



Trade &  
Investment  
Mine Safety

NSW CODE OF PRACTICE | WHS (MINES) LEGISLATION

# Safety management systems in mines



This code of practice has been approved under section 274 of the *Work Health and Safety Act 2011*.

Notice of that approval was published in the NSW Government Gazette referring to this code of practice as Roadway Dust Analysis in Underground Coal Mines on 23 January 2015. This code of practice commenced on 1 February 2015.

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NSW code of practice: Roadway dust analysis in underground coal mines

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Disclaimer: The information contained in this publication is a code prescribed under the *Work Health Safety Act 2011* ('WHS Act') and WHS (Mines) Act. Users are reminded that a code of practice is admissible in proceedings as evidence of whether or not a duty or obligation under the WHS Act or *Work Health and Safety (Mines) Act 2013* has been complied with. New versions of this code may be issued from time to time. It is the responsibility of users to ensure that the version of the code on which they rely is current by checking the Department of Trade and Investment, Regional Infrastructure and Services website.

## Foreword

The *NSW Code of Practice: Safety management systems in mines* is an approved code of practice under section 274 of the *Work Health and Safety Act 2011* (WHS Act).

An approved code of practice is a practical guide to achieving the standards of health, safety and welfare required under the WHS Act, the *Work Health and Safety Regulations 2011* (WHS Regulations), *Work Health and Safety (Mines) Act 2013* (WHS (Mines) Act) and *Work Health and Safety (Mines) Regulations 2014* (WHS (Mines) Regulations)<sup>1</sup>.

A code of practice applies to anyone who has a duty of care in the circumstances described in the code. In most cases, following an approved code of practice would achieve compliance with the health and safety duties in the WHS laws in relation to the subject matter of the code. Like regulations, codes of practice deal with particular issues and do not cover all hazards or risks that may arise. The health and safety duties require duty holders to consider all risks associated with work, not only those for which regulations and codes of practice exist.

Codes of practice are admissible in court proceedings under the WHS laws. Courts may regard a code of practice as evidence of what is known about a hazard, risk or control and may rely on the code in determining what is reasonably practicable in the circumstances to which the code relates.

Compliance with the WHS laws may be achieved by following another method, such as a technical or an industry standard, if it provides an equivalent or higher standard of work health and safety than the code.

An inspector may refer to an approved code of practice when issuing an improvement or prohibition notice.

### The development of this code of practice

This code of practice has been developed under the 'Inter-Governmental Agreement for Consistency or Uniformity of Mine Safety Legislation and Regulations in NSW, Queensland and Western Australia' and forms part of the mining safety legislative framework for these states. Under this agreement, tri-state model legislation was developed that is to be structured and customised differently in each of these states.

This code was also developed in consultation with the Non-Core (tri-state) Legislative Working Group representing the following stakeholders from the mining industry in the tri-states:

- NSW Minerals Council
- Construction, Forestry, Mining and Energy Union (CFMEU) – NSW and Queensland
- Cement, Concrete and Aggregates Australia
- NSW Trade & Investment (Mine Safety)
- Queensland Resources Council
- Queensland Department of Natural Resources and Mines
- Western Australian Department of Mines and Petroleum
- Western Australia Chamber of Mines and Energy

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<sup>1</sup> It will sometimes be convenient to refer generally to 'WHS laws', as defined under s5 WHS (Mines) Act, which includes:

- *WHS Act*
- *WHS (Mines) Act*
- *WHS Regulations*
- *WHS (Mines) Regulations*

Accordingly, this code of practice is based on both:

- the Non-Core (tripartite) Legislative Working Group endorsed tri-state model code on 10 December 2013, and
- the National Mine Safety Framework model code version, developed in conjunction with Safe Work Australia.

A draft of this code of practice was released for public consultation on 2 June 2014 and was approved by the Minister for Energy and Resources, the Hon Anthony Roberts MP on 19 January 2015. The code will be reviewed as required or when the legislation is reviewed.

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## Scope and application

This code provides guidance for mine operators on meeting the requirements of both the WHS (Mines) Regulations and the WHS Regulations in relation to establishing and implementing a safety management system (SMS) for a mine.

### How to use this code

This code includes references to both mandatory and non-mandatory actions. The references to legal requirements contained in the WHS Act, and WHS (Mines) Act, WHS Regulations and WHS (Mines) Regulations are not exhaustive and are included for context only.

This code has been prepared to be consistent with the WHS laws as at the date of publication and should be interpreted, to the extent that if there is any ambiguity, in a manner that is consistent with the WHS laws.

To ensure you comply with your legal obligations you must refer to the latest legislation, which is available on the NSW legislation website ([www.legislation.nsw.gov.au](http://www.legislation.nsw.gov.au)).

This publication does not represent a comprehensive statement of the law as it applies to particular problems or to individuals or as a substitute for legal advice. You should seek independent legal advice if you need assistance on the application of the law to your situation.

The words 'must', 'requires' or 'mandatory' in the code indicate that there are legal requirements that must be complied with. When instructions/advice use the word 'should' this indicates a recommended course of action, while 'may' is used to indicate an optional course of action.

Lists of points in the code should not be read as exhaustive unless this is indicated in the text.

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## Acronyms used in the code

This code uses acronyms for some common and new terms related to the mining parts of the WHS laws:

**AS** - Australian standard produced by Standards Australia

**AS/NZ** - Australian and New Zealand standard produced by Standards Australia

**HOC** - Hierarchy of risk control

**HSR** - Health and safety representative

**SHR** - Safety and health representative

**JSA** - Job safety analysis

**PCBU** - Person conducting a business or undertaking

**PMH** - Principal mining hazards

**PMHMP** - Principal mining hazard management plan

**PPE** – Personal protective equipment

**SMART** - Specific, measurable, achievable, realistic and targeted

**SMS** - Safety management system

**SWMS** - Safe work method statement

**TARP** - Trigger action response plan

**WHS** - Work Health and Safety

**WHS (Mines)** - Work Health and Safety (Mines)

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# 1 Introduction

## 1.1 Who has duties in relation to safety management systems?

The WHS Act requires all persons conducting a business or undertaking (PCBU), including the mine holder and the mine operator, to ensure, so far as is reasonably practicable<sup>2</sup>, the health and safety of workers and that the health and safety of other people is not put at risk from work carried out as part of the business or undertaking. This means eliminating or minimising risks to health and safety, so far as is reasonably practicable.

