SafeOP for petroleum and gas

A guide to legislative requirements for operating plant

Part A Explanatory guide

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Further Information

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Foreword

This document and the related legislative basis were created in the belief that the only way to achieve safer workplaces is to allocate the responsibility for safety to those who are directly affected. The prevention of accidents requires vigilance by every person at a workplace, from the manager to the roustabout, from the most experienced old hand to the brand new recruit.

Government can play a role in setting guidelines, auditing compliance with them and, sadly, prosecuting when it is too late. But it is the industry itself that best understands the risks, the potential consequences and the means to protect against them.

This publication is dedicated to the memory of all workers, who tragically died or have been seriously injured while working in our industry. Our duty to their memory is to strive to prevent similar accidents from ever happening again.

This SafeOP document was developed after the introduction of the *Petroleum and Gas (Production and Safety) Act 2004*. It has proved to be a valuable document and tool over the last seven years to review and enhance safety management systems for the petroleum and gas industries.

This revised document has been updated to take into account minor legislative changes and has also been restructured into two parts. Part A provides an explanatory guide of the legislative requirements while Part B is a self audit tool that can be used by industry to ensure their safety management system complies with legislative requirements.

While industry performance and safety management compliance has improved considerable over the last seven years as the industry has rapidly developed it remains below expectations and is capable of improvement. It is imperative that industry leads the continued improvement. Robust and comprehensive risk assessment is the key component of any safety system and embedding this risk assessment and related controls throughout the safety system and ensuring that all workers understand its importance is vital. Industry must also seek to improve the safety culture of its organisations and contractors. Behavioral change is a critical next step in improving safety performance.

A safety management system is only as good as its implementation, use and embracement by all. It is up to everyone involved to play their part and for the system to be dynamic, and reviewed and revised to ensure its currency and effectiveness. I urge all in the industry, to be aware of their responsibilities and fulfill their obligations so that everyone comes home safe and free from incident or injury.

Stewart Bell

Commissioner for Mine Safety and Health

Overview

SafeOP for petroleum and gas provides information for operators of operating plant to assist them in understanding their legislative obligations and for reviewing their compliance with those obligations by mapping their current safety management system against the elements of section 675 of the *Petroleum and Gas (Production and Safety) Act 2004* (P&G Act).

The document was first produced in 2005 and has been updated in line with legislative amendments to s.675 of the P&G Act. The document has also been reformatted separating out the informative information from the self audit tool.

This document is in two parts.

Part A provides explanatory detail of the content requirements for a safety management plan (SMP) under the P&G Act.

Part B is a self audit tool for use by the operating plant entity to map and self audit their existing safety systems for compliance with the P&G Act. The tool is also used by the Petroleum and Gas Inspectorate as an auditing tool.

Introduction

The P&G Act obligates operators of operating plants to address a number of elements in their safety management plan (SMP) to the extent that they are appropriate for the plant. These are outlined in s.675 of the P&G Act (content requirements for safety management plans), s.388 of the P&G Act (additional content requirements), s.705B (content requirements for principal hazard management plans), and s.59 of the *Petroleum and Gas (Production and Safety) Regulation 2004* (P&G Reg).

The P&G Act and P&G Reg also impose other obligations that may be audited by the Petroleum and Gas Inspectorate of the Department of Natural Resources and Mines.

The self-audit tool (Part B of SafeOP) provides a checklist of items that address each element required under the legislation. The extent to which these need to be addressed will vary depending on the type and complexity of the operating plant.

The self-audit tool can be used to:

- map where the information or process required by a particular element is located in the operator's SMP or system
- identify what is already in place and what needs to be addressed
- determine what evidence exists that the requirement has been met
- state why it is inappropriate or unnecessary to address a particular requirement.

The checklist in the self-audit tool is by no means exhaustive and in many cases, additional items may need to be addressed. The document is presented in sections allowing the operator to map the information provided to their safety management system and make any relevant comments.

Operating plant and safety management plan background

Operating plant is defined in section 670 of the P&G Act and s.10 of the P&G Reg. 'Operating plant' is the term used in the legislation to define facilities, plant, equipment and areas where activities need to be managed under a safety management system regime.

Section 674 of the P&G Act requires the operator of an operating plant to have, for each stage of the plant, a safety management plan that complies with s.675 of the P&G Act. An SMP may be a stand-alone document, but more often the elements of the SMP can be or are already incorporated into the organisation's existing documented safety management system. However constructed, the plan must address all the relevant issues stated in the P&G Act and be an integral part of ensuring the safety of petroleum and gas facilities and activities. To achieve this, it must be a 'living' document, continually used and updated as part of on-going operations.

Many organisations use the framework provided by the standard AS/NZS 4801:2001 (AS4801) *Occupational health and safety management systems–specification with guidance for use* as it provides a good basis for constructing a safety management system. AS/NZS 4804:2001 *Occupational health and safety management systems–general guidelines on principles, systems and supporting techniques* also provides assistance in developing a system.

An AS4801 style system is not, however, mandated under s.675 content requirements. Indeed, if an operator has a system and the P&G Act's SMP requirements can be mapped into it so that employees and regulators can readily access the information, then they are strongly encouraged not to create a new document or system.

The layout of this document (into a number of elements) is not intended as a guide or format for layout of the SMP. In many cases the elements may be addressed in combination or under different headings. A document, which simply cross-references the SMP elements to the organisation's existing safety management system, may be all that is necessary to achieve compliance. What is most important is that the SMP addresses all the relevant criteria contained in the P&G Act and P&G Regulation and, even more importantly, that it are put into practice.

Many operating plant are distinct, standalone facilities (for example drilling plant, pipelines, petroleum processing plant) and the SMP will need to cover all aspects of their commissioning, operation, maintenance, modification and decommissioning. Each of these stages of an operating plant (defined in s.672) requires an SMP to be in place before the stage commences. A separate SMP can be prepared for each stage, or an overall SMP could cover all stages, as long as individual issues unique to a stage are adequately covered in relevant sections. In some cases, such as large industrial operations, the processing, storage and transport of petroleum (as defined in s.10 of the P&G Act) may form only part of a larger operation.

While the SMP for such a plant may be stand-alone for the petroleum part, integration of the requirements of s.675 into the safety management system of the overall operation is appropriate and indeed desirable in many cases. In such cases, a document mapping the s.675 requirements to the system is critical to ensure compliance can be verified through auditing. It should be noted that, for existing plant, there is no need to produce a commissioning SMP in retrospect.

Annual Safety Report

The Executive Safety Manager is obligated to provide the office of the Chief Inspector with an annual report. The report must include:

- a description of the plant, its location and operations
- names and contact information for each operating plant, including the Executive Safety Manager and Site Safety Manager
- the nature and extent of activities carried out at the plant
- significant safety risks at the plant
- whether the plant and its activities complied with the SMP and the P&G Act
- details of any non-compliance, remediation of any non-compliance, or proposal to remedy any non-compliance.

Because the report requires a review of compliance against the P&G Act including the content requirements listed under s.675 the SafeOP Part B audit tool provides a mechanism for that review and assessment.

Further guidance to preparing an annual safety report can be found at
http://mines.industry.qld.gov.au/safety-and-health/annual-safety-reports.htm

Legislative requirement elements for operating plant

The legislative requirements that operators may need to address have been divided into 28 elements (numbered from 1 – 26 including 3A and 13A). These can be grouped into three areas:

1. **Section 675 safety management plan legislative requirements** - The first 22 elements pertain to safety management plan legislative requirements specified in the P&G Act (including element 20, which details four additional sections from the P&G Reg).
2. **Other safety legislative obligations** - Element 21 deals with other safety legislative obligations outside section 675 relevant to operators of operating plant that may be subject to audit.
3. **Coal seam gas regime requirements** - Coal seam gas regime additional requirements are detailed in Elements 22 to 26. These elements deal primarily with additional safety management plan requirements, which the SMP must address, with respect to overlapping coal and petroleum tenure. They are intended to ensure that petroleum exploration and production activities do not adversely affect the current and future safe and efficient mining of coal. Principally, these requirements relate to drilling rig type operating plant. Element 26 describes the other legislative obligations associated with the coal seam gas regime.

Note: Elements 1–21 will apply to some degree to most operating plant. However, the specific items to consider under each element will vary depending on the type, complexity and location of the plant.

Elements 22–26 typically apply to drilling related operating plant, particularly plant whose activities may impact on coal seams.

Quick checklist for safety management plans

The following quick reference checklist is provided to assist operators in ensuring their safety management plans meet the legislative requirements. The checklist is by no means exhaustive and in many cases additional items may need to be addressed.

