management [r. 10(4)]</th>
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<td>The safety management system for a pipeline operation must —</td>
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<td>(d) provide for the ongoing and systematic identification of hazards that have the potential to cause a major accident event</td>
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<tr>
<td>(e) provide for the ongoing and systematic assessment of the risk associated with each of those hazards, including the likelihood and consequences of each potential major accident event</td>
</tr>
<tr>
<td>(f) provide for the reduction to a level that is as low as is reasonably practicable of risks to the safety and health of persons engaged in the operation or other protected persons including, but not limited to, risks arising from equipment and hardware.</td>
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The SMS description must describe planned arrangements (e.g. policies, procedures) for hazard identification and risk management, including systems identified within the risk assessment as controls. The content and level of detail should be sufficient to gain an appreciation of hazard identification and risk management processes for all hazards.

The information must be appropriate to the pipeline and attendant activities, and could address:

- HAZID and HAZOP processes
- job safety analysis (JSA) and job hazard analysis (JHA) processes
- observational hazard identification programs
- qualitative and quantitative risk assessment processes
- risk reduction and control evaluation processes
- inclusion of non-major accident event examples (e.g. noise, fatigue, naturally occurring radioactive materials).

The licensee should demonstrate that by following the SMS, each major accident event has a cohesive set of control measures, and these are further defined in performance standards for each measure.

The risk assessment process will have identified various systems that aid in controlling, to ALARP, risks that affect the safety and health of people at the pipeline operation. Many of these procedures are not be addressed elsewhere in this publication, but it is a requirement that these procedural systems be described in the SMS [r. 10(4)(f)].
Inspection, testing and maintenance

**Requirement for inspection, testing and maintenance of physical controls [r. 10(4)(g)]**
The safety management system for a pipeline operation must provide for inspection, testing and maintenance of the equipment and hardware that are the physical control measures for those risks.

**Requirement for inspection and testing of isolation valves [r. 25(4)(b)]**
The safety case for a pipeline operation must also specify a frequency of periodic inspection and testing of pipeline emergency shutdown valves that can reasonably be expected to ensure that they will operate correctly in an emergency.

The SMS description must describe planned arrangements for inspection, testing and maintenance. The content and level of detail should be sufficient to gain an appreciation of inspection, testing and maintenance processes, and show that these processes encompass all physical controls determined through the hazard identification process.

The information must be appropriate to the pipeline and attendant activities, and could address:
- criticality and prioritisation
- planning
- maintenance management software
- pipeline emergency shutdown inspection and testing program.

Communications

**Requirement for communications [r. 10(4)(h)]**
The safety management system for a pipeline operation must provide for adequate communications between the relevant areas of the operation, including transport and other support facilities.

The SMS description must describe planned arrangements for communications. The content and level of detail should be sufficient to gain an appreciation of how the communication systems are effective in scenarios where they are required to act as risk-mitigating controls.

The information must be appropriate to the pipeline and attendant activities, and could address communication protocols for:
- simultaneous and combined operations;
- managing trucks offtaking petroleum from a facility on the pipeline; and
- liaison with connected pipelines.

Objectives of the regulations

**Requirement to meet objectives of regulations [r. 10(4)(j)]**
The safety management system for a pipeline operation must provide for any other matter that is necessary to ensure that the safety management system meets the requirements and purposes of these regulations.

The SMS description should describe planned arrangements for any other activities that could contribute to meeting the objectives of the regulations. The content and level of detail should be sufficient to gain an appreciation of such processes.

It should be recognised that this is a “catch all” requirement and a reminder to licensees to consider carefully the extent to which the case for safety effectively addresses all the objectives, notwithstanding the prescribed content and level of detail requirements imposed by the regulations.

Performance standards

**Requirement to specify performance standards [r. 10(4)(k)]**
The safety management system for a pipeline operation must specify the principal performance standards, established by a licensee for a pipeline operation, that apply to the performance of a system, item of equipment, or a person or procedure used as a basis for managing the risk of a major accident event connected with the operation.
The SMS description should describe planned arrangements for developing and setting performance standards for managing major accident events. The content and level of detail must be adequate to gain an appreciation of the processes that are applied.

The information must be appropriate to the pipeline and attendant activities, and could address:

- process for development of performance standards;
- structure and content, such as the extent to which the following aspects are considered
  - functionality
  - reliability and availability
  - survivability
  - maintainability;
- listing of performance standards;
- use of performance standards (e.g. linkages with inspection, testing and maintenance programs, emergency response plans); and
- examples of the content of selected performance standards (e.g. samples for both hardware-related and procedural controls).

A complete set of performance standards is not required as part of a safety case submission. However, as with the facility description, references to applicable performance standards should be explicitly included throughout the safety management system description.

Applicable standards

**Requirement for application of standards [r.12]**

The safety case for a pipeline operation must specify principal Australian and international standards that have been applied, or will be applied, in relation to the operation and plant used in connection with the operation.

As for the facility description (see Section 3.2), the SMS description should refer to the standards that have been applied. Simply listing standards without discussing the relevance of their application does not demonstrate the appropriateness of the control measures to which they apply. Licensees may choose to provide a consolidated list of applied standards in the document reference section but this list should not be included in the main body of the safety case.

Whichever standards are used, the licensee should take care to justify their applicability and recognise their limitations.

The primary standard for the design, operation and maintenance of a petroleum pipeline is AS 2885, and use of this Australian Standard is normally a condition for grant of a pipeline licence.

Ongoing integrity of control measures

**Requirement for means of ensuring ongoing integrity of control measures [r.43(3)]**

A revised safety case submitted under subregulation (1) must describe the means by which the licensee will continue to ensure that the pipeline, and the machinery, electrical systems and instrumentation controls used in the operation, are kept in good condition, free from damage or defect, and fit for purpose.

The SMS description should describe planned arrangements for ensuring the ongoing integrity of technical and other control measures for the pipeline operation. This requirement is specific to the five-yearly revisions of the safety case. The content and level of detail should be sufficient to gain an appreciation of SMS implementation processes.

The information must be appropriate to the pipeline and attendant activities, and could address the implementation and periodic review of:
- risk assessments
- performance standards and deviations from them
- manual override systems
- planned maintenance systems
- SMS audits
- safety and health reporting (e.g. incident and near-miss data)
- integrity surveys and inspections.
Safety and health duties

**Requirement for safety management system to include safety and health duties [r. 10(4)(a)]**

The safety management systems for a pipeline operation must contain a detailed description of how a licensee for the operation proposes to—

(i) comply with its duties under Schedule 1 Division 2 Subdivision 1 in relation to the operation; and

(ii) ascertain whether other persons comply with their duties under Schedule 1 Division 2 Subdivision 1 in relation to the operation, to the extent that it is practicable for the licensee to do so,

including details of the systems and procedures to be used for those purposes.

The licensee, those undertaking work on behalf of the licensee, and those supplying materials for pipeline operations have duties to fulfil in relation to safety and health.

The safety case is required to describe in detail how the licensee will achieve those duties and, to the extent practicable, how the duties of others will be accountable to the licensee. This description includes any systems and procedures that are used. Appendix 4 lists the applicable safety and health duties.

**Procedural controls**

**Specific occupational safety and health regulations that can be addressed in the safety case**

The regulations result in numerous requirements for procedures, as discussed elsewhere in this publication. Specific safety matters in the Petroleum Pipelines (Occupational Safety and Health) Regulations 2010 that can be addressed within the safety case are:

- fatigue [OSH regulation 28]
- drugs and alcohol [OSH regulation 29]
- prohibited hazardous substances [OSH regulation 31]
- exposure limits to hazardous substances [OSH regulation 32]
- exposure to noise [OSH regulation 33].

There is considerable overlap between the drug and alcohol requirements of regulation 19 of the Petroleum Pipelines (Occupational Safety and Health) Regulations 2010 and regulation 19 of the Management of Safety Regulations (see Section 5.2).

5.2 Safety measures

As well as the general content requirements for the safety case [r. 10, 11], there are specific content requirements [r. 12–20] that are more prescriptive. The SMS description appears to be the logical location for discussion of some of these safety measures but this is not a specific regulatory requirement. The licensee may find a better fit elsewhere in the safety case for these safety measures to be described.

In practice, all relevant matters discussed below could be addressed in the SMS in order to meet the requirement that the SMS is “comprehensive and integrated”.

Chain of responsibility

**Requirement for chain of responsibility [r. 13(1)]**

The safety case for a pipeline operation must specify—

(g) an office or position the holder of which, when on duty, is the person in charge of, and responsible for, the operation; and

(h) an office or position, the holder of which is responsible for implementing and supervising procedures in the event of an emergency; and

(i) the chain of responsibility that applies in the event of an emergency.
The SMS description should describe planned arrangements for the command structure. The content and level of detail should be sufficient to gain an appreciation of command structure management processes.

The same person may be both the person in charge and emergency controller [r. 13(2)].

**Specific requirements about the chain of responsibility [r. 13(3)]**

The safety case for a pipeline operation must describe, in detail, the means by which a licensee for the operation will ensure that, as far as is reasonably practicable –

(a) the offices or positions mentioned in subregulation (1) are continuously held while the operation is being carried out; and

(b) the person who holds each office or position mentioned in subregulation (1) has the necessary skills, training and ability to perform the functions of the office or position; and

(c) the identity of the persons who hold each office or position, and the chain of responsibility can, at all times, be readily ascertained by any person engaged in the operation.

The licensee is responsible for ensuring that the office or position of “person in charge” and “emergency controller” are held continuously while the pipeline operation is being carried out. These positions must be filled continuously while activities covered by the safety case in force take place, and the safety case must demonstrate how this will be achieved.