A mine operator also has duties under the WHS (Mines) Regulations, including establishing and implementing a safety management system (SMS) before mining operations commence.

### WHS (Mines) Regulations

#### 13 Duty to establish and implement safety management system (cl 621 model WHS Regs)

- (1) The mine operator of a mine must establish a safety management system for the mine, in accordance with this Subdivision.  
(details of penalty omitted)
- (2) The mine operator must implement the safety management system for the mine, so far as is reasonably practicable.  
(details of penalty omitted)
- (3) The mine operator must ensure that no mining operations take place during any time at which the safety management system is not established and implemented at the mine in accordance with this subdivision.  
(details of penalty omitted)
- (4) The safety management system must form part of any overall management system that is in place at the mine.
- (5) The safety management system must be designed to be used by the mine operator as the primary means of ensuring, so far as is reasonably practicable:
  - (a) the health and safety of workers at the mine, and
  - (b) that the health and safety of other persons is not put at risk from the mine or work carried out as part of mining operations.
- (6) Subject to subclause (7), the safety management system must provide a comprehensive and integrated system for the management of all aspects of risks to health and safety in relation to the operation of the mine.
- (7) The safety management system must comply with subclause (6) to the extent appropriate to the mine having regard to:
  - (a) the nature, complexity and location of the mining operations, and
  - (b) the risks associated with those operations.

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<sup>2</sup> What is reasonably practicable is set out in section 18 of the WHS Act and involves taking into account and weighing up all relevant matters that are reasonably able to be done in relation to ensuring health and safety including:

- (a) the likelihood of the hazard or the risk concerned occurring
- (b) the degree of harm that might result from the hazard or the risk
- (c) what the person concerned knows, or ought reasonably to know, about (i) the hazard or risk, and (ii) ways of eliminating or minimising the risk
- (d) the availability and suitability of ways to eliminate or minimise the risk
- (e) after assessing the extent of the risk and the available ways of eliminating or minimising the risk, the cost associated with available ways of eliminating or minimising the risk, including whether the cost is grossly disproportionate to the risk.

(8) The safety management system must be documented.

**Note:** A safety management system document is not required to be set out in the same way in which matters are addressed in this regulation so long as the substantive matters required by this regulation are properly addressed. It may be set out in one or more documents or may be placed in documents that also deal with other matters. For example a principal mining hazard management plan may be combined with a principal control plan.

### 1.1.1 Identifying hazards and preparing plans

The SMS is used as the primary means of ensuring the health and safety of workers at the mine. Establishing an SMS requires a mine operator to, among other things:

- identify all principal mining hazards (PMH), assess the risks and prepare a principal mining hazard management plan (PMHMP) for each PMH
- prepare principal control plans depending on the legislative requirements, type of mine and/or risks present, as summarised below:

#### **All mines**

- emergency
- health

#### **Underground mines**

- ventilation

#### **Any mine identifying risks associated with**

- mechanical aspects of plant and structures
- electricity
- explosives.

### 1.1.2 Maintain, audit and review the SMS

This includes assessing emerging hazards and evaluating the effectiveness of existing risk assessments and the controls implemented.

### 1.1.3 Managing risks

Effectively controlling risks at a mine requires the mine operator to follow a risk management process. This code provides practical guidance on how an SMS can assist a mine operator to manage and control risks associated with mining operations. General guidance on risk-management is available in the NSW *Code of Practice: How to manage work health and safety risks* and in 4.1 - 4.4 below.

### 1.1.4 Consultation

Throughout the development and implementation of the SMS, the mine operator must consult with their workers and other PCBUs at the mine, so far as is reasonably practicable.

For details on when the mine operator must consult with workers, refer to 3.2 below.

General guidance on the duty to consult under the WHS Act can be found in the NSW *Code of Practice: Work health and safety consultation, cooperation and coordination*.

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## 2 Safety management system

### 2.1 What is a safety management system (SMS)?

An SMS for a mine is the primary means of ensuring the safe operation of a mine. It brings together a number of procedures and policies to enable a mine operator to follow a systematic approach to achieving and monitoring an effective level of health and safety.

The SMS must be documented. It must be understandable and accessible to those who need to read it. It should be written in plain language. Some workers may require a translation.

The SMS must form part of the overall management system for operating the mine.

### 2.2 Why is a safety management system necessary?

Mining is an industry with a range of hazards and associated risks due to the dynamic and varied nature of the tasks and the environment in which they are done. The hazards range from principal mining hazards (PMHs) specific to the industry that have potential to result in multiple deaths (see 2.4 below), other major hazards such as the loss of ventilation control in the case of underground mines, to hazards common in many work environments such as lifting heavy objects and slips and trips.

While most mines have safety-related policies, plans and processes in place, the SMS ties all the elements together into an integrated system to effectively manage the risks to the health and safety of all workers. A properly integrated system ensures there are no gaps and that all the elements work in a coordinated way. As well as improving work health and safety outcomes at the mine, the SMS should avoid duplicating procedures and processes and reduce paperwork.

### 2.3 Outline of a safety management system

As well as setting out arrangements generally for managing risks at the mine, there are specific requirements for plans relating to particular risks at some mines. These plans fall into two groups depending on the nature of the hazard:

1. PMHMPs are used to manage risks that have potential to result in multiple deaths in a single incident or a series of recurring incidents. Examples include roof collapses, ground collapses, fire or explosion and inrush. Requirements for planning for these types of hazards emphasise identifying and assessing the risks, including their potential interaction with other hazards.
2. PCPs help to ensure that there is an integrated approach to hazards across different aspects of the mining operation. For example, the use of electricity or the use of equipment and machinery. The requirements for these plans vary depending on the type of hazards. For example, the mechanical engineering control plan includes an emphasis on planning for the entire life cycle of plant from its design, introduction to the mine, safe use and maintenance and decommissioning, while the health control plan focuses on eliminating and minimising exposure to health hazards, monitoring workers' exposure and health, as well as managing health information.