Safety management plan–quick checklist

Item	Action	Done
	Must-haves	
1	Is the SMP in place before a defined stage of the operating plant commences?	
2	Has a commissioning notice been provided as required under s.673A of the P&G Act and in accordance with guidelines? The PDF document is available at: http://mines.industry.qld.gov.au/assets/petroleum-pdf/guide_commissioning_s673a.pdf	
3	Is the SMP accessible as required under s.676 of the P&G Act?	
4	Have all necessary elements (legislative requirements) been addressed?	
	• for most plant–at least elements 1–17	
	• for a plant within a petroleum authority–also element 18	
	• for MHF related plant–also element 19	
	• for plant drilling near mine workings–also element 20	
	• for plant that may impact on coal mining–also elements 22–26.	
5	If the elements are not addressed, is the reason justified in accordance with s.675(2)?	
6	If the SMP does not follow s.675 format, is there a document that maps the SMP with the elements in the SafeOP document? *Note: This self–audit tool is one means of achieving this.*	
7	Have all other relevant legislative obligations (element 21) been considered and incorporated where appropriate?	
8	Have all statutory positions been identified, and where appropriate, been appointed?	
9	Is risk assessment and management comprehensive and embedded throughout the safety management system and are the procedures commensurate with the complexity of the plant?	
10	Is the plan current and are there processes for it to be kept up to date and to address impacts of change (in complexity and size of plant, new technology, new activities etc.)?	
11	Have plant employees been actively involved in the development of the SMP?	

Index of legislative requirement elements

This guide provides detailed information on all the legislative requirements pertaining to operators of petroleum and gas operating plant, particularly those relating to SMPs. Details for each element can be found in this guide.

Element	Act/Reg section	Description	Application	Page
15	s.675(1) (p)	Key performance indicators to be used to monitor compliance with the plan and the P&G Act.	Universal.	26
16	s.675(1) (q)	(i) Mechanisms for the investigation, recording and review of incidents at the plant. (ii) Implementing recommendations from an investigation or review of an incident at the plant.	Universal.	27
17	s.675(1) (r)	Record management including, for example, all relevant approvals, certificates of compliance and other documents required under the P&G Act.	Universal.	29
18	s.675(1) (s)	To the extent that, because of the *Work Health and Safety Act 2011,* (WH&S Act *Schedule 1, Part 2, Division 1, section 2*, does not apply to a place or installation at the plant, details, including codes and standards adopted, addressing all relevant requirements under that Act that would, other than for that section, apply.	Operating plant on an authority to prospect, petroleum lease or pipeline license.	30
19	s.675(1) (t)	If the operating plant is, under the NOHSC standard, a major hazard facility each matter not mentioned in paragraphs (b) to (r) that is provided for under chapters6 to 10 of that standard.	For operating plant that fall under the definition of a MHF.	32
20	s.675(1) (u)	Another matter described under regulation. Four additional regulatory requirements for an SMP relating to drilling and petroleum processing operating plant		33
	s.59 A	Particular risk assessment for drilling near coal mining areas.	Plant operating in or adjacent to a coal mining lease or in an area where current or abandoned mine workings exist.	33
	s.59 B	Requirement for identification of, and controls for, ignition sources for SMP.	Drilling operating plant.	33
	s.59 C	Standard operating procedures for well completion equipment.	Drilling operating plant that installs well completion equipment.	33
	s.59 D	Lower flammable limit alarm levels for unplanned or uncontrolled gas release.	Petroleum processing facility.	33
21	Various (15 sub elements)	Other legislative obligations subject to audit. There are a number of legislative obligations over and above the specific s.675 and related SMP.	Where applicable.	34
22	s.65(a)	Impacts of stimulation activities on safe and efficient coal mining.	Operating plant drilling or completing a prescribed well and undertaking stimulation activities in a coal seam.	36

Element	Act/Reg section	Description	Application	Page
23	s.65(b)	Additional risks that may arise by operating in or adjacent to a coal mining lease (s.65 of the Regulation for details).	Plant operating in or adjacent to a coal mining lease.	37
24	s.388(1)	Assessment and mitigation of particular potential risks related to safe and efficient mining of coal.	Plant used to explore for, extract, produce or release petroleum within coal seams being completed or tested.	38
25	s.705 A-C	Principal Hazard Management Plan content requirements (s.705 A -C).	Plant operating in area of coal or oil shale mining lease where plant may physically affect safe and efficient mining.	40
26	s.236	Other legislative obligations. Coordination arrangement.	Operating plant drilling or completing a well or particular overlapping production leases subject to a coordination arrangement.	41

Safety management plan elements

Element 1

Section 675(1)(a) a description of the plant, its location and operations

This is information that would typically appear in a document used to induct new employees or in the introduction of an SMP.

Apart from identifying where the plant is physically, it is used to set the context, helping the reader to understand the purpose of the plant, what the main processes and hazards are, and therefore what level of complexity and detail is required in the SMP to safely operate the plant.

The type of information that could be found here includes:

- Street address/location of the plant. Where the SMP covers a number of operating plants, which may be the case for a LPG distributor, the locations of all tanks covered by the SMP should be included. Names and addresses of any agents should also be included. The location of remote plants example: well heads and pipelines, may need to be identified by GPS co-ordinates.
- A plan showing the layout of the plant. Location of critical isolation and abatement equipment such as emergency shut-off, pressure relief systems may be identified. For distribution networks and gas cylinder delivery, a map showing the coverage areas (by agent, if used) would be sufficient.
- A description of petroleum and gas production, storage, transportation and utilisation facilities and associated processing equipment. Flow diagrams should be included where appropriate.
- A very brief history of the plant including its age, when significant modifications were made and previous owners.
- Any major incidents that may have occurred and any special safety features that have been included as a result.
- Estimated number of people on site including employees and contractors, day/night shift personnel. Major variations because of seasonality, shutdown programs, or similar, should be described.
- Suitably scaled maps of the area surrounding the plant indicating the land uses outside the facility, such as industrial, mining, residential and agricultural.
- A map showing the relationship of the plant to petroleum or mining tenures where appropriate.

It is vitally important where a SMP covers multiple plant, that all plant covered by the SMP are clearly identified. Each plant (whether a facility or activity) should be identified by name and a description of the plant provided. For plant that is authorised activities under a petroleum or other authority by virtue of s.670(6) the authority number and name should be included.

Element 2

Section 675(1)(b) organisational safety policies

Senior management drives the culture of any organisation; therefore the key to achieving a safe workplace is a visual demonstration of the commitment of senior management to operating in a safe manner.

This should take the form of clearly written policy statements, dated and signed by the Executive Safety Manager, that:

- states the organisation's safety and health objectives
- declares management's commitment to achieving those objectives
- are clearly understandable and available to all employees and contractors
- are implemented at all levels of the organisation
- are up to date (a common fault is that the policies have not been updated and/or signed by the current Executive Safety Manager).

Section 4.2 of AS/NZS 4801:2001 and section 4.1 of AS/NZS 4804:2001 provide additional guidance in this area.

Element 3

Section 675 (1)(c) organisational structure and safety responsibilities

The organisation needs to define, document and communicate the areas of accountability and responsibility (including those imposed by safety legislation) of all personnel involved in the operation. This should include:

- a current organisational chart that is readily available and clearly identifies those people responsible for the control of work
- job descriptions of those people responsible for the control of work
- a clear definition of the relationship between contractors and the organisation, including identification of the accountabilities and responsibilities of contractors. **The application of each operator's safety management plan at a site should be clearly identified. Typically these are outlined in a bridging document between the relevant SMPs. The bridging document forms part of each SMP.**
- the processes by which safety and health responsibilities are communicated and how those with responsibilities are held accountable
- identification of the resources needed to ensure that safety objectives are met and the safety-management system is implemented, maintained and improved on an on-going basis.

Section 4.4.1 of AS/NZS 4801:2001 provides guidance in this area.

Element 3A

Section 675 (1)(ca) operating plant, other than a coal mining-CSG operating plant – the operator of the plant

The SMP must nominate an Operator in accordance with the P&G Act. The Operator, as defined in s.673 of the P&G Act, must be an individual. This interpretation arises from the wording of the P&G Act which includes requirements for the operator to be appointed and to be appropriately qualified.

The appointment of the Operator must be a formal appointment, by the Executive Safety Manager, so the person is fully aware of their formal obligations under the SMP and the P&G Act. The person must be appropriately qualified [see s.688 (a)]. Evidence of those qualifications should be referenced.

The Operator's obligations include; making, implementing and maintaining a SMP that meets the requirements under s.675 of the P&G Act and ensure that all necessary and reasonable action is taken to reduce the risk at the plant to be **as low as reasonably practicable** (ALARP).

The SMP must be regularly reviewed and these reviews must be documented.