The licensee is also responsible for ensuring that the people holding these offices or positions have the necessary skills, training and ability to perform the associated functions. The safety case needs to demonstrate how this will be achieved, which could include:

- human resource processes (e.g. recruitment, retention)
- training and competency processes
- applicable job descriptions
- training and competency requirements for the positions.

The licensee must ensure that people engaged in a pipeline operation can readily find out who the person in charge and the emergency controller are, and the safety case needs to demonstrate how this will be achieved.

The information must be appropriate to the pipeline and attendant activities, and could include organisation charts for:

- emergency response
- pipeline and asset level
- corporate level.

**Workforce competency**

**Requirements for workforce competency [r. 14]**

The safety case for a pipeline operation must describe the means by which a licensee for the operation will ensure that each person engaged in the operation has the necessary skills, training and ability –

(a) to undertake routine and non-routine tasks that might reasonably be given to him or her –
   (i) in normal operating conditions; and
   (ii) in abnormal or emergency conditions; and
   (iii) during any changes to the operation; and

(b) to respond and react appropriately, and at the level that might be reasonably required of him or her, during an emergency.

The SMS description should describe planned arrangements to ensure workforce competency. The content and level of detail should be sufficient to gain an appreciation of workforce competency processes.

The information must be appropriate to the pipeline and attendant activities, and could address:

- recruitment and retention
- training and competency
- links with emergency response plans
- links with emergency drills and exercises
- compliance monitoring
- training and competency management software
- example records of
  - job descriptions
  - training and competency requirements.

**Permit to work**

<table>
<thead>
<tr>
<th>Requirements for permit to work systems [r. 15]</th>
</tr>
</thead>
<tbody>
<tr>
<td>The safety case for a pipeline operation must provide for a licensee for the operation to establish and maintain a documented system of coordinating and controlling the safe performance of all work of persons engaged in the operation that –</td>
</tr>
<tr>
<td>(a) identifies the persons having responsibility to authorise and supervise work; and</td>
</tr>
<tr>
<td>(b) ensures that members of the workforce are competent in the application of the system.</td>
</tr>
</tbody>
</table>

The SMS description should describe planned arrangements for the system. The content and level of detail should be sufficient to gain an appreciation of the permit-to-work system.

The regulations do not specify which activities require a written permit but this does not mean that all activities require one. The permit to work system should identify those activities requiring control and coordination through individual written permits, and describe why the remainder do not require a written permit.

The information must be appropriate to the pipeline and attendant activities, and could address:

- overview of system (e.g. objects, roles and responsibilities)
- permit types and uses
- management and operation of the system
- links with training and competency systems
- examples of a selection of permits types
- display and availability of the permits
- review and closeout of the permits
- triggers for the cancellation of permits.

An example of a description of a permit-to-work system is provided in Section 2.4.

It is common during construction for contractors to implement a permit-to-work system without the licensee’s direct involvement. Under the regulations and where a permit to work applies to a pipeline operation (which includes construction), the licensee is responsible for the permit to work, and is accountable for the system. While there is no obligation for the licensee’s personnel to fill the roles described in the regulations regarding permit to work during construction, the licensee must ensure the system meets the regulatory requirements and describe the system in the safety case.

**Workforce involvement**

<table>
<thead>
<tr>
<th>Requirements for workforce involvement [r. 16(10)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A licensee for a pipeline operation must demonstrate to the Minister, to the reasonable satisfaction of the Minister, that the safety case provides adequately for effective consultation with, and the effective participation of, the members of the workforce, so that they are able to arrive at informed opinions about the risks and hazards to which they may be exposed when engaged in the operation.</td>
</tr>
</tbody>
</table>

Members of the workforce need to be provided with information so they understand what actions to take to support safe operations, and minimise the effect on people’s safety and health in the event of an emergency. Involving employees in the specified activities supports two key objectives:

- to develop an understanding of the hazards and risks, so that informed decisions are made concerning the control measures and SMS implemented to control these risks; and
• to fully inform members of the workforce about the risks to which they may be exposed, the control measures and SMS that provide the means of eliminating or reducing those risks, and the safety case that presents the demonstrations and arguments for adequacy of the SMS and control measures.

Meeting these objectives means that those in the workforce with an active role in implementing the controls and SMS will be aware of their responsibilities.

The SMS description should describe planned arrangements for workforce involvement. The content and level of detail should be sufficient to gain an appreciation of the workforce involvement arrangements.

The information must be appropriate to the pipeline and attendant activities, and could address:
• safety case development processes
• inductions
• hazard identification and risk management process (project and task level)
• workplace arrangements.

Structural integrity

To comply with regulation 18 (see Section 2.7), the SMS description must capture:
• processes for ongoing integrity assessments through the integrity management and risk management systems, or both;
• plans and arrangements in place to respond to the identification of poor integrity; and
• monitoring and inspection of any physical controls identified in the facility description (see Section 3.4).

Machinery and equipment

Regulation 17(1) requires the machinery and equipment that relate to, or may affect, safety or health to be addressed in the safety case. The machinery and equipment should be described in the facility description (see Section 3.2). To ensure the process for selecting and maintaining the machinery and equipment is robust and covers future additions to the pipeline, the SMS description should cover the systems for:
• purchasing machinery and equipment, including provision for ensuring that items are suitable for their intended use;
• subjecting manufacturers and suppliers to evaluations or checks to ensure that their products are safe for use;
• a quality control or assurance process for equipment and machinery purchasing;
• ensuring purchased equipment and machinery is accompanied by appropriate documentation, such as operating and safe-use instructions; and
• maintaining equipment and machinery with consideration for manufacturer and supplier guidance, applicable legislative requirements, standards, codes of practice and historical information.

Drugs and intoxicants

**Requirements for the control of drugs and intoxicants [r. 19(2)]**

The safety case for a pipeline operation must describe the means by which a licensee for the operation will ensure that there is in place, or will be put in place, a method of —
(a) securing, supplying, and monitoring the use, during the operation, of controlled substances that have a therapeutic use; and
(b) preventing the use, during the operation, of —
   (i) controlled substances (other than those that have a therapeutic use); and
   (ii) intoxicants.

The SMS description should describe planned arrangements for managing drugs and intoxicants. The content and level of detail should be adequate to gain an appreciation of the drugs and intoxicants management processes.

The information must be appropriate to the pipeline and attendant activities, and could address:
• responsibilities and authorities
• training and competency requirements
• dispensary processes
• pharmaceutical management processes including stock takes and auditing
• drug and alcohol testing processes.

5.3 Emergencies

The regulations require planning for emergencies, training to prepare for emergencies, and the ability to isolate the pipeline from emergency situations.

Emergency preparedness and response plan

The safety case for a pipeline operation must –

(a) describe a response plan designed to deal with possible emergencies, the risk of which has been identified in the formal safety assessment for the operation; and
(b) provide for the implementation of that plan.

The safety case should provide sufficient information to describe the major aspects of the emergency response plan and explain how these aspects contribute to reducing the risks from possible emergencies at the pipeline. The information must be appropriate to the pipeline and attendant activities.

The description of the response plan should provide adequate linkages between the emergencies identified in the formal safety assessment and the elements of the response plan used to control the risks from those hazards and emergencies. It should also be sufficient to give the Minister reasonable assurance that the plan specifies all reasonably practicable steps to ensure the pipeline is safe and without risk to the health of those likely to be on the pipeline at the time of an emergency.

The requirements of regulation 24 are closely linked with those of regulation 10(4) (see Section 5.1) as they provide contingency measures for the hazards identified, including major accident events. The emergency response plan, and the personnel and resources it calls upon, are treated as control measures under the regulations. The plan must be properly incorporated into the SMS as a control measure subject to the same requirements as all other control measures. The emergency response plan must therefore include processes for testing, review, training and informing, and a consideration of the performance standards (see Section 5.1).

The safety case must also describe how the response plan will be implemented, indicating that it is understood by the workforce and other potentially affected people, and is subject to regular review, testing and update.

The description of the emergency response plan should provide an overview of the expectations of risk-mitigating controls (e.g. performance, activation, backups) in an emergency if these have not already been defined under specific sections of the safety case.

The response plan itself is not part of the safety case — only a description is required. Further written information will be requested if required during the safety case assessment.

The content and level of detail should be sufficient for the Minister to gain an appreciation of the plan, its relationship with the formal safety assessment, and how it will be implemented and contribute to risk reduction.

All aspects of the emergency plan need to be realistic, workable and agreed to by the relevant parties. This includes assumptions regarding actions required, timing, effectiveness of detection methods, and decision-making processes. The emergency plan should be robust and take into account the less-than-ideal conditions that may prevail in a real emergency.

The safety case should describe an emergency response plan that is appropriate to the hazards and risks at the pipeline, and mitigates these so far as is practicable. The response plan should be shown to be specific to the pipeline and the identified major hazards, and be effective in addressing the consequences of any major accident event. It should also be compatible with relevant studies (e.g. fire and explosion risk analysis).

For most pipelines, there is a spectrum of potential major accident events of varying nature, likelihood and severity, each of which could lead to different emergency planning areas. The emergency planning process must consider the full spectrum of incidents, and also uncontrolled events that could lead to major incidents.
Example of extent of emergency response plan — natural disasters

A response plan may be based on natural disasters that may arise between once per year and once every 50 years. It is probably meaningless to develop an emergency response plan for a scenario that is not likely to occur in 100 years. Rather, it may be more appropriate to base the response plan primarily on a less severe but more likely major incident, and then include contingency plans and actions to take if the natural disaster was more serious.

In this example, the emergency response plan and associated training drills would reflect the full range of scenarios but place different levels of emphasis and detail on each scenario according to its relative risk or significance to emergency planning.