Figure 1: The elements of a safety management system



PCPs, PMHMPs and contractors' health and safety management plans are included in the SMS only to the extent that:

- the hazards to which they relate exist at the mine (for example, a ventilation control plan is required only for underground mines) or
- there is no relevant alternative or exemption provided in the WHS (Mines) Regulations; for example:
  - clause 22 gives contractors the option of preparing a contractor health and safety management plan or using the mine SMS
  - clause 184 exempts certain gemstone mines and tourist mines from preparing PMHMPs and PCPs, and specific requirements such as communication between shifts.

## 2.4 Managing principal mining hazards

Principal mining hazards are singled out for special consideration because they are hazards with specific relevance to mining that have the potential to cause an incident with very serious consequences, even though the probability may be low.

As the risks associated with principal mining hazards are not always obvious, they must be identified and then assessed separately and in combination in case there are interactions flowing from one to the other. The plan(s) to manage these hazards - principal mining hazard management plans - must form part of the mine's SMS to ensure that PMHs are managed effectively and in a systematic way. A PMHMP may be combined with a principal control plan.

Underground small gemstone mines, opal mines and tourist mines are exempt under clause 184 of the WHS (Mines) Regulations from the requirement to have PMHMPs. However, the SMS must still control any risks from a list of specified hazards in this clause, including those that can cause fatalities.

The box below sets out the meaning of a principal mining hazard and specific requirements for identifying and assessing the risks of PMHs.

## WHS (Mines) Regulations

### 5 Meaning of principal mining hazard (cl 612 model WHS Regs)

In this Regulation, a *principal mining hazard* is any activity, process, procedure, plant, structure, substance, situation or other circumstance relating to the carrying out of mining operations that has a reasonable potential to result in multiple deaths in a single incident or a series of recurring incidents, in relation to any of the following:

- (a) ground or strata failure,
- (b) inundation or inrush of any substance,
- (c) mine shafts and winding systems,
- (d) roads or other vehicle operating areas,
- (e) air quality or dust or other airborne contaminants,
- (f) fire or explosion,
- (g) gas outbursts,
- (h) spontaneous combustion,
- (i) subsidence,
- (j) a hazard identified by the mine operator under clause 34 of the WHS Regulations.

### 23 Identification of principal mining hazards and conduct of risk assessments

(cl 627 model WHS Regs)

- (1) The mine operator of a mine must identify all principal mining hazards associated with mining operations at the mine.  
(details of penalty omitted)
- (2) The mine operator must conduct, in relation to each principal mining hazard identified, a risk assessment that involves a comprehensive and systematic investigation and analysis of all aspects of risk to health and safety associated with the principal mining hazard.  
(details of penalty omitted)
- (3) The mine operator, in conducting a risk assessment under subclause (2), must:
  - (a) use investigation and analysis methods that are appropriate to the principal mining hazard being considered, and
  - (b) consider the principal mining hazard individually and also cumulatively with other hazards at the mine.

As part of the SMS legislative requirements, mining operations that give rise to a PMH cannot commence at a mine without a PMHMP for that PMH.

## WHS (Mines) Regulations

### 24 Preparation of principal mining hazard management plan (cl 628 model WHS Regs)

- (1) The mine operator of a mine must prepare a principal mining hazard management plan for each principal mining hazard associated with mining operations at the mine in accordance with this clause and Schedule 1.

(details of penalty omitted)

...

- (5) The mine operator of a mine at which there is a principal mining hazard must ensure that no mining operations are carried out at the mine that may give rise to the hazard before the principal mining hazard management plan for the hazard has been prepared in accordance with this clause.

(details of penalty omitted)

Appendix A lists matters that must be considered when developing a PMHMP. Codes of practice are available for some PMHs. Please contact the regulator if you require further information.

## 2.5 Principal control plans

Mine operators must also prepare principal control plans (PCPs) as part of the SMS.

### WHS (Mines) Regulations

#### 26 Principal control plans

- (1) The mine operator of a mine must comply with the requirements of this clause and Schedule 2 with respect to principal control plans.

(details of penalty omitted)

- (2) A principal control plan must:

- (a) be documented, and
- (b) so far as is reasonably practicable, be set out and expressed in a way that is readily understandable by persons who use it.

(details of penalty omitted)

PCPs are different from PMHMPs because they cover hazards and controls that exist across the mining operations for a particular matter, such as electricity. PMHMPs deal only with the identified PMHs and these may exist only in a certain part of the mining operations, such as ground instability where extraction is taking place.

A control plan should be developed only if the hazards it would control are present at the mine. For example, if no explosives are used at the mine then an explosives control plan would not be required and this should be stated in the SMS. Some control plans, such as a health control plan, will be required at all mines.

Similarly, all mines must prepare an emergency plan. *NSW Code of Practice: Emergency planning for mines* provides guidance on preparing an emergency plan.

There are specific requirements for the health, mechanical engineering, electrical engineering and explosives control plans set out in schedule 2 of the WHS (Mines) Regulations. Similarly, there are specific requirements for the emergency control plan set out in schedule 7. The requirements typically include a list of matters that must be considered when developing the control plan or when developing controls to manage the risks that the control plan is addressing. There are specific requirements as to who must be involved in the development of the mechanical engineering control plan and the electrical engineering control plan. The codes of practice for these control plans provide guidance on this.

PCPs may be integrated with each other or with PMHMPs.

Underground small gemstone mines, opal mines and tourist mines are exempt under clause 184 of the WHS (Mines) Regulations from the requirement to have PCPs. Instead, the SMS for these mines must manage a list of risks, that include those covered by some PCPs.

## 2.6 Content of a safety management system

The SMS must provide a comprehensive and integrated system for the mine operator to manage all aspects of risks to health and safety at the mine and must include numerous mandatory elements. The SMS does not need to be compiled in the order listed in table 1 below and elements can be combined, for example, if that's how they are managed. The SMS needs to be

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documented, but it doesn't all have to be in one document. The SMS may refer to a range of policies and procedures in other documents.

SMS details will differ for each mine as it must contain a level of information appropriate to the mine in regard to the nature, complexity and location of the mining operations, and the risks associated with those operations. It must also, as far as is reasonably practicable, be set out and expressed in a way that is readily understandable by the people who will use it.