The appointed Operator must have a sound working knowledge of the following key functions:

- carrying out a formal safety assessment as mentioned in section 675(1)(e) of the Act
- carrying out a skills assessment mentioned in section 675(1)(g) of the Act
- carrying out a training and supervision program mentioned in section 675(1)(h); of the Act
- how and when standard operating and maintenance procedures were applied
- the maintenance of machinery and equipment relating to, or that may affect, the safety of the plant
- implementing, monitoring and reviewing and auditing safety policies and safety management plans
- investigating and reviewing incidents at the plant
- implementation of recommendations from an investigation or review of an incident at the plant
- testing and monitoring control systems
- Reporting prescribed incidents as required under a regulation, about a matter prescribed under section 675(1)(u) of the Act
- An Operator may be appointed for more that one plant.

Element 4

Section 675 (1)(d) plant sites for which a site safety manager is required

Under the P&G Act if a SMP requires a site safety manager, the Operator of the plant must appoint an appropriately qualified person as the site safety manager.

Generally, a site safety manager should be appointed for any distinct site that forms part of an operating plant where people are regularly working. The site safety manager carries the primary responsibility for safety at the site and must have the necessary skills and competencies to be aware of all the hazards and mitigating procedures of the jobs at hand. The site safety manager would normally be the person responsible for day-to-day operations at the site.

Depending on the complexity of the operations and nature of the hazards, more than one site safety manager may be required. For example, a site operating on a 24-hour basis may require a site safety manager for each shift. In particular, it is expected there will always be a site safety manager present and actively supervising when hazardous or unusual activities are taking place. Very clear processes and procedures need to be in place to ensure when the manager is not at the site, a nominated replacement has the required competencies and is responsible and accountable for ensuring the obligations of a site safety manager are met.

The requirements for having site safety managers will vary from site to site and also from operation to operation. These should be determined as part of the risk assessment carried out under Element 5. They should consider the level of supervision necessary to reduce the risks and potential consequences of error to as low a level as reasonably practicable and identify the competencies required for all persons with site safety manager responsibilities.

For an unmanned site, the site safety manager is likely to be the person authorising access to the plant.

If no site safety managers are identified as being required, the operator as defined in s.673 is, by default, the site safety manager and must meet the obligations under s.693. These obligations include ensuring that:

- appropriate site inductions are given to all persons entering the site
- each person at a site complies with standard operating and emergency procedures and any other measures (e.g. use of personal protective equipment, control of ignition sources) required, assuring the safety of the site and the person
- appropriate first aid and safety equipment is available, and adequately maintained
- relevant staff are trained in first aid, emergency and other safety procedures.
- The specific procedures to be complied with and equipment required to meet these obligations should be identified, together with the processes and procedures (such as regular audits) that ensure compliance.
- The position descriptions of all persons identified as responsible and accountable for meeting the obligations of a site safety manager should clearly state those responsibilities.
- It should be noted that s.692 of the P&G Act allows for the Chief Inspector to direct the Operator to appoint a site safety manager.

It is expected under this section that all site safety mangers for each plant are listed. This list must be kept up to date and be readily available.

Element 5

Section 675 (1)(e) formal safety assessment consisting of the systematic assessment of risk and a description of the technical and other measures undertaken, or to be undertaken, to control the identified risk

The most critical part and the cornerstone of any SMP is risk assessment. **Risk assessment and risk management must be comprehensive and fully documented.** Every effort must be made to identify all hazards associated with the operating plant. The risks from the hazards need to be assessed and controls to eliminate, prevent and mitigate those risks, identified. Many tools are available to assist with the hazard identification process, such as:

- HAZOP
- fault tree analysis
- job safety analysis
- human error identification methods
- safety and past incident reviews.

The best results irrespective of the tools used, are generally obtained through maximising involvement of the workforce through a consultation process. This also serves to increase the understanding of the hazards and gain ownership of the resulting controls and procedures used to manage the risks. The assessment should be facilitated by someone competent and experienced in risk assessment. For complex plants, the assistance of a risk management professional will probably be necessary, remembering that the involvement of the workforce is essential.

Section 675(3) of the P&G Act requires **the formal risk assessment to state ways to control the risk to an acceptable level.** It is important these **controls are fully described for each identified hazard** and the responsibility for implementing and maintaining them is clear to all parties and is fully documented.

Determination of whether the risks are at an acceptable level, as defined in s.700 of the P&G Act, must be undertaken as part of this process, with additional controls identified and implemented as necessary to ensure that they are reduced and maintained at as low a level as reasonably practicable. The basis for assessing the level of risk must be clearly stated and justified. It is critically important that risk analyses reflect real probabilities and are not unduly biased.

Risk should be determined on criteria other than projected fatalities and should compare the proposed courses of action with known best practice. Risk assessment is not, of course, a one-off effort and must be an integral part of any management-of-change process, permit to work system, planning and design.

On-going management of the risks is the main purpose of the safety management system and links must be established between the identified risks and controls to the system. For example, exclusion zones may be declared around areas of plant containing flammable liquids or gases to eliminate ignition sources. The SMS should describe how these zones are enforced through both physical and procedural controls. If procedural, links to training and awareness programs must be clear.

Section 4.4.6 of AS/NZS 4801:2001 and 4.3.4 of AS/NZS 4804:2001 provide guidance in this area.

ISO 31000:2009 Risk Management – 'Principles and guidelines' provides a useful guide to risk management principles.

The NOPSEMA website has useful information on the evidence that might be needed to demonstrate appropriate risk assessment and management in their safety case guidelines. See <www.nopsema.gov.au/safety/safety-case/safety-case-guidance/>

While aimed at the minerals industry, the Minerals Industry Safety and Health Centre website <www.mishc.uq.edu.au> and, in particular, the Mineral Industry Risk Management Gateway website <www.mirmgate.com>, provide substantial resources and tools with respect to risk assessment and risk management.

Element 6

Section 675 (1) (f) interaction with other operating plant or contractors

Section 675 (1)(f) if there is proposed, or there is likely to be, interaction with other operating plant or contractors in the same vicinity, or if there are multiple operating plant with different operators on the same petroleum tenure

(i) a description of the proposed or likely interactions, and how they will be managed; and

(ii) an identification of the specific risks that may arise as a result of the proposed or likely interactions, and how the risks will be controlled; and

(iii) an identification of the safety responsibilities of each operator.

Because of the wide definition of operating plant, there are a number of situations where there may be multiple operating plant or contractors undertaking activities in the same area.

For example, at a well site on a petroleum lease, a drilling rig, 'fraccing' equipment, the well and the geophysical downhole plant are all defined as operating plant and will interact at the site. It is also common for owners/operators of operating plant to use contractors to undertake certain activities. There may be numerous contractors undertaking activities at the one site.

To ensure safe operations in these types of situations, both current and future, it is critical to identify:

- possible interactions
- the risks of those interactions
- the controls required to manage the potential risks
- who will be responsible for specific activities
- which part of the SMPs is to be used.

Contractor management is an area that needs particular attention and care.

The responsibilities of all operators/contractors must be clearly identified, documented and explained. Mechanisms must be set up to ensure appropriate communication occurs when work is being carried out or proposed. These mechanisms, including the triggers that initiate communication, should be described.

Critically, there must be no gaps in coverage. Safety responsibilities and application of safety systems must be very clearly identified to all parties. One way of addressing this element is **to develop a bridging document that addressed the above issues and specifically outlines the application of different components of SMP elements**. Such a document cannot abrogate the legislative obligations of any Operator but may call up and adopt elements of another Operator's safety management system.

The above requirements are critical where overlapping coal mining and petroleum activities are planned. A number of strategies could be developed as part of any coordination arrangement and incorporated into the relevant SMP or system. These might include:

- The companies agreeing to set up consultative committees to jointly assess risks and establish management controls and system before activities commence.
- The Site Safety Manager for the petroleum activities being appointed to a position within the management structure of the coal operations to ensure input on safety matters.
- The Site Senior Executive being required to sign off before petroleum activities commence on the mining lease.

Element 7

Section 675 (1)(g) a skills assessment identifying minimum skills, knowledge and experience requirements for each person to carry out specific work

This element provides for a training needs analysis (TNA). Critical to this element is the establishment of the minimum competency required by each person working at a plant and specifying the skills and knowledge they should be able to demonstrate in their role. Factors that should be considered when determining competency standards include:

- the inherent risks in the work and activities as identified in the risk assessment carried out as per Element 5
- the roles and responsibilities of people, including requirements to perform specific roles/tasks safely (e.g. specific procedures to be followed)
- the level of supervision of the employees or contractors
- site specific issues, including basic requirements for all people working at the plant.