Drills and exercises

**Requirements to train for emergencies via exercises [r. 24(2)]**
The safety case must make adequate provision for exercises to train persons to function in the event of an emergency with an adequate degree of knowledge, preparedness and confidence concerning the relevant emergency procedures.

**Requirements to undertake escape and fire drills [r. 24(3)]**
The safety case for a pipeline operation must provide for a licensee for the operation to ensure, as far as is reasonably practicable, that escape drill exercises and fire drill exercises are held in accordance with the safety case.

The SMS description must describe planned arrangements for managing escape and fire drills and exercises. The content and level of detail should be sufficient to gain an appreciation of the drills and exercise processes.

The information must be appropriate to the pipeline and attendant activities, and could address:
- coverage of the drills and exercise program for fires, explosions and escape analyses undertaken as part of the formal safety assessment;
- processes for evaluating and reporting on the success of drills and exercises and the management of subsequent corrective and preventative actions;
- relationship with performance standards specified in the emergency response plan;
- schedule of drills and exercises, which include a range of desktop and mobilisation exercises;
- processes for monitoring and enforcing compliance with the schedule;
- involvement of parties not at the pipeline (e.g. logistics providers, titleholders, emergency services, medical facilities); and
- requirements for participation and grounds for exemption.

For the proposed schedule, consideration should be given to how frequently those with specific functions during an emergency are provided training in those functions.

**Isolation**

**Requirement for emergency isolation procedures**
The safety case for a pipeline operation involving a pipeline that:
- (a) is connected to one or more other operational pipelines or facilities; or
- (b) is proposed to be connected to one or more other operational pipelines or facilities [r. 25(1)]
must specify adequate procedures for shutting down or isolating, in the event of an emergency, each pipeline or facility connected to the pipeline, so as to stop the flow of hazardous material to other pipeline or facilities. [r. 25(2)]

**Requirements of the emergency isolation procedures [r. 25(3)]**
The procedures specified in the safety case must include —
- (a) effective means of controlling and operating all relevant emergency shutdown valves for a pipeline or facility; and
- (b) a fail-safe system of isolating a pipeline in the event of failure of other safety devices for the pipeline or facility.
Evidence of emergency isolation procedures, provided within the SMS description, must describe the procedures for managing pipeline shutdown or isolation. The content and level of detail should be sufficient to gain an appreciation of the pipeline shutdown or isolation processes and must be appropriate to the pipeline and attendant activities.

5.4 Regulatory reporting

The regulations require accidents and dangerous occurrences at pipeline operations to be reported to the Minister, and a report about safety and health performance provided weekly during construction.

Reporting accidents and dangerous occurrences

Regulation 45 requires accidents and dangerous occurrences to be reported, and the safety case should describe the internal reporting processes that will support this requirement. The description should include the office responsible for reporting, how information regarding incidents will be provided to the safety regulator, and how the licensee has interpreted the reporting criteria.

The monthly summary report must include the hours worked on the pipeline licence area and who worked them. The safety case should describe how this information is captured.

Reporting templates are available from Resources Safety (email petreps@dmp.wa.gov.au).

Weekly construction reports

The safety case for a pipeline operation that is an operation in connection with the construction of a pipeline must provide for a licensee for the operation to ensure that during the construction period the Minister is given weekly progress reports, in a form approved by the Minister, on matters relating to the occupational safety and health of persons engaged in the operation; and the safety and health of other protected persons.

Ministerial approval is required for the format of weekly reporting and will normally be given on the basis of a template prepared by the licensee for the safety case covering construction.

The information required depends on the complexity of the construction operation. The format should allow for inclusion of progress reports, the status of leading and lagging indicators, and incident summaries.

Progress reports can be in the form of a table or progress map showing progress towards completion for each stage of construction (e.g. clear and grade, trenching, stringing). Site photos help to establish the context for reviewing the information provided.

Indicators included in the weekly report could include weekly and to-date numbers for:

- toolbox meetings
- project inductions
- project re-inductions
- near miss and minor incidents
- dangerous incidents (serious potential)
- lost time injuries (LTI)
- medical treatment injuries (MTI)
- first aid treatments (FAT)
- equipment damage incidents
- hazard reports
- audits and inspections
- emergency drills
- quality issues identified.
5.5 Management of change

There is no specific regulatory requirement for a management of change system, although such a system would assist greatly in maintaining compliance with certain regulations. Management of certain changes is also a feature of standards that may be used to develop the management system for a pipeline, such as:

- AS 2885.3:2001 Pipelines – Gas and liquid petroleum – Operation and management

The management of change system could be used to meet the following regulatory safety and structural integrity requirements:

- review of risk management [r. 10(3)], which should include, if applicable, review of the fire and explosion analyses [r. 21] and emergency communication and control systems [rr. 22, 23] (see Section 2.9);
- demonstrate ongoing identification and analysis of major accident events [rr. 10(4)(d – e)] (see Section 5.1);
- demonstrate ongoing drive to ALARP for risks to the safety and health of people involved [rr. 10(4)(f)] (see Section 5.1);
- trigger review of the SMS to ensure it is adequate [r. 11] (see Section 5.7);
- identify the person in charge and emergency coordinator for the specific activities involved in the change [r. 13] (see Section 5.2);
- trigger evaluation of new activities, or people involved, against the competency requirements [r. 14] (see Section 5.2);
- assess new equipment or machinery that relates to, or may affect, the safety or health of people involved [r. 17(1)] (see Section 3.3);
- trigger evaluation of new systems against structural integrity requirements [r. 18] (see Section 2.7);
- trigger review of the processes to control drugs and intoxicants to ensure they are sufficient for new activities [r. 19] (see Section 5.2);
- trigger reporting requirements during construction, should construction be involved [r. 20] (see Section 5.4); and
- trigger review of the emergency response plan for the changes [r. 24(1)] (see Section 5.3).

The management of change system could also be used to meet the following regulatory approval requirements:

- prompt testing of the boundaries of the current safety case in force (see Section 3.1);
- determine the requirement for a new safety case rather than revision of the existing safety case (see Section 6.2); and,
- if required, aid in scoping the scale of change in the safety case (see Section 6.2).

A management of change system should ensure that changes will be analysed, evaluated and communicated to employees before implementation. Changes should be supported by document control systems. Features of such a system normally include:

- evaluation of hazards, resources needed, and the effect on operational conditions, construction, decommissioning and maintenance requirements;
- assessment of risk levels;
- review of change requirements in other systems (e.g. changes in inspection and test frequencies);
- review of approval mechanisms to ensure they are at appropriate levels within the organisation;
- communication of intended changes to affected groups; and
- training requirements.

Managing change is not limited to physical changes to pipelines. Safety and health implications should be assessed when there are organisational or work activity changes, such as:

- change of company ownership;
- change of organisational structures and reporting relationships;
- changes in staffing numbers or staffing philosophy (e.g. downsizing, upsizing or outsourcing);
- job or task redesign; and
- changes in duty allocations.
5.6 Documents and records

Documentation

Requirements for maintaining records [r. 9]

A licensee for a pipeline operation must ensure that all documents required by the safety case in force for the operation to be kept are kept in the manner set out in the safety case.

The safety case must specify where and how the supporting documentation that it references will be made available. Licensees have overall responsibility for maintaining documentation availability, regardless of who actually provides the documentation.

Record keeping

Requirements for record keeping [r.26(10)]

The safety case for a pipeline operation must include arrangements for –

(a) making a record of –
   (i) the safety case in force for the operation at any particular time; and
   (ii) each revision of the safety case; and
   (iii) each written audit report for the safety case; and
   (iv) a copy of each report given to the Minister under Schedule 1 clause 70;
   and
(b) making those documents and records available to persons who need to be aware of the contents; and
(c) securely storing those documents and records –
   (i) at an address nominated for the operation; and
   (ii) in a manner that facilitates their retrieval as soon as practicable.

The SMS description must describe planned arrangements for records management. The content and level of detail should be sufficient to gain an appreciation of the records management processes, and must explicitly address safety cases, audit reports and reports of accidents and dangerous occurrences.

The information must be appropriate to the pipeline and attendant activities, and could address:

- retention and disposal schedules
- storage, security and retrieval.

Note: To comply with regulation 26, each of the records covered above must be retained for five years.

5.7 Monitoring and auditing

Safety management system implementation and review

Requirements for safety management system implementation and improvement [r. 11(a)]

The safety case for a pipeline operation must contain evidence showing that there are effective means of ensuring the implementation, and ongoing and systematic improvement, of the safety management system.

Requirements for measuring safety management system compliance [r. 10(4)(b)]

The safety management system for a pipeline operation must contain a detailed explanation of how compliance with the safety management system would be measured, evaluated and maintained.

Requirements for safety management system review [r. 10(4)(c)]

The safety management system for a pipeline operation must contain a detailed explanation of how the safety management system would be reviewed.
The requirements for checking for deficiencies in the safety management system [r. 11(b)]

The safety case for a pipeline operation must contain evidence showing that there are effective means of ensuring ongoing and continual and systematic identification of deficiencies in the safety management system.

The SMS description must describe planned arrangements for implementing, measuring compliance, reviewing and improving the SMS. The content and level of detail should be sufficient to gain an appreciation of implementation processes for the SMS.

The information must be appropriate to the pipeline and attendant activities, and could address:

- induction and training for users of the SMS
- key performance indicators for the SMS
- audit processes
- corrective and preventative action management
- management of change processes for the SMS
- organisational learning processes.

For new pipelines or pipelines that have changed licensee, a transition period may be required before the licensee’s SMS is fully implemented as per the safety case. If there are new work crews, this transition period may also apply to the requirement for effective consultation with, and the effective participation of, the members of the new workforce so they can be informed about the risks and hazards to which they are exposed on the pipeline [r. 11(b)].