The required elements for the SMS are set out in clause 14 of the WHS (Mines) Regulation. Extracts of clause 14 below have guidance provided on what they require and how the mine operator should go about addressing them.

## WHS (Mines) Regulations

### 14 Content of safety management system (cl 622 model WHS Regs)

(1) The safety management system document for a mine must set out the following:

#### 2.6.1 Health and safety policy

(a) the mine operator's health and safety policy, including broad aims in relation to the safe operation of the mine,

The mine operator's health and safety policy is a statement of the mine operator's commitment and approach to safety and health at the mine. This will vary considerably between mines but common features of a good health and safety policy include that it is an authoritative statement setting out matters of principle and the actions that are to be taken to support those matters.

For more information see 3.3 below – Health and safety policy

#### 2.6.2 Arrangements for managing risk

(b) the arrangements for managing risks in accordance with clause 9.

**Note:** This includes all control measures implemented in accordance with specific requirements under this Regulation (see clause 33 of the WHS Regulation).

The mine operator's arrangements for managing risk must include an ongoing process for:

- identifying hazards ensuring a competent person conducts and documents risk assessments, as required, that takes into account the nature of the hazard and the likelihood and severity of the risk to health and safety at the mine
- applying the hierarchy of controls to select the best controls to manage risks so far as is reasonably practicable
- recording the procedures used to implement any administrative control (such as a policy, procedure or training that is used to control a risk)
- maintaining and reviewing control mechanisms to ensure they remain effective or are changed
- specific requirements under the WHS or WHS (Mines) Regulations for managing risk (e.g. a requirement to implement a control measure relating to a particular hazard).

For more information, see Chapter 4 below – Developing controls and implementing an SMS.

### 2.6.3 Systems, procedures and plans to control risks – including PMHMPs and PCPs

- (c) the systems, procedures, plans and other control measures that will be used to control risks to health and safety associated with mining operations at the mine, including:
- (i) the principal mining hazard management plans for the mine prepared under Division 2, and
  - (ii) the principal control plans for the mine, and
  - (iii) in the case of an underground mine—the ventilation control plan and ventilation plan prepared for the mine under Subdivision 2 of Division 5, and
  - (iv) in the case of an underground coal mine—the matters required under Subdivision 3 of Division 5,

Systems, procedures, plans and measures to control risk are key elements of the mine's SMS. Depending on the nature of the mine and how the SMS is structured, the systems, procedures, plans and measures to control risk could be stated in the SMS itself or may exist in other documents and manuals that are referenced in the SMS.

Systems, procedures and plans may include:

- procedures to identify hazards, assess risk, select/reject controls and the subsequent evaluation and review of risk controls
- operating procedures to control risk such as systems of work, 'permits to work' and procedures to be followed to operate plant, carry out inspections, when alarms activate and for shut-down/isolation of plant
- maintenance system programs and procedures to be followed covering preventative repair and overhaul activities, including asset integrity
- contingency planning, particularly for emergency shutdowns, isolating processes or hazardous work areas, actions triggered by monitoring systems (e.g. a system that shows workers are being exposed to specific health hazards).

For more information, see chapter 4 and in particular 4.2 to 4.4 on identifying, assessing and controlling risk.

Specific plans that must be included:

- an emergency plan
- any principal hazard management plans
- any principal control plans
- any contractor health and safety management plan – this plan is prepared by contractors that set out the means by which the contractor will manage the risks to health and safety from mining operations carried out by the contractor at the mine. Note: the contractor may use the mine operator SMS instead of having this plan – see clause 22)

Underground coal mines must also include systems and procedures and plans to address the matters set out in Part 2, Division 4, Subdivision 3 of the WHS (Mines) Regulations. These includes a range of matters relating to safety in underground coal mines such as coal dust explosion, ventilation, requirements for explosion protected plant and sealing. Mine operators should contact the regulator if they require further information.

### 2.6.4 Management structure and organisational chart

- (d) the management structure for the management of work health and safety at the mine, including:
- (i) arrangements for filling temporary and permanent vacancies, and
  - (ii) requirements relating to acting positions in the structure, and
  - (iii) the competency requirements for positions in the structure,
  - (iv) the positions within the management structure that have responsibility for the

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management of work health and safety at the mine (including mining supervisors and other persons nominated to exercise a statutory function at the mine) and the names of the relevant persons, and

- (v) for persons nominated to exercise key statutory functions at the mine, the responsibilities for each such person with regard to the supervision of workers at the mine.

The above requirements are largely self-explanatory. Short absences of people in critical positions or key statutory positions should be addressed. For example, specifying that the ventilation officer can only be absent for a certain time before being relieved by another person and any competencies required of that person.

The description of the management structure in the SMS could also include:

- documentation of the structure such as roles, responsibilities and scheduling for actions in relation to implementing and ongoing operation of the SMS
- how the overall SMS is to be managed to ensure it is functioning and who is responsible for this
- an assessment of technical requirements of the position in the structure against actual competence to determine training requirements for them and any delegates for that role as well as for succession planning.

#### 2.6.5 Coordination of PCBUs

- (e) the arrangements in place, between any persons conducting a business or undertaking at the mine, for consultation, co-operation and the coordination of activities in relation to compliance with their duties under the WHS laws,

Any individual, company or partnership that supplies services to the mine, other than as a direct employee, will be a PCBU and has the primary duty of care under the WHS Act as well as other duties and responsibilities under WHS laws.

There must be arrangements in place between the PCBUs to ensure consultation, cooperation and coordination between the various PCBUs working at a mine with respect to their various activities and with a view to ensuring each PCBU can fully meet its WHS duties at the mine.

The mine operator must ensure that the arrangements are in place and must document these arrangements in the SMS.

For more information see 3.4 - Contractors and consultation between PCBUs.

#### 2.6.6 Contractors and contractor health and safety management plans

- (f) if a contractor is working or likely to work at the mine—the control measures that will be used to control risks to health and safety associated with the contractor’s work at the mine, including:
  - (i) any contractor health and safety management plan prepared by the contractor under clause 22, and
  - (ii) how any such contractor health and safety management plan will be integrated with the safety management system for the mine, and
  - (iii) the process for assessing health and safety policies and procedures (including competency requirements) of the contractor and integrating them into the safety management system, and
  - (iv) the arrangements for monitoring and evaluating compliance by the contractor with the health and safety requirements of the safety management system,

In this code the term ‘contractor’ has the same meaning as in the WHS (Mines) Regulations clause 19 and this excludes contractors if they only carry out the following at the mine:

1. delivery services
2. office equipment services
3. office cleaning services
4. catering services.