To determine the standards of competency, analyse people's specific activities and break down their roles into tasks or steps. Use this process to identify the important safety knowledge and skills required for the job.

These can then be identified as required competencies to be used in a description of the position that also includes accountabilities, responsibilities and critical attributes essential for the position. The analysis should be carried out with people experienced in the roles as they can usually best describe the tasks and activities involved.

As well as identifying task/role-specific competencies, more generalised competencies applicable to all persons at an operating plant need to be identified. Typically these could include areas such as emergency plans and procedures, permit to work systems, incident reporting and hazard identification.

Consideration should also be given to competencies established and training provided by external providers and national bodies by reviewing what is available and assessing their suitability.

Most, if not all competencies will have a 'use by' date which will trigger the need for a reassessment of competency and, if necessary, retraining to update skills and standards.

Section 4.4.2 of AS/NZS 4801:2001 and 4.3.2.5 of AS/NZS 4804:2001 provide guidance in this area.

Some generic key areas that should be considered in a TNA are, but not limited to, the following:

- accreditation for working at height
- emergency response training
- risk assessment processes
- gas devices/ monitoring equipment
- 4WD training or defensive driving for off road vehicles
- trainer and assessing skills.

For drilling workers, there are specified competencies required. Reference should be made to s.54AA of the P&G Regulation and the competency standard for petroleum and gas drilling <http://mines.industry.qld.gov.au/safety-and-health/technical-information.htm>

Element 8

Section 675 (1)(h) training and supervision program containing the mechanism for imparting the skills, knowledge, competencies and experience identified in s675(g) and assessing new skills, monitoring performance and ensuring ongoing retention of skill levels

Once the skills, knowledge, and competency needs have been identified (as required by Element 7), they should be imparted to all required persons, and then retained through appropriate refresher training programs and processes. Training should be competency based, particularly for all critical safety related needs. If supervision has been identified as key to ensuring safety, then mechanisms to provide sufficient, competent supervisory resources need to be in place. Both the application of the competencies and the training program itself, need to be monitored.

Examples of ways in which this can be achieved are:

- documented task observation programs
- monitoring of completion rate of training plans.

It is vitally important that any competency-based training assesses not only the elements of competency, but also the complete work task. Competency assessments should not only consider the ability to undertake a task, but should instil an understanding of:

- the task and the whole process in the work environment
- the hazards and consequences of incorrect procedures
- emergency procedures.

Change is a normal part of any work environment and must be accommodated in training programs. The impact of change on required competencies must of course be assessed and then appropriate training programs implemented. The mechanism for identifying change and its impact on required skills and knowledge needs to be described. Ideally, this would form part of a management-of-change process.

Another way of gaining competencies and knowledge is with training performed through registered training organisations (RTOs). RTOs can also provide refresher training to ensure that the currency of the skills and competencies are maintained.

The P&G Reg provides for some specific training requirements, these include:

- Competency Standard for the Petroleum and Gas Drilling Industry (2011). This itemises the minimum competency requirements for persons working on drilling operating plant under s.54AA of the P&G Reg.
- General requirements for training and supervision for activities carried out on drilling operating plant under s.54A of the P&G Reg.
- Training program for persons using well completion equipment under s.54B of the P&G Reg.
- Induction training for accessing land for a resource authority under schedule 1A, Part 2, section 4 of the P&G Reg.
- Specific training and qualification requirements for a gas work licence under s.116 of the P&G Reg.
- Specific training and qualification requirements for a gas work authorisation under s.125A of the P&G Reg.

Section 4.4.2 of AS4801 and 4.3.2.5 of AS4804 provide guidance in this area.

Element 9

Section 675 (1)(i) safety standards and operating procedures applied or to be applied, in each stage of the plant

This requirement focuses on ensuring that operating plant processes that affect, or could affect safety and health are controlled through application of appropriate standards and procedures. These standards and procedures need to be clearly identified and should:

- conform with applicable safety and health legislation, standards, codes and good industry practice
- be updated when found not suitable or when changes to work practices occur.

The site safety manager is obliged to ensure that the identified procedures are complied with.

Schedule 1 of the P&G Reg lists the mandatory and preferred standards that must be complied with.. A mandatory standard must be complied with in its entirety with no allowance for deviation. In the case of preferred standards these must be complied with or if an alternative approach is taken, the deviation must follow the process outlined in s.7 of the P&G Reg. The deviation must be justified through an appropriate risk assessment showing that the risk is the same or less than it would be if the standard had been followed. The risk assessment must be documented. This should be provided with the notice of deviation (if not it will be requested) and be available for audit. Chief Inspector may accept the deviation or require further evidence or steps to be undertaken which may include following the standard. Any deviation that has not followed the required process would be a non compliance. .

There may be other standards / codes of practice including ISO and API standards that are not listed in schedule 1 of the P&G Reg but are considered industry best practice and should be followed.

Standard operating procedures should include a level of checking, inspection or direct supervision commensurate with the risks and potential consequences of error.

The need for one or more levels of supervision or monitoring must be considered and, as a general rule, the more complex the task, the more hazardous it is or the more serious the consequences of it going wrong, the greater the need for close supervision. Consideration must also be given to the relative experience of individuals and crews with mentoring being included for new starters or workers facing new areas of work.

Standard operating procedures (SOPs) must be established for all key activities that are routinely carried out at an operating plant. The SOPs must include such checks and balances to ensure that a mistake by an individual operator does not result in a situation that could cause serious injury or major plant malfunction.

Under s.61A of the P&G Reg there is a requirement for manufacturers of well head equipment to provide operators of drilling related operating plant with procedures for the installation and use of the equipment. There is also a requirement for the operator to incorporate the manufacturer's procedures into their SOPs.

Under s.59C of the P&G Reg there is a requirement for drilling rig operating plant that installs well completion equipment. It is a requirement to have an SOP for the installing of the well completion equipment which includes the manufactures instructions, the fitting of the equipment and the requirement to have appropriately qualified persons.

Job Safety Analysis (JSAs) are an important part of a safety management system; **however, they are not adequate own their own for routine tasks**. JSAs are designed to be kept simple so that they can be used practically by the workforce and are not designed to delve deep into the activities like an SOP.

JSAs are designed for use when the activity is not routine or the routine activity covered by an SOP has a change in circumstance and the SOP is no longer sufficient to achieve an acceptable level of risk. For the drilling industry this is a requirement and is specified under s.54C of the P&G Reg.

Permit to work (PTW) is a key procedure within any safety management system. PTW form a key part of many SOP's. It is essential that there is a robust and fully implemented PTW system at the operating plant with authorised officers who are full trained and aware of their obligations.

The objective of the PTW System is to:

- control access to plant and equipment for identified potentially hazardous tasks
- minimise the risk of injury to personnel
- minimise the risk of damage to plant
- known the location of persons and work being undertaken in case of emergency
- document and communicate uncompleted tasks.

Key features of a PTW system include:

- training of permit holders and permit issuers
- well documented procedures and systems
- accurate record keeping
- robust close out procedures and documenting of incomplete work.

Useful tools: The Wellsite Permit to Work System for the Australian Onshore Oil and Gas industry. <www.drillsafe.org.au/09-06_pres/DrillSafe_Forum_Sep06_SANTOS_Tom_Gouldie_Wellsite_Permit_to_Work.pdf>

Element 10

Section 675 (1)(j) control systems including, for example, alarm systems, temperature and pressure control systems, and emergency shutdown systems

Control systems that could affect safety need to be clearly identified so that appropriate training and education in their function and operation can be put in place.

This requirement is focused on the systems, and their backups, that control processes and react to deviations from normal operating levels. Responses include shutdown functions that can be manually or automatically activated. It is obviously important that such systems are properly calibrated, maintained and tested and the processes for doing this should be readily evident in the SMP.

Safety critical control systems must have undergone appropriate safety integrity level (SIL) assignment in accordance with relevant standards.

Safety shutdown systems must be located so they can be activated in any foreseeable unplanned event and where they do not put the activating person at further risk.

There are specific emergency shut down (ESD) requirements for drilling operating plant in s.54D of the P&G Reg. Failure to have a functional ESD or control systems on safety critical aspects of the plant is likely to result in the issues of a direction / notice to cease work at the plant or part of the plant until the system is corrected.

Element 11

Section 675 (1)(k) machinery and equipment relating to or that may affect the safety of the plant

All safety critical machinery and equipment must be identified and managed appropriately. If equipment fails to perform as designed (for example by losing integrity or operating outside specification), it may result in unsafe conditions. Typically this would include equipment such as pressure vessels, high inventory pipelines, storage tanks, pressure relief valves, blowout prevention devices, flow controllers and flammable gas detectors. Ensuring employees are aware of the equipment and the consequences of it failing is critical for ensuring it is operated and maintained properly. This equipment should be clearly identified as safety critical in relevant training programs, maintenance programs and procedures.