This transition period does not mean the licensee can operate the pipeline at an increased risk level — activities not covered by the SMS in place should not be carried out until the updated SMS has been fully implemented. However, there are some instances, such as the example below for offtake construction, where planned future activities may be described in the safety case without the accompanying SMS controls being in place.

In practice, there are very few activities that can be carried out without the SMS being fully implemented. Licensee commitments made in the safety case will be verified during inspections or third party audits and the Minister may withdraw acceptance of a pipeline safety case on the grounds of non-compliance with Schedule 1 to the Petroleum Pipelines Act 1969 [r. 39(1)(a)(i)].

Example of discussion of a future activity in the SMS — construction of an offtake

The licensee envisages that an offtake for future third-party lateral lines on the pipeline will be required at some time in the foreseeable future. However, work involving the offtake construction is not planned for 12 months. The planned offtake construction activities are described in the pipeline’s safety case but since the work will not be carried out immediately, the associated SMS controls do not need to be in place until the activities are to be conducted. Other production or operation activities, however, may be carried out in the interim provided their associated controls are effectively implemented.

Audit regime

The requirements for auditing [r. 10(4)(i)]

The safety management system for a pipeline operation must provide for auditing of the operation.

System audits that may be needed to demonstrate regulatory compliance include:

- implementation and improvement of the safety management system (see above);
- standards to be applied (see Section 5.1);
- competence of members of the workforce (see Section 5.2);
- machinery and equipment (see Section 5.2);
- drugs and intoxicants (see Section 5.2); and
- emergency preparedness (see Section 5.3).

The licensee should ensure that the proposed auditing regime is sufficient to achieve the intent of the SMS. Any audit referenced within the safety case to demonstrate safety or integrity matters must also meet the document retention requirements (see Section 5.6).
When establishing the audit programs described in the safety case, the licensee should consider how the following aspects of the programs will sufficiently test the implementation of the SMS:

- schedule of internal and independent audits;
- methodology for conducting audits, including audit scope and objectives, criteria for selection of audit teams and leaders, and reporting requirements; and
- involvement of appropriate employees in the audit process.

When establishing the audit procedures described in the safety case, the licensee should ensure that:

- corrective actions and findings are recorded and prioritised;
- affected employees are informed of audit results and corrective actions;
- corrective actions are reviewed for appropriateness before implementation; and
- corrective actions are monitored for timely completion.

The audit system should evaluate:

- documented as required;
- implemented as written;
- used as intended by the organisation; and
- effective.

### 5.8 Common weaknesses in the SMS description

The most common weaknesses in the SMS description are:

- safety case presents SMS documentation without evidence to show that the SMS complies with requirements;
- SMS description focuses on operational matters and ignores the licensee’s organisational structure;
- SMS description focuses on the high-level system without adequately describing how the SMS works in the field (i.e. at the pipeline) to control the risks associated with identified hazards;
- SMS comprises many procedures with no clear system, structure or integration;
- SMS does not provide clear linkages to corporate safety and health policies, or does not demonstrate how it implements those policies;
- gaps are identified in the SMS but there is no system for prioritisation and correction;
- vague performance standards (e.g. systems are reviewed “periodically”, “frequently” or “kept under constant review”); and
- there is poor integration between the SMS and other relevant business systems such as human resources, particularly for change management. Hazard management identified in the safety case but not integrated with day-to-day operations is unacceptable because gaps are likely to develop between what is actually done and what the safety case says should be done.
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6.1 Validation

Request for validation [r. 41(1)]

The Minister may, by notice in writing, require a licensee for a proposed pipeline operation or a pipeline operation that is currently being carried out to provide a validation for the operation.

Requirements of validation [r. 41(2)]

A validation for the purposes of this Division —

(a) is to be given by a person who is —
   (i) suitably qualified and competent person; and
   (ii) not employed by the licensee; and
   (iii) not engaged by the licensee except for the purpose of providing the validation

(b) is about matters proposed by the licensee and accepted by the Minister; and

(c) comprises a statement in writing to the effect that the subject of the validation complies with the description given in the safety case and is fit for the purpose proposed by the licensee.

The Minister may require aspects of the safety case to be validated, but any validation is limited to determining whether an aspect of the pipeline operation complies with its description in the safety case [r. 41(2)(c)].

More requests for validation are for initial safety cases or safety cases revised to accommodate pipeline modifications. Validation must demonstrate that the physical or procedural systems described in the safety case are fit for purpose.

After a safety case covering construction activities has been submitted, requests for validation are likely to address elements such as design, construction or manufacturer’s date records (MDR) documentation, and welding. The 90-day assessment period applicable to new safety cases allows time for responses to requests for validation (see Section 6.3).

6.2 Revision

Stages in pipeline life cycle

Requirement for a safety case [r. 5(1)]

A person must not engage in a pipeline operation unless there is a safety case in force for the operation.

The requirement for a safety case covers the complete life cycle of the pipeline. A pipeline operation is defined in the Petroleum Pipelines Act 1969 [s. 4(1)] and Management of Safety Regulations [r. 4], and includes activities undertaken on the pipeline licensed area associated with:

- construction
- commissioning
- operation, including
  - inspection (by a person other than an inspector)
  - maintenance
  - repair
  - alteration
- reconstruction
- decommissioning.
A safety case must cover pre-construction activities, such as design, to demonstrate compliance with the nominated standards (see Section 3.2) and ensure structural integrity (see Section 2.7).

Note: The safety case does not need to be in force for pre-construction activities.

The safety case must provide a true reflection of the of safety arrangements for the existing or proposed pipeline. It must demonstrate, by its contents and relevant supporting material, that the licensee knows what technical and human activities occur or will occur, how they will be managed, and how safety will be assured in the event of an emergency.

The concept of “life cycle stages for a pipeline” does not impose any limitations on what activities may be conducted during any particular stage. It is up to the licensee to choose what assets and activities are involved in any particular stage and, as long as the accepted safety case adequately addresses those assets and activities, the licensee can proceed.

Example of commissioning

Commissioning activities can pose difficulties as they typically occur during both construction and operation. Licensees should consider how best to address this, particularly in the case of “hot” commissioning where hydrocarbons are being introduced into new, untested systems.

The original safety case for the pipeline covers construction and installation activities up to and including pre-commissioning. The safety case is then revised to cover operations.

The revised safety case comes into effect at project handover to the operations group, which occurs prior to hot commissioning. The revised safety case covers hot commissioning and activities carried out by a commissioning team addressing punch list items including performance testing. The commissioning activities are expected to carry on for two to three months into operations after project handover.

There is a requirement to test a compressor station at the head of the pipeline that has been complete since the early stages of construction. Although it may have been possible to return hydrocarbons via a bypass line and test the compressor station before completion of the pipeline, the testing had to be postponed until the revised safety case came into effect.

Example of phase development

The facility description must be appropriate to the stages in the life of the pipeline for which the safety case is being prepared. The facility description for the operations stage of the pipeline should address any planned future development at the pipeline, so far as it is practicable to do so at the time.

A licensee plans a phased development of a pipeline with low, medium and then high pressure operational phases as new gas sources become available. This will require the addition of a compression station in later years. It would be appropriate for the facility description to describe the different phases of operation, the changes to the pipeline that will be made to accommodate them and any changes as required, such as those to critical safety systems, measures and procedures.

New versus revised safety case

### Additional particular pipeline operation as trigger for safety case revision [r. 32(1)(b)]

A licensee for a pipeline operation for which a safety case is in force must submit a revised safety case to the Minister as soon as practicable after it is proposed to carry out a particular pipeline operation and the safety case does not provide, or adequately provide, for the operation.

It is important to differentiate between the need to revise an existing safety case for a new pipeline operation and requiring a new safety case to be developed. The approach adopted determines the time allowed for approval by the Minister (see Section 6.3).

The transition between stages in a pipeline operation’s life cycle would typically require a new safety case, particularly where separate stages are handled by different contractors or groups within the licensee’s organisation undertaking distinctively different activities.

The regulatory reference to a “particular pipeline operation” only allows a limited change to be considered for revision of a safety case, and the Minister must approve the proposed revision [r. 32(2)] (see below). The Director of Resources Safety’s Petroleum Safety Branch is delegated by the Minister to deal with these matters, and should be contacted before starting to revise the safety case. This is also an opportunity to obtain further guidance on this matter.

Note: If commissioning and operation are undertaken by the same organisation, both can be covered in the same safety case.
Triggers for revision

Minister may request revision of safety case [r. 33(1)]

The Minister may, by written notice (a revision notice) request a licensee for a pipeline operation for which a safety case is in force to submit a revised safety case to the Minister.