This element applies only where there are contractors (other than those discussed above) working at the mine. In practice, this clause means that the mine operator has to manage and coordinate the activities of contractors and interactions with others working at or around the mine.

The management or coordination of contractors at a mine is a control measure and the SMS must set out how any contractor's system for working safely will be integrated into the mine's SMS. This requires the mine operator to have a process for assessing the contractor's policies, procedures and required competencies and to integrate the contractor's health and safety management plan within with the SMS. The mine operator should also describe how the operator will evaluate the contractor's compliance with the mine's SMS.

It may be useful to include in the SMS details of how the mine operator will meet its duty to provide all relevant information to contractors to assist them identify risks. For example, how will the mine operator provide the contractor with:

- (a) risk assessment documentation for hazards
- (b) details of administrative controls such as procedures
- (c) the emergency plan.

For more information, see 3.4 – Contractors and consultation between PCBU's.

#### 2.6.7 Emergency procedures and plan

- (g) the emergency procedures and all other matters in the emergency plan for the mine,

Mine operators have duties in relation to emergency planning under both the WHS and WHS (Mines) Regulations. An emergency plan must be prepared that provides for emergency procedures, including evacuation procedures, notifying emergency services and otherwise responding to the emergency. Emergency procedures need to make provision for providing medical treatment and assistance.

Emergency procedures must be tested and competent people must be trained and made responsible for the control of emergency situations. Emergency instructions, including the names and control details of key personnel, must be clear and accessible to the personnel who need them.

For more information, see 3.7 – Emergency plan; and the *NSW Code of Practice: Emergency planning for mines*.

#### 2.6.8 Withdrawal conditions

- (h) the procedures and conditions under which persons at the mine or a part of the mine are to be withdrawn to a place of safety and to remain withdrawn as a precautionary measure where a risk to health and safety warrants that withdrawal,

Withdrawal to a place of safety may be needed as a precautionary measure if there is an increased risk to health and safety that is not an emergency.

An example of a condition that would trigger a withdrawal of workers and others to a specified safe place would be in the event of loss of communications.

For more information see 3.8 - Withdrawal conditions.

### 2.6.9 Information, training and instruction

- (i) the arrangements for the provision of information, training and instruction required under Clause 39 of the WHS Regulations,

All PCBUs must ensure workers are provided with suitable and adequate information, training and instruction to workers in regard to the nature of the work, the risks associated with the work and the control measures implemented. It must be provided in a way that is readily understandable by the workers depending on factors such as their level of English, qualifications, experience and literacy skills.

An example of suitable arrangement could be the common industry practice of scheduled refresher training and/or reassessment, which is usually part of a competency-based training system.

For more information, see 4.7 – Information, training and instruction.

### 2.6.10 Induction

- (j) the induction procedures for workers at the mine,

Induction procedures for workers should ensure that the induction is appropriate to the tasks that the worker will perform. The procedure should address:

- how the content of any induction supports the implementation of the SMS. For example, introduction to safety operating procedures and use of personal protective equipment (PPE)
- how often workers must be refreshed in any part of the induction. For example, changes have occurred at the mine
- keeping records of induction
- regular review and, if required, the process for revising induction content and procedures.

For more information, see 4.7 – Information, training and instruction.

### 2.6.11 Supervision

- k) the arrangements in place for the supervision needed to protect workers and other persons at the mine from risks to their health and safety from work carried out at the mine,

Supervision is essential to check that work instructions and procedures are followed and tasks are completed as required. Arrangements may be for direct or indirect supervision or a mix of levels. What is appropriate to the mine and the number of supervisors required will depend on factors such as remote work and level of risk.

### 2.6.12 Health monitoring

- (l) arrangements in place for health monitoring under Part 3,

The mine operator must provide health monitoring to workers if there is a significant risk of an adverse effect on the worker's health because of exposure to a hazard associated with mining, if the exposure can be detected. For example, exposure to lead can cause lead poisoning and exposure can be tested by periodic blood sampling. Part 3 of the WHS (Mines) Regulations sets out a range of requirements for how health monitoring is to be conducted. Health monitoring is likely to be required if workers are exposed to hazards, including:

- poor air quality
- excessive noise
- hazardous chemicals.

If health monitoring is required at the mine, the SMS must set out how the requirements for health monitoring will be implemented. The monitoring should be for the possible short and long

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term adverse health effects on workers. Triggers should be established to ensure action is taken if monitoring identifies certain levels of adverse risks.

For more information, see 4.4 – Controlling risks.

#### 2.6.13 Consultation and safety role for workers

(m) the consultation and safety role for workers developed under Part 4,

In addition to section 49(f) of the WHS Act, the mine operator must also consult with workers on matters specific to a mine. These include the development, implementation and review of the SMS, and parts of it, such as risk assessments for certain plans.

The mine operator must also implement a safety role for workers that, drawing on their relevant experience working at the mine, enables them to, contribute to:

- identifying PMHs
- providing input on the appropriate risk control measures for PMHs and principal control plans
- providing input on the PMHMPs and their review.

The SMS should set out how this safety role for workers will be achieved at the mine in practice. This may involve the mine operator considering how to give all workers the opportunity to contribute, given factors such as the different types of work undertaken at the mine, how to involve contractors and their workers, etc.

For more information, see 3.2 – Consulting with workers

#### 2.6.14 Incident and notifiable incident response and investigation

(n) the procedures for notifiable incident response and investigation at the mine,

(o) the procedures for the response to, and investigation of, incidents referred to in clause 128,

There is a difference between 'notifiable incident' and 'incident' in the WHS (Mines) legislation:

- A 'notifiable incident' is defined in section 14 of the WHS (Mines) Act and means the death of a person; certain serious injuries or illnesses of a person; or certain dangerous incidents
- By contrast an 'incident' is defined in clause 128 of the WHS (Mines) Regulations and means incidents other than notifiable incidents that either results in certain illnesses or injuries that require medical treatment or are 'high potential incidents'
- 'High potential incidents' are also defined in clause 128 (e.g. the burial of machinery such that it cannot be recovered under its own tractive effort).