When purchasing or acquiring machinery and equipment, the procurement process needs to include a risk assessment to ensure the equipment complies with all safety requirements.

All Type B gas devices must be certified by an approving authority. To obtain approval, a submission must be provided to the approving authority. The Type B approving authority approval process is available on the DNRM website <www.dnrm.qld.gov.au> along with a list of the approving authorities.

On approval of a submission, the Type B approving authority will issue a certificate under s.733(2) of the P&G Act for the appliance. This will allow for commissioning gas to be provided to the appliance.

Once the appliance is installed and commissioned the Gas Work Authorisation holder will issue a 'Gas System Compliance Certificate' under s.734(3) of the P&G Act. For installation of a Type B device at an operating plant operating under a SMP and not a Gas Work Authorisation, the installation and commissioning of the Type B device must have final certification under s.697(3) of the P&G Act.

All certificates and submission documents need to be retained for auditing purposes.

Under s.54 of the P&G Reg all operating plant used for drilling for petroleum must be fit for purpose and equipped to undertake reasonable remedial measures should an unplanned event occur. Drilling equipment must comply with the mandatory and preferred standards for safety requirements itemised in Schedule 1 of the P&G Reg.

It is considered best practice for drilling equipment not identified in Schedule 1 to be compliant with the API standards. It is also recommended the drilling rigs are inspected by an accredited external party every two years. This ensures the machinery is fit for purpose.

Alterations/modifications to machinery must follow the requirements/guidelines as set out by the original equipment manufacture (OEM), be accompanied with engineering approvals and certification and be documented.

Some types or pieces of machinery may require additional certification/approvals as required by the *Work Health & Safety Act 2011*. These requirements are identified in Element 18 of this document.

Registers

A robust SMP should have documented plant and machinery registers. These registers should detail the number and location of each P&E, the service provider, responsible officers and the last action taken in relation to the P&E. P&E register templates are commonly found by conducting a web search.

Element 12

Section 675 (1)(l) emergency equipment, preparedness and procedures

Many of the preceding elements are clearly designed to prevent incidents occurring that could affect the safety and wellbeing of everyone. However, eventualities are not always identified and controls and systems need to be in place to manage emergencies should they occur.

All potential emergencies need to be identified and equipment and procedures established to minimise their impact. These should be documented in an emergency plan that includes:

- descriptions of potential scenarios such as gas escapes, blowouts, explosions, fires (including bushfires), critical equipment failure, trapped/missing people, flooding, cyclones, power failure, security threat, road/rail transport incidents
- site plan readily available to emergency services showing quantities and locations of hazardous materials, isolation points, assembly points and emergency equipment
- the response procedures for the potential scenarios
- procedures for safe evacuation and the accounting of all employees, contractors and visitors
- roles and responsibilities of employees in the execution of the plan
- training of all personnel in their roles
- frequency of drills and emergency exercises
- processes that ensure review of emergency procedures occurs regularly or whenever significant changes are made
- the emergency and rescue equipment available, its maintenance, and training in its use
- emergency services personnel in exercises and planning.

Note that emergency situations could arise through malfunction or emergencies at neighbouring installations or facilities.

Section 4.4.7 of AS/NZS 4801:2001 and 4.3.5 of AS/NZS 4804:2001 provides guidance in this area.

Element 13

Section 675 (1)(m) communication systems including for example emergency communication systems

This requirement relates to communication systems at the plant and how they operate during normal operational activities and emergencies. As well as internal communication, the methods of calling emergency services during an emergency, including notifying other agencies such as Petroleum and Gas Inspectorate as statutorily required, will need to be documented and kept up to date. There should be clear plans to run exercises to test communication systems.

The documentation should also outline how information is communicated to workers, both externally and internally. For example,

- Are tool box or town house style meetings held?
- Is there a process to collate information from outside the organisation (e.g. safety alerts) once received, identified and communicated to people within the organisation who need it?
- Does the company know where or how to receive the P&G Inspectorates safety alerts?
- Have the company ever downloaded one in the past?
- Does the company know how to view a copy of the most recent safety alert or bulletin?

Element 13A

Section 675 (1)(ma) a process for managing change including a process for managing any change to plant, operating procedures, organisational structure, personnel and the safety management plan

Companies must develop and implement a management of change (MOC) process. This is a safety critical element as it is a common casual factor in incidents. Documentation must be agreed by appropriate personnel, technical, safety, environmental and economical and final approval to be received by one manager overseeing the operations. The management of change procedure should deal with all aspects of the companies operations and be mentioned throughout the SMP. The process should follow the following steps and be documented, Appraisal; Approval; Verification; Documentation and Training.

An implementation plan/program must be documented. The plan/program may include purchasing, work planning, contractors and supervision. All relevant documentation should be updated such as: product specifications, operating procedures, control logic documentation, alarm trips schedules, drawings and manuals, pressure test certificates and training records.

Documented evidence must exist ensuring affected employees and contractors are trained on the impact of the change prior to the restart of the changed process.

Management of change

It would be most unusual if poor management of change were not identified as one of the greatest risks to safety at any operating plant. Procedures need to be in place to ensure that changes/modifications to operating plant, systems, processes and people do not compromise safety. These should cover at a minimum:

- definition of what constitutes a change or modification
- authorisation process for the intended changes
- documentation of the change
- safety implications/assessment of risk associated with the change
- communication processes to ensure details of the change are appropriately disseminated and training provided as necessary
- post change review.

Particular care needs to be taken in defining what a change is. Major plant modifications and design changes are generally obvious and would be expected to trigger appropriate risk assessment processes. These may be subject to its own SMP as a stage of an operating plant. However, an apparently innocuous or minor change can have unexpected consequences and needs to be managed in a disciplined and controlled way. Other than for basic routine operations, a simple checklist may help to decide whether a more rigorous assessment of the operation is required.

For example:

- a change in the supplier of a component should trigger a comparison of material specifications
- a task requiring a permit to work should trigger a risk assessment of the task
- a change in shift roster should trigger a check that required skills and competencies are not compromised or handover arrangements are not impacted.

Element 14

Section 675 (1)(n) the mechanism for implementing, monitoring, reviewing and auditing safety policies and SMPs

Implementation of the SMP must occur as soon as the commissioning commences and inclusion of operation staff is vital at the commissioning stage so that operations can commence safely with all employees and contractors trained in their roles and responsibilities under the SMP. The mechanism for ensuring this occurs needs to be established and documented prior to commencing operations.

Once established the plan needs to be monitored and regularly reviewed to ensure it remains effective in managing risk at the operating plant. The triggers for review, such as a stipulated review period or a significant change, should be identified and must include those required by s.678 of the P&G Act.

Audit processes need to be established to monitor the plan's effectiveness and check that workplace activities comply with the plan.

Deficiencies found during the monitoring, reviewing and auditing process need to be rectified in order for the SMP to be effective. This requires a sound and robust corrective and preventative action process accompanied with an action timeframe for the timely completion of the actions. This process must identify the specific people responsible for completing the actions and the time / duration to close out the action.

Auditing is a critical management tool that measures the 'health' of the SMP or system. Audits must be carried out by competent people, appropriately trained in auditing techniques and able to objectively review and report findings. An audit of the auditing system coupled with regular reporting of audits and the resulting action plan would be an example of how operators could, at least in part, meet their obligations under s.677 of the P&G Act to ensure that the SMP is complied with. Audits, both internal and external, should be scheduled on a regular basis and performance monitored against the schedule.

Audits should include internal and external third party audits for additional verification. Auditors need to test the content of the plan and how it is being implemented.

Sections 4.5.4 and 4.6 of AS/NZS 4801:2001 and 4.4.3 of AS/NZS 4804:2001 provide guidance in this area.

Examples of triggers for review of safety management plan/system include:

- stipulated review periods
- the setting or amendment of relevant safety codes, requirements or standards
- an event or incident relevant to the plant
- changes to the plant that could result in altered risk levels.

(This should be linked to the management of change process).

Element 15

Section 675 (1)(p) key performance indicators to be used to monitor compliance with the plan and this Act

Auditing is one means of checking for compliance. The results of audits, presented in terms of deficiencies found, corrective actions completed, and so on, are an obvious indicator of compliance.

Other reactive and lead indicators should also be established to provide further information.

For example, the normal statistics on injuries and incidents need to be kept and made visible. Data should also be established on 'actual' versus 'planned' for key activities identified in the SMP, such as audits and training in critical procedures. In relevant cases, particularly in the public arena, expected response times to emergencies need to be established as key performance indicators (KPIs). These times should be monitored and recorded.