Licensee may refute request for revision of safety case

A licensee who receives a revision notice may, in writing, inform the Minister of the licensee’s opinion that —

(a) it is not necessary to revise the safety case; or

(b) if a revision of the safety case is to occur the revision should be in terms different from those proposed by the Minister; or

(c) the revision should be completed by a time later than that set out in the notice. [r. 33(4)]

A submission under subregulation (4) must —

(a) contain the licensee’s reasons in support of the licensee’s opinion; and

(b) be given to the Minister within 21 days after receiving a revision notice or any longer period that the Minister allows in writing. [r. 33(5)]

Requirement for 5 year revision of safety case

A licensee for a pipeline operation for which a safety case is in force must submit a revised safety case to the Minister —

(a) 5 years after the day on which the safety case was first accepted under regulation 30; and

(b) then at 5 yearly intervals, starting on the day on which the revised safety case submitted under paragraph (a) was accepted under regulation 37. [r. 34(1)]

A revised safety case submitted under subregulation (1) must describe the means by which the licensee will continue to ensure that the pipeline, and the electrical systems and instrumentation controls used in the operation, are kept in good condition, free from damage or defect, and fit for purpose. [r. 34(3)]

Licensees need to submit revised safety cases to the Minister for assessment and acceptance only when required to do so by the regulations. In addition to the above requirements for revision of a safety case (“request by the Minister” [r. 33] and “revision after five years” [r. 34]), there is also a “change of circumstances or operations” requirement [r. 32] that applies when:

- the technical knowledge relied upon to formulate the safety case becomes outdated [r. 32(1)(a)];
- the licensee proposes to undertake a pipeline operation not adequately provided for within the safety case in force [r. 32(1)(b)];
- a series of proposed modifications would result in a significant cumulative change in the overall risk level of major accident events [r. 32(1)(c)];
- a significant new, or increase in existing, risk to safety or health that arises or is likely to arise from the pipeline or pipeline operation and this increase in risk is not provided for within the current safety case [r. 32(1)(d)]; or
- a significant change to the safety case for the operation is proposed [r. 32(1)(e)].

Example of outdated technical knowledge

Where industry experience suggests that assumptions underpinning a safety case have been inadequate (e.g. vessel or pipe leak frequencies or damage in actual fire situations that are unexpected or unaccounted for in the safety case), the technical knowledge relied upon to formulate the original safety case may have become outdated and a safety case revision would be required.

Example of activity outside safety case coverage

A safety case revision would be required if a licensee proposes to modify a pipeline to add an offtake and meter station for a proposed lateral, and there is no provision in the safety case in force for that modification.
Example of cumulative change

If a licensee proposes to loop an existing pipeline to allow for significant pressure increase and additional above ground facilities, such as meter stations, near an existing residential area, then the overall risk of major accident events would increase. Containment scenarios that would not have affected the public using the public space above the pipeline could now result in fatalities, changing the overall risk of major accident events. A safety case revision would be required.

Example of significant new or increased health or safety risks

The petroleum source for a pipeline changes and the pigging requirements for the pipeline need to be increased to allow for cleaning pigs. The licensee plans for pigging operations to be undertaken “in-house” instead of using a specialist contractor. The change in activities and associated increase in risk to the health and safety of people involved in the pipeline operation requires a revision of the safety case.

Example of significant change to the safety case

A licensee is modifying the organisational structure of the operation, which alters the authorities within the procedures of the SMS. A safety case revision would be required to demonstrate that management of safety will not break down under this change.

The Minister may request a licensee of a pipeline to submit a revised safety case, usually when deficiencies are identified in the safety case in force as a result of an inspection, audit or incident investigation. Any written request by the Minister must specify the matters to be addressed by the revision, the proposed date of effect of the revision and the grounds for the request [r. 34(2)].

As part of continuous improvement during a safety case revision, licensees should review their operations against standard industry and internal safety alerts, codes and standards (including recent revisions), and associated key learnings.

Note: A request for a revised safety case may be accompanied by other enforcement measures.

If the Minister requests a licensee to submit a revised safety case, the licensee may make a written submission to the Minister requesting either variation or withdrawal of the request, stating the reasons why [r. 33(4)], within 21 days after receiving the request. This period may be extended if specified in writing by the Minister [r. 33(5)].

The licensee of a pipeline must also submit a revised safety case to the Minister every five years after approval of the original safety case [r. 34]. Revised safety cases submitted because of a change of circumstances, or because the Minister has requested a revision, and which are accepted within the five-year period, do not require five-yearly revision.

Licensees should incorporate a five-yearly safety case review and revision in their internal processes. These processes should ensure that review and revision commences well in advance of the required submission date. Ideally, licensees should continually review and update their safety cases.

Minister must approve proposed safety case revisions

**Minister must agree with safety case revision [r. 32(2)]**

If the Minister agrees, a licensee for a pipeline operation may submit a revised safety case under subregulation (1) in the form of a revision of part of the safety case in force for the operation.

When a safety case requires revision, the Minister must approve the proposed revision [r. 32(2)]. To ensure a planned revision to cover a pipeline operation not covered by the safety case in force, the licensee should contact the Director of Resources Safety’s Petroleum Safety Branch, who is delegated by the Minister to deal with these matters.

Triggers for safety case revision should be captured in the management of change processes described in the safety case (see Section 5.5). This will allow time for the licensee to discuss with the Minister’s delegate the elements that can be managed without safety case revision, what can be captured within a safety case revision, and what requires an additional safety case.
6.3 Safety case submission

Details required with submission

**Requirements for information with submission of safety case**

An application or submission (however described) that a person is required or permitted to make or give to the Minister under these regulations must include —

(a) the person’s name; and

(b) if applicable, the name of the person’s agent; and

(c) the person’s or agent’s address in Australia; and

(d) the person’s or agent’s telephone number and facsimile number [r. 47(1)].

If there is a change to any of the details mentioned in subregulation (1), the person or agent must notify the Minister in writing as soon as practicable [r. 47(2)].

Despite any provision of these regulations, the Minister may delay proceeding with an application or submission until the person or agent has complied with this regulation [r. 47(3)].

The Minister may delay assessment of a safety case if the details of the applicant specified in regulation 47(1) are not supplied. If these details change, the Minister must be notified in writing as soon as possible.

The safety case should be submitted to the Director of Resources Safety’s Petroleum Safety Branch, who is delegated by the Minister to deal with these matters.

Assessment and acceptance decision

Within 90 days of receiving a new safety case, or 30 days for a revised safety case, the Minister will either accept or reject the safety case, or will notify the licensee that a decision cannot be made within the time period and set out a timetable for consideration of the safety case [rr. 30(1), 37(1)].

During the assessment process, the Minister may seek further written information from the licensee about any matter required by regulation to be included in the safety case [rr. 28, 35]. If there is a request for further information, the “clock is stopped” on the assessment period. Each request for further information must be in writing and must specify a period of at least 30 days for a new safety case and ten days for a revised safety case within which time the information must be provided. Should a safety case be clearly deficient, it will be promptly rejected and the licensee will be required to resubmit.

Information received from a licensee within the specified period becomes part of the safety case as if it had been included within the safety case originally submitted to the Minister. However, the Minister may request the licensee to include this further written information in an updated version of the safety case.

If the requested written information is not provided to the Minister within the specified period, the Minister will accept or reject the safety case based on the information already received. Requests for further written information from the licensee can lead to delays in a decision and extend the safety case assessment process beyond the normal 90-day assessment period (30 days for revised safety cases).

The Minister will accept the safety case if it is appropriate to the pipeline and complies with the requirements for safety cases [Division 3; rr. 29(1), 36(1)].

Acceptance of a safety case may be subject to conditions or limitations, but the Minister’s preference is to avoid applying conditions and limitations except in extraordinary circumstances.

The Minister may accept the safety case for one or more stages in the life cycle of a pipeline and reject others, but this is uncommon.

The Minister must give the licensee a reasonable opportunity to revise and resubmit a safety case that is rejected. Once a safety case is accepted, a licensee may undertake the activities only those that it covers.

Communications about the assessment process, including requests for and submission of additional information should be addressed to the Director of Resources Safety’s Petroleum Safety Branch.
Withdrawal of acceptance

### Ability for the minister to withdraw acceptance of a safety case [r. 39(1)]

The Minister may, by written notice to a licensee for a pipeline operation, withdraw the acceptance of the safety case for the operation on any of the following grounds —

(a) a licensee for the operation has not complied with —
   (i) Schedule 1; or
   (ii) a notice issued by an inspector under Schedule 1; or
   (iii) regulation 33, 34(7) or 35;

(b) the Minister has rejected a revised safety case.

The Minister may withdraw acceptance of a safety case if a revised safety case has been rejected [r. 39 (1)] or a licensee has not complied with:

- the health and safety provisions of the Petroleum Pipelines Act 1969;
- a notice issued by an inspector; or
- any of the safety case revision triggers (see Section 6.2).

Before withdrawing the acceptance of a safety case for the pipeline, the Minister must give the licensee at least 30 days written notice of the intention to withdraw the acceptance. The licensee then has the opportunity to make a written submission on the matters the Minister should take into account when deciding whether to withdraw acceptance.

Upon withdrawal of acceptance of a safety case, the licensee must immediately make the pipeline safe and then cease activities as there is no longer a safety case in force. Acceptance is withdrawn only in extreme circumstances when other compliance and enforcement provisions have failed.

6.4 Work outside the requirements of a safety case

### Allowance for the minister to authorise work outside of a safety case

The Minister may, by notice in writing given to a licensee for a pipeline operation, consent to the carrying out of a pipeline operation in a manner that is different from the requirements of the safety case in force for the operation. [r. 31(1)]

The Minister must not give a consent under subregulation (1) unless he or she is satisfied that a significant new risk to safety or health, or a significant increase in an existing risk to safety or health, is not likely to arise from the operation being carried out in the proposed manner. [r. 31(2)]

There may be situations where it is necessary to make urgent changes to a pipeline operation, such as to prevent or respond to a major accident event. In these cases, the licensee must seek consent to operate in a manner that is different from the safety case in force, as provided for under regulation 32.

Note: The consent to work without a safety case in force will only be issued in extraordinary circumstances. Consent will not be issued in cases where the licensee could have but has not adequately planned a proposed change.

The Minister will not give consent unless satisfied that there will not be a significant new risk introduced or a significant increase in an existing risk because of the proposed work. The licensee must demonstrate that the risks associated with the proposed work have been reviewed and the work meets the criteria that would allow the Minister to give consent under regulation 32(2).