The SMS needs to set out in detail the procedures that will be used in the event of either a notifiable incident or an incident.

Incident and notifiable incident management also involves the reporting and investigation procedures, as well as tracking any remedial actions (e.g. new control measures) to ensure they are implemented.

For more information, see 3.5 - Incident and notifiable incident investigation; 3.7 – Emergency plan; and *Guide: Notification of incident and injury*.

#### 2.6.15 Review of control measures

(p) the procedures for the review of control measures,

Control measures must be reviewed in a range of circumstances, including when there is evidence that they are not working as intended. The SMS must include procedures for the review of control measures to address things including:

- how a review of controls will be triggered (some automatic triggers can be found in the WHS (Mines) Regulations such as when an audit indicates a deficiency in a control measure)
- how a review will be undertaken and by whom
- how workers, including supervisors, are to report concerns about controls or evidence of their failure
- any arrangements for prioritising review of critical controls.

See 4.6 below - Reviewing controls.

#### 2.6.16 Records management

(q) the procedures for records management for the mine to ensure compliance with the WHS laws,

The SMS should set out how records, including the mine record, will be kept as well as arrangements for the management of those records and documents to ensure compliance with the various duties under the WHS laws. This might involve, for example, consideration of whether records are to be stored electronically or in hard copy; what arrangements need to be in place to limit access to personal information such as health records and, conversely, how can access to other documents (such as the SMS) will be provided.

For more information, see 4.8 below – Documentation and records management.

#### 2.6.17 Communication

(r) the arrangements for the effective communication of relevant information across shifts by workers, supervisors and other relevant persons and the procedures for documenting those communications,

If the mine employs workers on different shifts, the mine operator needs to arrange for the exchange of information between shifts and with other relevant people. This will include how recording or reporting of such information will be documented. For example, in shift reports, log books or other methods. These arrangements must be set out in the SMS.

In deciding on these arrangements the mine operator should consider:

- any specific controls that apply for example in relation to emergencies, remote or isolated work, and contact with people working underground
- alternative methods of communication in the event of power failure or interruption to communication.

There are specific requirements for communication between outgoing and incoming shifts:

### WHS (Mines) Regulations

#### 27 Communication between outgoing and incoming shifts (cl 630 model WHS Regs)

The mine operator of a mine at which more than one shift is worked each day must implement a system that ensures that, as soon as is reasonably practicable at the commencement of each shift:

- (a) the supervisor of each outgoing shift provides a written report to the supervisor of the incoming shift, in relation to the state of the mine workings and plant and any other matters that relate to work health or safety, and
- (b) the supervisor of the outgoing shift acknowledges in writing to the supervisor of the incoming shift the accuracy of the report and signs (or electronically signs) the acknowledgement, and
- (c) the supervisor of the incoming shift communicates the content of the report to the workers on the incoming shift, and
- (d) the supervisor of the incoming shift acknowledges in writing to the supervisor of the

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outgoing shift that the content of the report has been communicated to workers on the incoming shift and the supervisor of the incoming shift signs (or electronically signs) the acknowledgement.

(details of penalty omitted)

**Note.** For requirements relating to communication with workers carrying out remote or isolated work at the mine, see clause 48 of the WHS Regulation.

#### 2.6.18 Other monitoring

- (s) the arrangements in place for all other monitoring and assessment and regular inspection of the working environment of the mine to be carried out for the purposes of the WHS laws,

**Note.** See clauses 37 and 85 which deal with inspections.

The type of monitoring, assessment and inspection relates to requirements for any workplace under the WHS laws. These requirements should be included in the overall risk management processes for the mine.

For more information, see *NSW Code of Practice: How to manage work health and safety risks* and *NSW Code of Practice: Managing the work environment and facilities*.

#### 2.6.19 Measuring and managing performance of the SMS

- (t) the performance standards under clause 15,

Clause 15 of the WHS (Mines) Regulations relates to performance standards and audits put in place for measuring the effectiveness of the SMS, a description of the ways in which performance standards are to be met and a system for auditing the SMS against the performance standards. It also requires a mine operator to plan for the continual improvement of the SMS, for example in response to changes in conditions, requirements and expectations.

For more information, see 5.1 below – Performance measurement and 5.2 – Audits.

#### 2.6.20 Resources

- (u) the resources that will be applied for the effective implementation and use of the safety management system.

The mine operator must demonstrate in the SMS that adequate resources are allocated to implement, maintain and improve the SMS. Resources include not only adequate financial resources but also people with appropriate skills, time and authority.

For more information, see 4.5 – Implementing the safety management system.

There are several Australian and international standards on health and safety management systems that provide additional general information on preparing an SMS (see Appendix B).

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### 3 Developing a safety management system

This chapter provides guidance on what is involved in developing and establishing an effective SMS.

The key steps below are explained further in this code:

- develop a work health and safety policy
- consult with workers and other PCBUs at the mine, such as contractors
- develop arrangements for managing risk
- develop an emergency plan and determine withdrawal conditions
- develop any required principal control plans (PCP)
- develop any required principal mining hazard management plans (PMHMP)
- establish health monitoring arrangements
- establish arrangements for incident and notifiable incident response and investigation
- develop arrangements for reviewing control measures and reviewing and auditing the effectiveness of the SMS.

Consideration at the development stage should be given as to how the SMS will be regularly monitored, reviewed, audited and tested in a structured way to ensure it remains effective. Opportunities for improvement should be continually identified (e.g. introduction of technology or changes in the workplace or activities) when reviewed.

The mine operator should also consider ensuring the people involved in developing the SMS have the relevant competencies, which should include an appropriate mix of technical and risk management skills. This may be partly achieved through consulting the appropriate persons (see 3.2 below).

Appendix B provides references to other documents that may help the mine operator develop an SMS.

#### 3.1 How much detail is required in a safety management system?

The detail on each mandatory element (see 2.6 above) depends on the nature and complexity of the mining operations and the associated risks, as set out in clause 13 of the WHS (Mines) Regulations below. This means that the level of detail in an SMS will vary from mine to mine. Complex, high-risk operations would need more detail in their SMS than small operations or those with fewer hazards.