Indicators or KPIs are regarded as an important part of an organisation's SMP for measuring their performance. They can be used for measuring the performance of the organisation as a whole or for specific activity/processes.

The most popular indicators used by industry are frequency rates and severity rates of accidents based on personal injury for example lost time injury frequency rates (LTIFR). These are lag indicators and these indicators still have their problems as they focus on the consequences as opposed to cause. Therefore an equal mix of both lead and lag indicators need to be established and documented as part of the KPIs.

Examples of lead indicators are the rate (or number) of:

- audits conducted
- training courses held
- incidents analysed
- inspections conducted
- OHS policy and commitment from management.

Examples of lag indicators are the rate (or number) of:

- incidents occurring
- non-compliances from audits identified
- employees successfully trained
- risk controls implemented.

Sections 4.5.1 of AS4801 and 4.2.5 of AS4804 provide guidance in this area.

Some examples of key performance indicators:

- injury and incident statistics
- audit performance measures
- level of corrective actions completed
- key activities identified in the safety management plan (completed and outstanding)
- level of completion of the training plan
- level of completion of planned emergency exercises
- measures of quality of processes would be useful.

Element 16

Section 675(1)(q) mechanisms for the investigation, recording and review of incidents at the plant

(i) Recording, investigating, and reviewing incidents at the plant

Procedures need to be in place to identify report and investigate incidents that did, or could possibly have (near misses, HPI), resulted in:

- death
- injuries
- property damage
- emergency alarm activation other than as part of a routine test
- a fire
- an oil or gas leak
- failures of the SMP
- illness
- disease
- a dangerous event.

The leaders of investigation teams should be appropriately trained and competent.

The investigations should determine absent and failed defences, individual and team actions, task and environmental conditions and organisational factors that may have contributed to the incident. The investigation should clearly identify corrective and preventive actions and recommendations that need to be managed by a sound corrective action process, with timetables for the completion of the actions and with specific people responsible and held accountable.

Sections 705D and 706 of the P&G Act mandates the reporting of particular accidents, prescribed high potential incidents and prescribed incidents to the Chief Inspector. Schedule 2 of the P&G Reg defines prescribed incidents that must be notified to the Petroleum and Gas Inspectorate and the timeframe in which the reporting must be provided. The incident management system of the operating plant needs to ensure appropriate notification and reporting occurs.

It is imperative the requirements of both the P&G Act and P&G Reg, in relation to the timing and content of reporting of incidents are strictly adhered. A guideline to assist operators can be found at <http://mines.industry.qld.gov.au/safety-and-health/technical-information.htm>

There are also additional requirements and actions that must be undertaken in the event of an incident. They include:

- restricting access to the incident site under s.707 of the P&G Act
- offence to enter or remain in incident site if access is restricted under s.708 of the P&G Act.

All the issues above are requirements under the P&G Act and the Petroleum and Gas Inspectorate require they are followed. The Inspectorate has a zero tolerance to incorrect reporting.

The investigation process from the time of incident and the initial incident report through to the close out of the final action item must be fully documented and recorded.

Sections 4.5.2 of AS/NZS 4801:2001 and 4.4.4.2 of AS/NZS 4804:2001 provide guidance in this area.

(ii) Implementing recommendations from an investigation or review of an incident at the plant

The company should have SOPs procedures in place requiring the development and implementation of an action plan for investigation findings and outcomes. Specific people within the company should be appointed to complete the specific actions identified from the findings of the incident investigations.

All action plans should be closed out within the time frames specified by the company and the action personnel held accountable for the completion of the actions.

The company should develop information safety alerts / and or safety bulletins for their staff so lessons learnt from incidents can be passed on to staff to inform them of the outcomes of any investigations.

It is expected the company will fully investigate all incidents. The level of investigation will be commensurate with the extent of the incident and implement any and all corrective, preventive actions and recommendations that arise from the investigation.

The Petroleum and Gas Inspectorate expects investigation reports are provided to the Inspectorate and include all of the actions. The Inspectorate also expects the actions are fully implemented and the closeout of the actions is reported to the Petroleum and Gas Inspectorate.

Element 17

Section 675 (l) (r) record management including, for example, all relevant approvals, certificates of compliance and other documents required under this Act

Document control and record management are integral to any good safety management system.

All documents, information and data critical to safety and health should be properly managed. In particular, all documentation required under the P&G Act, such as approvals, authorisations, certificates of compliance, licences and compliance directions are managed securely and are readily available for inspection.

There needs to be a system in place that identifies the currency of all documents for the SMP. Documents should include a review date designed to ensure that they are kept up to date.

All documents should have version numbers and/or dates and version control mechanisms should be in place. The documentation should also include basic formatting e.g. page numbers and titles.

Sections 4.4.5 of AS/NZS 4801:2001 and 4.3.3 of AS/NZS 4804:2001 provide guidance on document control.

Some examples of record management process in a documented form:

- approvals
- certificates of compliance
- licenses
- training records
- compliance directions
- safety meetings
- daily toolbox meetings
- maintenance records.

Element 18

Section 675 (1)(s) to the extent that, because of the *Work Health and Safety Act 2011*, does not apply to a place or installation at the plant, details, including codes and standards adopted, addressing all relevant requirements under that Act that would, other than for that section, apply.

The intent of this requirement is to ensure that, at an operating plant on a petroleum authority, where the *Work Health and Safety Act 2011* (WH&S Act) does not apply; the health and safety of all persons at that plant are not any less assured than if that Act did apply.

A gap analysis therefore needs to be done to identify any health and safety issues addressed by the WH&S Act that may not be addressed by the other requirements of this section.

Areas which could be of particular relevance to the operating plant include:

- Part 5 of the WH&S Act, relates to consultation, representation and participation. While it is not intended to mandate arrangements exactly as described in the WH&S Act, effective consultation with the workforce on safety and health issues is essential to try to ensure the concerns and issues of all employees are addressed in an open and non-threatening way. Employees also need to be actively involved in workplace inspections, investigation of incidents, workplace changes and in all health and safety related matters. The SMP therefore needs to describe the processes used to achieve these aims.
- Section 5 of the *Work Health and Safety Regulation 2011* (WH&S Reg) defines plant and structures and includes the requirements of the plant and the need for certain plant to be registered. Items of plant that are required to be registered under s.246 of the WH&S Reg should be registered. Items of plant such as boilers, pressure vessels, lifts and cranes are defined in Schedule 5, Part 2 of the WH&S Reg. If the WH&S Reg does not apply to plant at a site formal registration is not required, however, the SMP needs to ensure this equipment is managed to at least meet the standard for registration, with auditable evidence. Registration is a simple way to achieve this.
- Chapter 4 of the WH&S Reg relates to hazardous work. Hazardous work has been divided into seven sections including noise, hazardous manual tasks, confined space, falls, high risk, demolition and driving work.
- Part 4.1 of the WH&S Reg refers to noise. The standards applicable under that regulation should be complied with. The SMP must ensure the operator prevents risk, to persons at the operating plant, from exposure to excessive noise as defined in the WH&S Reg. This should include personal monitoring programs, regular noise level determinations and assessment of effectiveness of mitigation controls as appropriate to the operating plant.
- Part 4.2 of the WH&S Reg refers to hazardous manual tasks. This relates to manual handling, design of the workplace, postures, movements and vibration. The SMP needs to identify these issues and clearly define how the tasks, work area and systems are designed to reduce the risks involved with hazardous manual tasks.
- Part 4.3 of the WH&S Reg relates to confined spaces' design, manufacture, supply, modification and use. The SMP should address all of the requirements of this section of the WH&S Reg. It also includes the responsibility of managing the risks to health and safety, emergency procedures and permits. Schedule 1 of the P&G Reg calls up AS/NZS 2865:2009—safe working in a confined space as a preferred standard. The SMP should ensure this standard is followed in its entirety in regard to all confined spaces. It is important to initially identify all confined spaces such as tanks and vessels and also partially enclosed spaces such as trenches and other excavations.
- Part 4.4 relates to falls and working at heights. The risk of falling during work related activities must be considered during any type of work at an operating plant for example, erection and dismantling of drilling rigs, working from unprotected platforms. The SMP must meet the intent of part 4.4 and any deviations, existing or proposed, from the requirements of this part are risk assessed. It is imperative that the SMP identifies the risk of a fall and specific actions are taken to minimise the risk of a fall. This could include barriers, fall prevention and fall arrest systems. The SMP also needs to take into

account the need for emergency response and rescue should a fall happen.