If in an emergency, the Minister issues consent to operate outside the requirements of the safety case in force, the licensee must ensure that the operation in question is fully reviewed and the risk assessed, even if it is a short-term risk that has already been dealt with.

Ideally, any such “emergency” should have been identified and incorporated in the original safety case so that a request under regulation 32 would not be required. Licensees need to carefully consider the management of change process, understanding and taking into account those changes that can be made “on the run” and those that require a shutdown.
APPENDICES

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Appendix 1

Definitions

ALARP means as low as reasonably practical.

Controlled substance means a substance mentioned in:

(a) the Customs (Prohibited Exports) Regulations 1958 (Commonwealth) Schedule 8; or
(b) the Customs (Prohibited Imports) Regulations 1956 (Commonwealth) Schedule 4. [r. 19(1)]

Intoxicant means a beverage or other substance for human consumption that contains alcohol but does not include a substance for medical or pharmaceutical use. [r. 19(1)]

Major accident event means an event connected with a pipeline operation, including a natural event, having the potential to cause multiple fatalities of persons engaged in the pipeline operation or persons who have an explicit or implicit invitation from the licensee to be at or near the pipeline operation. [r. 4; Petroleum Pipelines Act 1969, Schedule 1]

Other protected person means a person who is at or near a place where a pipeline operation is being carried out at the invitation of, or with the expressed or implied consent of, either the licensee or the persons in control of the pipeline operation. [Petroleum Pipelines Act 1969, s. 4]

Performance standard means a standard, established by a licensee for a pipeline operation, of the performance required of a system, item of equipment, person or procedure, which is used as a basis for managing the risk of a major accident event connected with the operation. [r. 10(4)(k)]

Pipeline means, in general, an onshore pipeline for the transmission of petroleum. Under the Petroleum Pipelines Act 1969 it is defined as a pipe or system of pipes used or intended to be used for the conveyance of petroleum; and includes all structures for protecting or supporting a pipeline and all loading terminals, works and buildings and all fittings, pumps, tanks, storage tanks, appurtenances and appliances and any facility, or any facility of a class, which is declared for the time being under section 5 to be a pipeline facility for the purposes of the Petroleum Pipelines Act 1969 used in connection with a pipeline, but does not include:

(a) a pipeline as defined in the Petroleum (Submerged Lands) Act 1982;
(b) a pipeline that is used –
  (i) for the conveyance of petroleum from the well head to a tank or separator or for the collection of petroleum within the area in which it is produced or recovered;
  (ii) for returning petroleum to a natural reservoir;
  (iii) for the conveyance of petroleum for use for the purpose of petroleum exploration operations or operations for the recovery of petroleum;
  (iv) for the conveyance of petroleum that is to be flared or vented;
(c) a pipeline constructed or to be constructed under the authority of any Act, other than the Petroleum Pipelines Act 1969;
(d) a pipeline constructed or to be constructed by a public authority;
  (i) a pipeline that is part of a distribution system as defined in the Energy Coordination Act 1994;
(e) a pipeline constructed or to be constructed on land used for residential, business, agricultural, commercial or industrial purposes, designed for use solely for the residential, business, agricultural, commercial or industrial purposes carried out on that land and situated wholly within the boundaries of that land; or
(f) a pipeline or a pipeline of a class declared for the time being under section 5 not to be a pipeline for the purposes of this Act. [Petroleum Pipelines Act 1969, s. 4]

Pipeline operation means an operation in connection with the construction, operation, inspection (by a person other than an inspector), maintenance, repair, alteration, reconstruction or decommissioning of a pipeline; and carried out on land that is specified in any licence as licence area. [r. 4; Petroleum Pipelines Act 1969, Schedule 1]

Therapeutic use has the meaning given to that term in section 3(1) of the Health Act 1911, which is a use for the purpose of:

(a) preventing, diagnosing, curing or alleviating of a disease, ailment, defect or injury in persons;
(b) influencing, inhibiting or modifying of a physiological process in persons; or
(c) testing of susceptibility to a disease or ailment in persons. [r. 19(1)]

Workforce means those persons identifiable before a safety case is established and engaged in, or likely to be engaged in, the pipeline operation to which the safety case applies. [r. 16(2)]
Appendix 2

AS/NZS ISO 31000:2010 risk management framework diagram
Appendix 3

Requirements of the risk management framework for each applicable regulation

The tables list the Management of Safety Regulations that may be relevant to an element of the risk management framework shown in Appendix 2. Each framework element has a corresponding table with the same name. Some regulations listed have been interpreted to reflect how they affect that framework element. The relevant section from this guideline is also given.

Design of framework for managing risk

<table>
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<tr>
<th>Regulation</th>
<th>Requirement</th>
<th>Guideline section</th>
</tr>
</thead>
<tbody>
<tr>
<td>r. 6(a)</td>
<td>Framework should capture when significant new, or significant increases, of risk to health or safety require stopping the applicable pipeline operation(s) until the safety case is revised</td>
<td>4.3</td>
</tr>
<tr>
<td>r. 10(2)(a)</td>
<td>Framework should capture collection of details of the pipeline operation to establish context for risk assessments</td>
<td>3.3</td>
</tr>
<tr>
<td>r. 10(2)(b)</td>
<td>Framework should capture collection of details of the pipeline configuration to establish context for risk assessments</td>
<td>3.2</td>
</tr>
<tr>
<td>r. 10(3)(a)</td>
<td>Framework should incorporate hazard identification processes that identify all potential hazards that may cause major accident events</td>
<td>4.1</td>
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<tr>
<td>r. 10(3)(b)</td>
<td>Framework should incorporate processes to assess likelihood and consequences of major accident events</td>
<td>4.1</td>
</tr>
<tr>
<td>r. 10(3)(c)</td>
<td>Framework should incorporate process to identify the measures required to ensure the risk of major accident events is reduced to ALARP</td>
<td>4.1</td>
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<tr>
<td>r. 10(4)(d)</td>
<td>SMS description should capture the elements of the framework to ensure ongoing identification of major accident events</td>
<td>5.1</td>
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<tr>
<td>r. 10(4)(e)</td>
<td>SMS description should capture the elements of the framework to ensure ongoing assessment of likelihood and consequence assessments of major accident events</td>
<td>5.1</td>
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<tr>
<td>r. 10(4)(f)</td>
<td>SMS description should capture the elements of the framework that ensure risks to persons engaged in the pipeline operation and other protected persons are reduced to ALARP</td>
<td>5.1</td>
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<tr>
<td>r. 16</td>
<td>Framework should incorporate the process for employee involvement in development or revision of the safety case, and how this involvement will be documented</td>
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<tr>
<td>r. 17(2)</td>
<td>Framework should incorporate the survivability analysis of equipment required to function during and immediately after an emergency</td>
<td>4.6</td>
</tr>
<tr>
<td>r. 18</td>
<td>Framework should incorporate the threat assessments required for assessing structural integrity</td>
<td>4.6</td>
</tr>
<tr>
<td>r. 21(2)</td>
<td>Framework should incorporate the fire and explosion risk analysis, which must include:</td>
<td>4.6</td>
</tr>
<tr>
<td></td>
<td>• identification of types of fires and explosions</td>
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<td></td>
<td>• measures for detecting those fires and explosions</td>
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<td></td>
<td>• consideration of measures for eliminating or reducing to ALARP potential fires and explosions</td>
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<td></td>
<td>• consideration of systems for detection, control and extinguishment of fire outbreaks and leaks or escapes of petroleum</td>
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<td>• consider means of isolating and safely storing hazardous substances</td>
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<tr>
<td></td>
<td>• consider the evacuation, escape and rescue analysis in relation to fires and explosions</td>
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<tr>
<td></td>
<td>• identify the technical and other control measures to reduce risk of fires and explosions to ALARP</td>
<td></td>
</tr>
<tr>
<td>r. 22</td>
<td>Framework should incorporate a survivability analysis for assessing nominated communication systems against potential emergencies and ensure these communication systems are adequate</td>
<td>4.6</td>
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### Regulation Requirement

<table>
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<tbody>
<tr>
<td>r. 23</td>
<td>Framework should incorporate a survivability analysis for assessing back-up power supply, alarm systems, and isolation and emergency shutdown systems against potential emergencies, and ensure these systems are adequate</td>
<td>4.6</td>
</tr>
<tr>
<td>r. 24(1)(a)</td>
<td>Framework should incorporate the gathering of emergencies for inclusion in the emergency response plan</td>
<td>4.6</td>
</tr>
<tr>
<td>r. 25</td>
<td>Framework should incorporate gathering details of hazards from connected systems, and those from connected pipelines, and ensure that there are adequate, physical and supporting procedural controls for isolation of the pipeline from connected systems</td>
<td>4.6</td>
</tr>
<tr>
<td>r. 32(1)(b)</td>
<td>Framework should capture new activities not previously included in the safety case, so that the safety case can be revised</td>
<td>6.2</td>
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<tr>
<td>r. 32(1)(d)</td>
<td>Framework should capture when significant new, or significant increases, of risk to health or safety trigger revision of the safety case</td>
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### Implementing risk management

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<td>r. 11(a)</td>
<td>SMS description should include evidence that there are effective means of implementing the risk management process</td>
<td>5.7</td>
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### Monitoring and review of the framework

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<tbody>
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<td>r. 10(4)(c)</td>
<td>SMS description should include the mechanisms for measuring, evaluating and maintaining compliance with the framework</td>
<td>5.7</td>
</tr>
<tr>
<td>r. 10(4)(c)</td>
<td>SMS description should include the mechanisms for review of the framework</td>
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<tr>
<td>r. 10(4)(i)</td>
<td>SMS description should capture the auditing involved in monitoring and review of the risk management process</td>
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<tr>
<td>r. 10(4)(k)</td>
<td>SMS description should capture the requirement to establish performance standards for major accident events identified by risk assessment</td>
<td>5.1</td>
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### Continual improvement of the framework