The level of detail in an SMS should be enough to ensure that the objectives of the mine's health and safety policy can be achieved by following the processes in the SMS.

#### WHS (Mines) Regulations

##### 13 Duty to establish and implement safety management system

...

- (6) Subject to subclause (7), the safety management system must provide a comprehensive and integrated system for the management of all aspects of risks to health and safety in relation to the operation of the mine.
- (7) The safety management system must comply with subclause (6) to the extent appropriate to the mine having regard to:
  - (a) the nature, complexity and location of the mining operations, and
  - (b) the risks associated with those operations.

...

### What if some systems already exist?

Many mines have policies, plans and processes to manage their health and safety obligations e.g. training, maintenance, traffic management plans, job safety assessments and security procedures. One of the purposes of an SMS is to ensure all such existing policies, plans and processes are linked and integrated.

### What is adequate for less complex mines?

Mines may manage their hazards with a document that is less complex than one needed for a more complex mine, but it must contain the mandatory elements of an SMS (see 2.6 above). In practice, this will probably involve establishing an SMS with the following components:

- health and safety policy
- operating procedures
- maintenance programs
- risk management
- incident management
- emergency plan
- management structure and responsibilities
- training and competence
- communications
- record management.

## 3.2 Consulting with workers

Section 47 of the WHS Act requires PCBUs (including a mine operator) to consult with workers likely to be affected by a health and safety matter, so far as is reasonably practicable. Section 49 below specifies when workers must be consulted:

### WHS Act

#### 49 When consultation is required

Consultation under this Division is required in relation to the following health and safety matters:

- (a) when identifying hazards and assessing risks to health and safety arising from the work carried out or to be carried out by the business or undertaking,
- (b) when making decisions about ways to eliminate or minimise those risks,
- (c) when making decisions about the adequacy of facilities for the welfare of workers,
- (d) when proposing changes that may affect the health or safety of workers,
- (e) when making decisions about the procedures for:
  - (i) consulting with workers, or
  - (ii) resolving work health or safety issues at the workplace, or
  - (iii) monitoring the health of workers, or
  - (iv) monitoring the conditions at any workplace under the management or control of the person conducting the business or undertaking, or
  - (v) providing information and training for workers, or
- (f) when carrying out any other activity prescribed by the regulations for the purposes of this section.

In relation to mining, section 49(f) applies with additional duties for the mine operator to consult under the WHS (Mines) Regulations:

### **WHS (Mines) Regulations**

#### **121 Mine operator must consult with workers** (cl 675R model WHS Regs)

For the purposes of section 49 (f) of the WHS Act, the mine operator of a mine must consult with workers at the mine in relation to the following:

- (a) the development, implementation and review of the safety management system for the mine,
- (b) conducting risk assessments for principal mining hazard management plans,
- (c) conducting risk assessments for principal control plans,
- (d) preparing, testing and reviewing the emergency plan for the mine,
- (e) the implementation of the workers' safety role under clause 120,
- (f) developing and implementing strategies to protect persons at the mine from any risk to health and safety arising from the following:
  - (i) the consumption of alcohol or use of drugs by any person,
  - (ii) worker fatigue.

(details of penalty omitted)

#### **3.2.1 Workers safety role**

Involving workers in developing and verifying the processes to be used will help keep the SMS practical and to the point.

If there are HSRs at the workplace, the mine operator has a duty as a PCBU to involve them in consultation on health and safety matters.

### **WHS (Mines) Regulations**

#### **120 Safety role for workers in relation to principal mining hazards** (cl 675Q model WHS Regs)

The mine operator of a mine must implement a safety role for the workers at the mine that enables them to contribute to:

- (a) the identification under clause 23 of principal mining hazards that are relevant to the work that the workers are or will be carrying out, and
- (b) the consideration of control measures for risks associated with principal mining hazards at the mine, and
- (c) the consideration of control measures for risks to be managed under principal control plans, and
- (d) the conduct of a review under clause 25.

(details of penalty omitted)

It may be convenient for the mine operator to deal with other mandatory requirements in relation to workers as part of the same process, for example the arrangements for:

- communicating the safety role to workers initially and then to all new workers
- training workers in basic risk management techniques

- 
- arrangements for involving workers who are exposed to particular PMHs at the mine as part of the risk management process
  - involving workers in safety audits and reviews
  - using other means of consultation such as through safety committees, any health and safety representatives (HSRs), safety and health representatives (SHRs) and work teams.

### 3.3 Health and safety policy

The health and safety policy, an element of the SMS, is a commitment by the mine operator to improve the health and safety of the mine's workers. The policy should:

- have objectives for improving health and safety
- be documented and communicated to workers and other interested parties (e.g. work group committee members, regulators and community groups, if they are affected by the operations).

The policy should be periodically reviewed so that it remains relevant and appropriate to changing circumstances and as new information becomes available.

### 3.4 Contractors and consultation between PCBUs

The mine operator must consult with other PCBUs at the mine about the cooperation and coordination necessary to discharge their duties safely. This should occur before PCBUs start work at the mine to manage any risk that may arise where their work interacts with that of other PCBUs and the mine operator's workers.

#### WHS Act

##### 46 Duty to consult with other duty holders

If more than one person has a duty in relation to the same matter under this Act, each person with the duty must, so far as is reasonably practicable, consult, co-operate and co-ordinate activities with all other persons who have a duty in relation to the same matter.  
(details of penalty omitted)

The mine operator should schedule regular contact between PCBUs to ensure their work continues to be coordinated so as not to give rise to any WHS issues and that each is able to fulfil their duties under the WHS laws. Consultation, cooperation and coordination are also required of PCBUs who may have only limited contact, such as maintenance specialists, construction contractors and cleaners.

Arrangements to allow for consultation, cooperation and coordination between PCBUs at mines may include:

- scheduled meetings between PCBUs, which the mine operator may facilitate
- procedures for how issues between PCBUs are to be raised and resolved.

For more information on consultation, see the *NSW Code of Practice: Work health and safety consultation, cooperation and coordination*.

#### Contractors

Where other PCBUs such as contractors are involved, the mine operator should clearly define how their work will be overseen and coordinated.