- Part 4.5 of the WH&S Reg refers to high risk work and defines what high risk work is. Certain work such as rigging and scaffolding, or operating a crane, dozer, excavator, forklift or boiler is deemed high risk work requiring a licence under the WH&S Reg. The SMP should clearly identify how workers at an operating plant performing these activities have the appropriate skills, knowledge and competencies and are at a standard at least equivalent to that required for an authority under the WH&S Reg.
- Chapter 5 of the WH&S Reg relates to plant and structures. This section covers guarding of machinery, operational controls, emergency stops and warning devices. The SMP should cover the requirements of this section and the requirements to control the risks.
- Chapter 6, division 3 of the WH&S Reg relates to excavation work. This section must be considered whenever excavation work is required. The SMP should ensure it meets the intent of division 3 and any deviations, existing or proposed, from the requirements of this section are risk assessed.
- Chapter 7 of the WH&S Reg relates to hazardous chemicals. The SMP should ensure all hazardous chemicals, as defined in chapter 7, are identified. The SMP should require material safety data sheets (MSDSs) to be obtained and made available and appropriate induction and training about the substances is provided. The risk to the health of anyone at the operating plant from all hazardous chemicals must be assessed as part of the formal assessment carried out under element 5 of the SMP and appropriate controls and review processes are put into place. A health surveillance or monitoring program can be implemented, particularly with regard to substances listed in schedule 10 of the WH&S Reg. Benzene and crystalline silica may have particular relevance to the petroleum extraction and drilling industries.

The WH&S section of the Department of Justice and Attorney-General provides further information. <www.deir.qld.gov.au/workplace/index.htm>

A guideline will be available in first quarter 2013 on the Petroleum and Gas Inspectorate safety website <www.dnrm.qld.gov.au> that outlines the jurisdiction of the WH&S Act and the P&G Act at operating plant.

Element 19

Section 675 (1)(t) if the operating plant is, under the NOHSC standard, a major hazard facility each matter not mentioned in section (1)(b) to (r) that is provided for under chapters 6 to 10 of that standard

This requirement is placed on an operating plant that, under Chapter 9 of the WH&S Reg are defined as a major hazard facility (MHF). Chapter 9 and schedule 15 call up many substances that contribute to identification of an MHF; however, for operating plant, as defined under s.670 of the P&G Act, it would be highly unusual for any substance apart from LPG and LNG to significantly contribute to the aggregation total. If LPG or LNG alone is present, an aggregate of 200 tonnes is required.

It is intended that there be a consistent approach across jurisdictions in Queensland with regard to the regulation of MHFs. In Queensland the Hazardous Industries and Chemical Branch (HICB) of Workplace Health and Safety Queensland under the Department of Justice and Attorney-General are responsible for the regulation of all MHFs.

Operating plant that meet the above requirements must comply with the requirements of Chapter 9 and schedules 15-18 of the WH&S Reg. The significant requirements this imposes are largely related to:

- identification of all hazards and events which may lead to a major accident
- safety assessment
- control of risk
- emergency plans
- safety management system
- review of risk management
- licensing
- safety case.

Reference:

Chapter 9 and schedules 15-18 of the Work Health and Safety Regulations (2011) <www.legislation.qld.gov.au/Acts_SLs/Acts_SL_W.htm>

The National Occupational Health and Safety Commission declared a National Standard for the Control of Major Hazard Facilities and a National Code of Practice for the Control of Major Hazard Facilities. **National Standard for the Control of Major Hazard Facilities is NOHSC:1014: 2002**

Element 20

Another matter prescribed under a regulation

Section 675(1)(u) of the P&G Act requires an SMP to include additional risk requirements outlined in the P&G Reg.

Part 3, Division 1 of the P&G Reg identifies four additional requirements for an SMP. Section 59A, B and C relate to drilling operating plant and section 59D relates to petroleum processing operating plant.

Section 59A – particular risk assessment for drilling near coal mining areas

This section covers risks for plant and plant operators who may be operating near mine workings. The requirements could be addressed as part of normal risk assessment and management being conducted for drilling activities. This should specifically consider the potential for this type of incident occurring and what controls are in place to minimise the risk. The accuracy of mine working plans should also be considered.

Note: The impact of drilling activities on current or future mining activities should be addressed elsewhere (see elements 21–24).

Specifically, s.59 of the P&G Regulation provides that an SMP for a drilling operating plant that is in, or adjacent to, the area of a coal mining lease or the area where current or abandoned mine workings exist.

Section 59B – requirement for identification of, and controls for, ignition sources for safety management plan.

This section relates to the requirement to identify and assess the specific risks that may arise from sources or potential sources of ignition at the plant.

This may include a hazardous zone study to identify the ignition sources and implement controls to mitigate the risk.

AS/NZS 60079:2008 needs to be consulted in relation to explosive atmospheres.

Section 59C – standard operating procedures for well completion equipment

This section relates to the requirements for drilling operating plant that installs well completion equipment. The requirements for this section can be incorporated into element 9 (s.675(1)(i) of the P&G Act).

Section 59D – lower flammable limit alarm levels for unplanned or uncontrolled gas release

For the sites where petroleum is processed, stored, transported or used there is an additional requirement for the SMP. The requirement is to identify each relevant gas that could be released from the operating plant and the lower flammable limit alarm level for an unplanned or uncontrolled release of each relevant gas.

Other legislative obligations subject to audit

Element 21

Guide to other legislative obligations

There are a number of legislative obligations over and above the specific s.675 and related SMP requirements against which owners and operators may be audited. Where appropriate, the SMP should provide for this compliance. These obligations include:

- **Operators must:**
  - ensure SMP is accessible at plant as required under s.676 of the P&G Act
  - not carry out activities if there is an unacceptable level of risk to a person or plant at an adjacent of or overlapping coal mining operation under s.699A of the P&G Act
  - comply with safety requirements in relation to drilling rigs under s.54 of the P&G Reg
  - comply with additional obligations for operators of drilling related operating plant including emergency shut down devices, risk assessment and training for well completion activities, requirements for job safety analysis and training, and well bore pressure and flaring requirements, detailed under s.54A – 54E of the P&G Reg
  - ensure each person working on a drilling rig meets the required competencies for their position under s.54AA of the P&G Reg
  - comply with safety provisions and safety requirements relating to coal mining and/or future coal mining under s.66 – 72 of the P&G Reg
  - comply with relevant safety requirements in schedule 1, Part 1 of the P&G Reg to comply with s.708Aof the P&G Act.

- **Designers, importers, manufactures and suppliers**
  - Have obligations to ensure plant complies with safety requirements under s.696 of the P&G Act.
  - Manufacturers of wellhead equipment must comply with s.61A of the P&G Reg to provide procedures for the installation and use of equipment to all operators supplied with the equipment.

- **Installers must:**
  - ensure that the installation of plant complies with the safety requirements and before the plant is made operational must certify that the installation complies with all relevant safety requirements in accordance with s.697 of the P&G Act.

- **Owners must:**
  - ensure the operator of the plant has the necessary competencies to operate the plant in accordance with s.698 of the P&G Act.

  Audit issues: Where plant is leased there is an obligation on the owner to ensure the operator is competent. This would be followed up with the owner in these cases.

- **General persons must:**
  - to the extent of their obligations under the Act take all necessary and reasonable action to ensure no person or property is exposed to more than an acceptable level of risk in accordance with s.699 of the P&G Act
  - comply with safety procedures and obligations under the SMP in accordance with s.702 of the P&G Act
  - comply with instructions of operator or supervisor of the plant in accordance with s.703 of the P&G Act
  - not undertake a willful or reckless act that might adversely affect the safety of anyone at the plant in accordance with s.704 of the P&G Act.

Additional coal seam gas regime requirements for SMPs

The P&G Act introduces specific provisions as part of a coal seam gas regime addressing overlapping coal and petroleum tenure issues. One of the principal reasons for legislating new coal seam gas regime requirements was to ensure that petroleum exploration and production activities did not adversely impact on the current and future safe and efficient mining of coal.

To this end there are a number of additional SMP content requirements for all operating plant that may cause such impacts. Primarily, this will be drilling rig type operating plant.

These additional requirements are outlined in the following four elements (22–25). Note that elements 23 and 24 address very similar issues and essentially identify specific risk assessments and management issues that might also be addressed in elements 5 and 6.

Extracts from the P&G Act and P&G Reg are included for ease of reference.

Element 22

Section 65(a) Regulation-impacts of stimulation activities on safe and efficient coal mining

By virtue of s.675(1)(u) of the P&G Act, the content requirements listed in s.675 also include additional requirements outlined in the Petroleum and Gas (Production and Safety) Regulation 2004.

Section 65(a) of the P&G Reg requires an operating plant drilling or completing a prescribed well, to include a specific identification and assessment of the potential risk to safe and efficient mining or future mining of coal that may be created by stimulation of a coal seam proposed to be carried out in the prescribed well.