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<tbody>
<tr>
<td>r. 11</td>
<td>SMS description should include the mechanisms for ongoing and systematic improvement, including identification of deficiencies in the framework</td>
<td>5.7</td>
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### Establishing the context

<table>
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<tr>
<th>Regulation</th>
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<tbody>
<tr>
<td>r. 10(2)(a)</td>
<td>The context for the risk assessments should be clearly based on the pipeline operation described in the facility description</td>
<td>3.3</td>
</tr>
<tr>
<td>r. 10(2)(b)</td>
<td>The context for the risk assessments should be clearly based on the pipeline configuration described in the facility description</td>
<td>3.2</td>
</tr>
</tbody>
</table>
### Submission of a Petroleum Pipeline Safety Case - Guideline

<table>
<thead>
<tr>
<th>Regulation</th>
<th>Requirement</th>
<th>Guideline section</th>
</tr>
</thead>
<tbody>
<tr>
<td>r. 17(1)</td>
<td>The context for risk assessments should incorporate all of the equipment required for the operation</td>
<td>3.3</td>
</tr>
<tr>
<td>r. 32(1)(d)</td>
<td>The context for the risk assessment should test existing assumptions, as outdated assumptions may require safety case revision</td>
<td>4.3</td>
</tr>
</tbody>
</table>

### Risk Assessment

<table>
<thead>
<tr>
<th>Regulation</th>
<th>Requirement</th>
<th>Guideline section</th>
</tr>
</thead>
<tbody>
<tr>
<td>r. 6(a)</td>
<td>Risk assessment should capture details of significant new, or significant increases to, risks to health or safety as these require stopping the applicable pipeline operation(s) until the safety case is revised</td>
<td>4.3</td>
</tr>
<tr>
<td>r. 10(3)(a)</td>
<td>Formal safety assessment description should capture the hazards that have the potential to cause major accident events</td>
<td>4.1</td>
</tr>
<tr>
<td>r. 10(3)(b)</td>
<td>Formal safety assessment description should capture the detailed and systematic risk assessments undertaken</td>
<td>4.1</td>
</tr>
<tr>
<td>r. 16</td>
<td>Formal safety assessment description should capture evidence of workforce involvement</td>
<td>2.3</td>
</tr>
<tr>
<td>r. 17(2)</td>
<td>Formal safety assessment description should capture the survivability analysis required for machinery and equipment required to operate during and immediately after emergencies</td>
<td>4.6</td>
</tr>
<tr>
<td>r. 18</td>
<td>Formal safety assessment description should capture the assessment of threats to structural integrity</td>
<td>4.6</td>
</tr>
<tr>
<td>r. 21</td>
<td>Formal safety assessment description should capture the description of, and results from, fire and explosion risk analysis, which must include: • identification of the types of fires and explosions • measures for detecting those fires and explosions • measures for eliminating or reducing to ALARP potential fires and explosions • systems for detection, control and extinguishment of fire outbreaks and leaks or escapes of petroleum • means of isolating and safely storing hazardous substances • evacuation, escape and rescue analysis in relation to fires and explosions • identification of technical and other control measure that reduce risk of fires and explosions to ALARP</td>
<td>4.6</td>
</tr>
<tr>
<td>r. 22</td>
<td>Formal safety assessment description should capture the description of, and results from, the survivability analysis of the communication systems in use</td>
<td>4.6</td>
</tr>
<tr>
<td>r. 23</td>
<td>Formal safety assessment description should capture the description of, and results from, the survivability analysis for back-up power supply, alarm systems, and isolation and emergency shutdown systems against potential emergencies, and ensure these systems are adequate</td>
<td>4.6</td>
</tr>
<tr>
<td>r. 24(1)(a)</td>
<td>Formal safety assessment description should capture the description of, and results from development of the emergency response plan</td>
<td>4.6</td>
</tr>
<tr>
<td>r. 25</td>
<td>Formal safety assessment description should capture the hazards from connected systems, and those from connected pipelines, and ensure that there are physical and supporting procedural controls for isolation between pipelines</td>
<td>4.6</td>
</tr>
<tr>
<td>r. 32(1)(b)</td>
<td>Risk assessment should flag activities not included in the safety case as these trigger revision of the safety case</td>
<td>6.2</td>
</tr>
<tr>
<td>r. 32(1)(c)</td>
<td>Risk assessment should flag significant cumulative change in safety or health risks as this triggers revision of the safety case</td>
<td>6.2</td>
</tr>
<tr>
<td>r. 32(1)(d)</td>
<td>Risk assessment should flag significant new, or significant increases to, health or safety risks as these trigger revision of the safety case</td>
<td>6.2</td>
</tr>
</tbody>
</table>
### Risk treatment

<table>
<thead>
<tr>
<th>Regulation</th>
<th>Requirement</th>
<th>Guideline section</th>
</tr>
</thead>
<tbody>
<tr>
<td>r. 10(2)(c)</td>
<td>Facility description should capture the controls identified in risk assessments that eliminate or mitigate major accident events</td>
<td>3.4</td>
</tr>
<tr>
<td>r. 17(1)</td>
<td>Facility description should capture the principal equipment or machinery identified in the risk assessments that may impact safety or health</td>
<td>3.3</td>
</tr>
<tr>
<td>r. 10(3)(c)</td>
<td>Formal safety assessment description should capture the controls indentified in risk assessments that eliminate or reduce to ALARP major accident events</td>
<td>4.1</td>
</tr>
<tr>
<td>r. 10(4)(f)</td>
<td>SMS description should capture the procedural controls identified in the risk assessments</td>
<td>5.1</td>
</tr>
<tr>
<td>r. 18</td>
<td>Facility description should capture the physical controls identified in the risk assessment for structural integrity</td>
<td>3.4</td>
</tr>
<tr>
<td>r. 18</td>
<td>SMS description should capture the procedural controls identified in the risk assessment for structural integrity</td>
<td>5.2</td>
</tr>
<tr>
<td>r. 21</td>
<td>Facility description should capture the physical controls identified that:</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td>• detect fires and explosions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• eliminate or reduce to ALARP potential fires and explosions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• detect, control and extinguish fire outbreaks and leaks or escapes of petroleum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• isolate and safely store hazardous substances</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• reduce risk of fires and explosions to ALARP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Facility description should capture the description of provisions for evacuation, escape and rescue in relation to fires and explosions</td>
<td></td>
</tr>
<tr>
<td>r. 25</td>
<td>Facility description should include physical systems for isolation as identified by risk assessment</td>
<td>5.4</td>
</tr>
</tbody>
</table>

### Monitoring and review

<table>
<thead>
<tr>
<th>Regulation</th>
<th>Requirement</th>
<th>Guideline section</th>
</tr>
</thead>
<tbody>
<tr>
<td>r. 10(4)(b)</td>
<td>SMS description should capture the processes for measurement, evaluation and maintenance of procedural controls</td>
<td>5.7</td>
</tr>
<tr>
<td>r. 10(4)(c)</td>
<td>SMS description should capture the processes for reviewing procedural controls</td>
<td>5.7</td>
</tr>
<tr>
<td>r. 10(4)(d)</td>
<td>SMS description should capture the processes for monitoring and reviewing the risk assessments that identified major accident events</td>
<td>5.1</td>
</tr>
<tr>
<td>r. 10(4)(g)</td>
<td>SMS description should capture the processes for inspection, testing and maintenance of physical controls</td>
<td>5.1</td>
</tr>
</tbody>
</table>

### Communication and consultation

<table>
<thead>
<tr>
<th>Regulation</th>
<th>Requirement</th>
<th>Guideline section</th>
</tr>
</thead>
<tbody>
<tr>
<td>r. 16</td>
<td>SMS description should capture the processes for employee involvement in the development or revision of the safety case</td>
<td>5.2</td>
</tr>
</tbody>
</table>
Appendix 4

Health and safety duties under the Act

This table of health and safety duties is collated from Schedule 1 Division 2, Subdivision 1 of the Petroleum Pipelines Act 1969. Only significant duties are listed and broadly described. The Act must be consulted for full details.

1 If subcontractors are used, the contract holder has the same responsibilities as an employer for aspects of safety or health management under their control [c. 9(3)(a)], or if the contract stipulates that the contract holder has this control [c. 9(3)(b)(i)], or if the contract holder would normally have control over that matter [c. 9(3)(b)(ii)].

2 An importer is consider to be a manufacturer where the manufacturer of an imported item [c. 10(3)(a)] does not have a place of business in Australia [c. 10(3)(b)].

3 Suppliers provide written information regarding pipeline to the licensee [c.11(1)(c)(i)], written information regarding plant or substances to the person being supplied [c. 11(1)(c)(ii)], and for time of supply of pipeline, plant or substance [c. 11(1)(c)(iii)].

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Responsible party</th>
<th>Responsibility</th>
<th>Clause</th>
</tr>
</thead>
<tbody>
<tr>
<td>General duty</td>
<td>Licensee</td>
<td>To take all reasonably practicable steps to ensure that the pipeline operation is carried out in a manner that is safe and without risk to the health of persons</td>
<td>7(1)</td>
</tr>
<tr>
<td></td>
<td>Person in control</td>
<td>To take all reasonably practicable steps to ensure that that part of the pipeline operation is carried out in a manner that is safe and without risk to the health of persons engaged in the pipeline operation or other protected persons</td>
<td>8(1)</td>
</tr>
<tr>
<td></td>
<td>Employer¹</td>
<td>To take all reasonably practicable steps to protect the safety and health of employees engaged in a pipeline operation</td>
<td>9(1), 9(5)(a)</td>
</tr>
<tr>
<td></td>
<td>Licensee</td>
<td>To provide and maintain a physical environment at the place where the pipeline operation is carried out that is safe and without risk to health</td>
<td>7(2)(a)</td>
</tr>
<tr>
<td></td>
<td>Person in control</td>
<td>To ensure that the physical environment at the place where that part of the pipeline operation is carried out is safe and without risk to health</td>
<td>8(2)(a)</td>
</tr>
<tr>
<td></td>
<td>Employer¹</td>
<td>To provide and maintain a working environment that is safe for employees and without risk to their health</td>
<td>9(2)(a)</td>
</tr>
<tr>
<td></td>
<td>Licensee</td>
<td>To provide and maintain adequate amenities for the safety and health of all members of the workforce engaged in the pipeline operation</td>
<td>7(2)(b)</td>
</tr>
<tr>
<td></td>
<td>Licensee</td>
<td>To ensure that any plant, equipment, materials and substances for use in the pipeline operation are safe and without risk to health</td>
<td>7(2)(c)</td>
</tr>
<tr>
<td></td>
<td>Person in control</td>
<td>To ensure that any plant, equipment, materials and substances for use in that part of the pipeline operation are safe and without risk to health</td>
<td>8(2)(b)</td>
</tr>
<tr>
<td></td>
<td>Employer¹</td>
<td>To ensure that any plant, equipment, materials and substances for use in connection with the employees’ work are safe and without risk to health</td>
<td>9(2)(b)</td>
</tr>
<tr>
<td></td>
<td>Licensee</td>
<td>To implement and maintain systems of work in relation to the pipeline operation that are safe and without risk to health</td>
<td>7(2)(d)</td>
</tr>
<tr>
<td></td>
<td>Person in control</td>
<td>To implement and maintain systems of work in relation to that part of the pipeline operation that are safe and without risk to health</td>
<td>8(2)(c)</td>
</tr>
<tr>
<td></td>
<td>Employer¹</td>
<td>To implement and maintain systems of work that are safe and without risk to health</td>
<td>9(2)(c)</td>
</tr>
<tr>
<td>Aspect</td>
<td>Responsible party</td>
<td>Responsibility</td>
<td>Clause</td>
</tr>
<tr>
<td>------------------------------------------</td>
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</tr>
<tr>
<td>Appropriate procedures and equipment for emergencies</td>
<td>Licensee</td>
<td>To implement and maintain appropriate procedures and equipment for the control of, and response to, emergencies arising in the pipeline operation</td>
<td>7(2)(e)</td>
</tr>
<tr>
<td>Information, instruction, training and supervision</td>
<td>Licensee</td>
<td>To provide all members of the workforce, in appropriate languages, with the information, instruction, training and supervision necessary for them to carry out their activities in a manner that does not adversely affect the occupational safety and health of persons engaged in the pipeline operation</td>
<td>7(2)(f)</td>
</tr>
<tr>
<td></td>
<td>Person in control</td>
<td>To provide all members of the workforce engaged in that part of the pipeline operation in appropriate languages, with the information, instruction, training and supervision necessary for them to carry out their work in a manner that is safe and without risk to health</td>
<td>8(2)(e)</td>
</tr>
<tr>
<td></td>
<td>Employer¹</td>
<td>To provide the employees, in appropriate languages, with the information, instruction, training and supervision necessary for them to carry out their work in a manner that is safe and without risk to health</td>
<td>9(2)(e)</td>
</tr>
<tr>
<td>Monitor OSH Regulations and keep records of such monitoring</td>
<td>Licensee</td>
<td>To monitor the occupational safety and health of all members of the workforce and keep records of that monitoring</td>
<td>7(2)(g)</td>
</tr>
<tr>
<td></td>
<td>Employer¹</td>
<td>An employer must take all reasonable steps to monitor the safety and health of employees, and keep records of that monitoring</td>
<td>9(4)</td>
</tr>
<tr>
<td>Medical and first aid facilities</td>
<td>Licensee</td>
<td>To provide appropriate medical and first aid services at the places at which a pipeline operation is carried out</td>
<td>7(2)(h)</td>
</tr>
<tr>
<td>Establish safety policy</td>
<td>Licensee</td>
<td>To develop, in consultation with members of the workforce and workforce representatives, a policy relating to occupational safety and health</td>
<td>7(2)(i)</td>
</tr>
<tr>
<td>Access and egress</td>
<td>Person in control</td>
<td>To ensure a means of access to, and egress from the place where that part of the pipeline operation is carried out is safe and without risk to health</td>
<td>8(2)(d)</td>
</tr>
<tr>
<td></td>
<td>Employer¹</td>
<td>To provide a means of access to, and egress from, the employees’ work location that is safe and without risk to health</td>
<td>9(2)(d)</td>
</tr>
<tr>
<td>Design and construction</td>
<td>Manufacturer²</td>
<td>To take all reasonably practicable steps to ensure that the plant is so designed and constructed as to be, when properly used, safe and without risk to health</td>
<td>10(1)(a)</td>
</tr>
<tr>
<td></td>
<td>Supplier³</td>
<td>To take all reasonably practicable steps to ensure that, at the time of supply, the pipeline, or the plant or substance, is in such condition as to be, when properly used, safe and without risk to health</td>
<td>11(1)(a)</td>
</tr>
<tr>
<td>Substances</td>
<td>Manufacturer²</td>
<td>To take all reasonably practicable steps to ensure that the substance is so manufactured as to be, when properly used, safe and without risk to health</td>
<td>10(2)(a)</td>
</tr>
<tr>
<td>Research, testing and examination</td>
<td>Manufacturer²</td>
<td>To take all reasonably practicable steps to carry out, or cause to be carried out, the research, testing and examination necessary to discover, and to eliminate or minimise, any risk to safety or health that may arise from the use of the plant</td>
<td>10(1)(b)</td>
</tr>
<tr>
<td></td>
<td>Supplier³</td>
<td>To take all reasonably practicable steps to carry out, or cause to be carried out, the research, testing and examination necessary to discover, and to eliminate or minimise, any risk to safety or health that may arise from the use of the substance</td>
<td>10(2)(b)</td>
</tr>
<tr>
<td></td>
<td>Supplier³</td>
<td>To take all reasonably practicable steps to carry out, or cause to be carried out, the research, testing and examination necessary to discover, and to eliminate or minimise, any risk to safety or health that may arise from the condition of the pipeline, plant or substance</td>
<td>11(1)(b)</td>
</tr>
<tr>
<td>Aspect</td>
<td>Responsible party</td>
<td>Responsibility</td>
<td>Clause</td>
</tr>
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<td>--------------------------------</td>
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</tr>
<tr>
<td>Written information for safe use</td>
<td>Manufacturer²</td>
<td>To take all reasonably practicable steps to make available, in connection with the use of the plant in a pipeline operation, adequate written information about the use for which it is designed and has been tested, details of its design and construction and any conditions necessary to ensure that, when put to the use for which it was designed and tested, it will be safe and without risk to health</td>
<td>10(1)(c)</td>
</tr>
<tr>
<td></td>
<td>Manufacturer²</td>
<td>To take all reasonably practicable steps to make available, in connection with the use of the substance in a pipeline operation, adequate written information concerning: the use for which it is manufactured and has been tested; details of its composition; any conditions necessary to ensure that, when put to the use for which it was manufactured and tested, it will be safe and without risk to health; and the first aid and medical procedures that should be followed if the substance causes injury</td>
<td>10(2)(c)</td>
</tr>
<tr>
<td>Written information of condition</td>
<td>Supplier²</td>
<td>To take all reasonably practicable steps to make available adequate written information, in connection with the use of the pipeline, plant or substance (as the case requires) about: the condition of the pipeline, plant or substance at the time of supply; any risk to the safety and health of members of the workforce engaged in a pipeline operation to which the condition of the pipeline, plant or substance may give rise unless it is properly used; the steps that need to be taken in order to eliminate that risk; and in the case of a substance — the first aid and medical procedures that should be followed if the condition of the substance causes injury to a member of the workforce engaged in a pipeline operation</td>
<td>11(1)(c)</td>
</tr>
<tr>
<td>Construction</td>
<td>Constructor</td>
<td>To take all reasonably practicable steps to ensure that the pipeline or plant is not erected or installed in such a way that it is unsafe or constitutes a risk to safety or health</td>
<td>12(2)</td>
</tr>
<tr>
<td>System of work</td>
<td>Employer</td>
<td>To take all reasonably practicable steps to ensure that the employer’s system of work is operated in a manner that is safe and without risk to the health of persons engaged in the pipeline operation or other protected persons</td>
<td>9(5)(b)</td>
</tr>
<tr>
<td>Protect one self and other protected persons</td>
<td>Persons</td>
<td>To take all reasonably practicable steps to ensure that the person does not take any action, or make any omission, that creates a risk, or increases an existing risk, to: the occupational safety and health of that person; or the safety and health of any other protected person</td>
<td>13(1)(a)</td>
</tr>
<tr>
<td>Cooperate with persons implementing health and safety duties</td>
<td>Persons</td>
<td>To take all reasonably practicable steps in respect of any obligation imposed on the licensee or on any other person under the OSH Regulations — to cooperate with the licensee or that other person to the extent necessary to enable the licensee or that other person to fulfil that obligation</td>
<td>13(1)(b)</td>
</tr>
<tr>
<td>Follow instructions when using equipment</td>
<td>Persons</td>
<td>To take all reasonably practicable steps to use equipment in accordance with any instructions given by the equipment supplier, consistent with the safe and proper use of the equipment</td>
<td>13(1)(c)</td>
</tr>
</tbody>
</table>