Note: prescribed wells include all exploration and production wells drilled on petroleum tenure and also wells drilled to explore for, or produce petroleum on coal tenure (this would include holes drilled specifically for gas exploration or to drain or produce gas).

The impact of stimulation activities, such as hydraulic 'fraccing' in coal seams, on the mineability of the coal is uncertain. The SMP should identify any proposed stimulation activities, their nature and any information on the risk that such activities may have on safe and efficient mining or future mining of coal. Where possible, reference to relevant experience should be included. Such information may be limited, but if possible, make use of existing experiences.

Regulation details

Section 65(1)(a) of the P&G Reg requires that:

(a) *For an operating plant drilling or completing a prescribed well - a specific identification and assessment of the potential risk to safe and efficient mining or future mining of coal that may be created by stimulation of a coal seam proposed to be carried out in the prescribed well, having regard to each of the following—*

(i) the proposed method of stimulation;

(ii) the predicted characteristics of the strata immediately above and below the coal seam;

(iii) the stress regime of the coal seam and surrounding strata;

(iv) information reasonably available to its operator about similar stimulation cases;

Example—

information may include a previous experience of mining through part of a coal seam that has been stimulated

In this section—

***similar stimulation cases** means previous instances involving stimulation of a coal seam in a well—*

(a) involving methods similar to the methods used or proposed to be used by the operator of the operating plant; and

(b) that was carried out in geological and geotechnical conditions that are similar to the conditions relating to the prescribed well.

Element 23

Section 65(b) Regulation-additional risks that may arise by operating in or adjacent to a coal mining lease

By virtue of s.675(1)(u) of the P&G Act the content requirements listed in s.675 also include additional requirements outlined in the P&G Reg.

Under this element, the additional risks that may arise by operating in or adjacent to a coal mining lease need to be assessed and managed. For an operator in an overlapping tenure situation this is essentially just an extension of their normal risk assessment and management requirements. In that regard this requirement could be covered under elements 5 and 6.

The matters that should be addressed include vehicle interaction and joint access issues, and gas and water migration impacts. Any risk assessment should also consider the coal seam hazard guide in schedule 4 of the P&G Reg, which provides some guidance as to the potential hazards to coal mining that could be created coal mining from petroleum exploration and production activities.

A similar requirement is made in s.388 of the P&G Act (see element 24), although the application in that case is wide. Ideally the SMP should address all these requirements in one section (or map these elements accordingly back to one section). There is no need to have different sections separately and repeatedly addressing these related requirements (elements) where they can be more efficiently and holistically addressed in one place.

The information/actions could also refer to the principal hazard management plan requirement under s.705A-C of the P&G Act, which forms part of an SMP (See element 25).

Regulation details

Section 65 (1)(b) of the P&G Reg requires that:

> if the operating plant is in, or adjacent to, the area of a coal mining lease—
>
> (i) a specific identification and assessment of the potential risk posed by the operation of the operating plant to the safe and efficient mining or future mining of coal in the area of the lease; and
>
> (ii) the measures put in place, or proposed to be put in place, by its operator to minimise the risk.
>
> Example—
>
> a buffer zone or area adjacent to the boundary of the area of the coal mining lease in which a particular activity must not be carried out at the operating plant.

Element 24

Section 388 (Act) - Assessment and mitigation of particular potential risks related to safe and efficient mining of coal

The element arises from Chapter 3 of the P&G Act and requires a specific identification and assessment of the potential risk of certain drilling and well-related activities to the safe and efficient mining or future mining of coal. The requirement is similar to element 23 but applies more widely in that it is not tenure related. It applies wherever exploration and production testing and completion activities are being undertaken in coal seams, but is not intended to apply where coal seams are merely drilled through (to access other deeper seams or strata).

Any risk assessment should consider the coal seam hazard guide in schedule 4 of the P&G Reg, which provides some guidance as to the potential hazards that could be created to coal mining from petroleum exploration and production activities.

Generally, in normal petroleum drilling operations, adequate measures have been undertaken if:

- the operator complies with industry best practice in completing and abandoning the well
- the relevant coal seam gas regime regulations are complied with (i.e. downhole survey, well abandonment, cementing and metal equipment in holes).
- However, the risk assessment may identify particular risks that require additional/varying control measures in seams where testing or production is occurring.

Associated with this additional SMP content requirement is an obligation for petroleum operator/tenure holder to consult with any relevant coal mining tenement holder about the SMP (s.386 of the P&G Act). A copy of the relevant parts of the SMP that may impact on the tenement holder must be provided to them. They have 30 business days to provide comment on the SMP to the operator. Reasonable provisions proposed by the tenement holder must be addressed in the SMP. A dispute resolution procedure exists if required (s387 of the P&G Act).

Because there may be a number of operating plants in these situations, the intention of s.386(3) of the P&G Act is to allow the petroleum tenure holder to coordinate the consultation with the coal tenement holder for all operating plant on their petroleum tenure. This would allow for a simpler and single process but it is something the petroleum operator should clarify with petroleum tenure holder. Ultimately the legislative responsibility lies with the petroleum operators.

Note: these requirements tie in with the general obligations (s.306 and s.310 of the P&G Act) of any applicant for a petroleum lease to:

- include in the lease application a proposed SMP that contains proposals to minimise potential adverse effects on possible future safe and efficient mining
- consult with any overlapping coal or oil shale mining tenement holder about the relevant parts of proposed SMP for operating plant proposed on the lease with regard to activities that may affect future safe and efficient mining of coal.

Act details

Section 388 states:

(1) Subject to any exemption granted under section 389, a safety management plan for an operating plant used to explore for, extract, produce or release petroleum within coal seams being completed or tested must include—

(a) an identification and description of all activities carried out, or proposed to be carried out, at the plant that may adversely affect the safe and efficient mining, or future mining, of coal; and

(b) proposed measures to mitigate the risks to safe and efficient mining, or future mining, of mining coal seams to an acceptable level of risk; and

(c) an assessment of the potential risks the activities may cause to the safe and efficient mining, or future mining, of coal.

(2) The proposed measures must comply with—

(a) good industry practice; and

(b) any relevant safety requirement; and

(c) protocols or standards prescribed under a regulation.

(3) A regulation may prescribe—

(a) what is good industry practice; and

(b) matters to which regard must be had in deciding what is good industry practice.

Element 25

Section 705A-C P&G Act Principal hazard management plan content requirements

For operating plant that is operated in the area on or adjacent to a coal or oil shale mining lease and where the operations of the plant may physically affect the safe and efficient mining of coal under the lease there is an additional SMP requirement.

In this case by virtue of s.674(5) of the P&G Act, the SMP must include a principal hazard management plan (PHMP). The requirements for making the plan including what the plan must include are outlined in section 705A-C of the P&G Act. The PHMP must be prepared in consultation with the overlapping/adjacent mining lease holder.

A PHMP is essentially a plan that identifies triggers or likely triggers that must be monitored to ensure that the operating plant activities do not physically impact on safe and efficient coal mining on the overlapping or adjacent mining lease. The PHMP must include response procedures and times.

There is a similar obligation on the site senior executive in section 12A of the Coal Mining Safety and Health Regulation 2001 and the coal mine lease holder in section 19D of the Mineral Resources Regulation 2003.

Element 26

Other legislative obligations—coal seam gas

Section 236 P&G Act – Coordination arrangements

Where activities on a lease are subject to a coordination arrangement, any particular safety provisions/obligations within the arrangement must be complied with (these could be particular communication/operational procedures).

An audit should check that these matters are incorporated into the SMP and are being fully implemented and complied with.

Further information

Queensland Government

Office of the Queensland Parliamentary Counsel
www.legislation.qld.gov.au

Petroleum and Gas Inspectorate
www.mines.industry.qld.gov.au/safety-and-health/petroleum-gas-safety.htm

Work Place Health and Safety
www.deir.qld.gov.au/workplace/index.htm

Industry bodies

Australian Gas Association
www.gas.asn.au/index.php

Australian Petroleum Production and Exploration Association (APPEA)
www.appea.com.au

Australian Pipeline Industry Association
www.apia.net.au

Gas Energy Australia (former ALPGA)
www.lpgaustralia.com.au

Queensland Gas Association
www.qga.org.au

SAI Global
www.sai-global.com

Standards Australia
www.standards.org.au

Other safety related sites

National Offshore Petroleum Safety and Environment Management Authority
www.nopsema.gov.au

American Gas Association
www.aga.org

Minerals Industry Safety and Health Centre
www.mishc.uq.edu.au

UK Health and Safety
www.hse.gov.uk

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Your response to the self-audit tool
If you require assistance or further information regarding the self-audit tool, or if you would like to make suggestions for its improvement, please contact:
gassafe@dnrm.qld.gov.au