If a contractor is working at a mine (or likely to work at a mine) the mine operator must include in their SMS, control measures that will be used to control risks to health and safety associated with the contractor's work. As noted previously in 2.6, provisions relating to contractors do not apply to business solely involved in office equipment service, office cleaning or catering, or deliveries.

The contractor has the option of either preparing a contractor health and management plan or using the mine safety management system if their review finds it consistent with their arrangements.

## WHS (Mines) Regulations

### 22 Contractor to prepare plan or use safety management system

(1) A contractor must not carry out mining operations at a mine unless:

(a) the contractor:

(i) has prepared a contractor health and safety management plan in accordance with subclause

(2) and has provided a copy of the plan to the mine operator, and

(ii) has obtained written notice from the mine operator that the mine operator has reviewed the plan and is of the opinion that the plan is consistent with the safety management system for the mine, and

(iii) has, so far as is reasonably practicable, implemented the plan, or

(b) the contractor:

(i) has reviewed the relevant parts of the safety management system for the mine, and

(ii) has given the mine operator written notice that the contractor has conducted the review and is of the opinion that the safety management system is consistent with the contractor's arrangements to manage the risks to health and safety from mining operations carried out by the contractor at the mine in accordance with clause 9 and any other requirements under the WHS laws that relate to those operations.

**Note:** Adopting the safety management system for the mine does not reduce the contractor's duty under section 19 of the WHS Act.

(details of penalty omitted)

If the contractor finds the contractor's arrangements are consistent with the SMS, then they must notify the operator in writing of this to indicate they will use the mine SMS when working at the mine. The mine operator should keep this notice and manage the contractor's arrangements in the SMS (see also SMS content in 2.6).

If the contractor prepares a plan, then the mine operator must review it and notify the contractor as to whether the plan is consistent with the mine SMS. A contractor cannot start work at a mine until its plan has been positively reviewed by the mine operator. The contractor's health and safety management plan is included in the SMS, although it is prepared by the contractor.

When reviewing a contractor's health and safety management plan, the mine operator should consider matters such as:

- how each contractor's work system will be assessed, and against what criteria, to determine areas of consistency and/or differences with the mine's SMS
- how any differences in work systems may be resolved so they are integrated e.g. work permits for hot work, detection devices are calibrated for consistency and communication systems use the same frequency
- induction of each contractor's workers to the mine and checking licences and requirements for PPE
- procedures to ensure ongoing communication and consultation with contractors and their workers
- responsibilities for the day to day supervision and inspection of contractor work for risks and implementation of risk controls
- auditing contractors according to a schedule of risks to be managed, which may be based on the past performance of the contractor.

The mine operator should also consider how the contractor's work system is to be integrated with the mine's SMS by, for example:

- adopting the contractor's system or arrangements in total so that it forms part of the mine SMS, which may be appropriate where it has specialised technical processes and expertise that the mine does not possess
- managing differences through formal processes such as scheduled communication meetings, joint workplace inspections and notification procedures to reduce risk
- adopting the contractor's system in part or in full but working separately. Its system would need to operate alongside the mine's SMS to ensure overall risks are controlled, such as when contractors are in separate locations or involved in distinct mining operations.

### 3.5 Incident and notifiable incident investigation

The WHS (Mines) Act requires notification of specific occurrences (see below). However, any unplanned event having at least the potential for injury, ill health, damage or other loss is evidence that the selected controls are not adequately controlling the risk, which in turn triggers the need to review them and the SMS.

#### WHS (Mines) Act

##### 15 Duty to notify of notifiable incidents

- (1) A mine operator of a mine must ensure that the regulator is notified immediately after becoming aware that a notifiable incident arising out of the conduct of any business or undertaking at the mine has occurred.  
(details of penalty omitted)
- (2) A person conducting a business or undertaking at a mine must ensure that the regulator is notified immediately after becoming aware that a notifiable incident arising out of the conduct of the business or undertaking at the mine has occurred.  
(details of penalty omitted)
- (3) Notice under this section must be given in accordance with this section and by the fastest possible means.
- (4) The notice must be given:
  - (a) by telephone, or
  - (b) in writing.  
**Example.** The written notice can be given by facsimile, email or other electronic means.
- (5) A person giving notice by telephone must:
  - (a) give the details of the incident requested by the regulator, and
  - (b) give a written notice of the incident within 48 hours of that requirement being made.
- (6) A written notice must be in a form, or contain the details, approved by the regulator.

##### 16 Notifiable incident at coal mine

- (1) A person who is required to ensure that the regulator is notified of a notifiable incident at a coal mine to which Part 5 applies must also ensure that an industry safety and health representative is given notice of the incident in accordance with this section.  
(details of penalty omitted)
- (2) Notice is to be given in the same manner and form as notice is given to the regulator and is to contain the same details as those required by the regulator in respect of telephone notice or written notice, as the case may be.

## WHS (Mines) Regulations

### 128 Duty to notify regulator of certain incidents (cl 675V model WHS Regs)

(1) The mine operator of a mine must take all reasonable steps to ensure that the regulator (and an industry safety and health representative in the case of a coal mine) is notified as soon as possible (but no later than 7 days) after becoming aware of an incident arising out of the carrying out of mining operations at the mine, but only if the incident:

- (a) results in illness or injury that requires medical treatment within the meaning of clause 13 of Schedule 9, or
- (b) is a high potential incident  
(details of penalty omitted)

(2) The notification under subclause (1) must be made no later than 48 hours after the incident if the incident resulted in an injury or an illness.

(3) The notification must:

- (a) be in writing, and

**Example.** The notice may be given by facsimile, email or other electronic means.

- (b) be in a form required by the regulator, and

- (c) in the case of an incident that results in an illness or injury, contain the details specified in Schedule 8.

(4) In this clause:

**high potential incident** means any of the following:

- (a) an event referred to in clause 179 (a) (i)–(xviii) that would have been a dangerous incident if a person were reasonably in the vicinity at the time when the incident or event occurred and in usual circumstances a person could have been in that vicinity at that time,
- (b) the detection of a concentration of methane in the general body of the air in an underground coal mine (other than in a sealed area or goaf) that is 2.5% by volume or greater,
- (c) an unplanned fall of ground, roof or sides that impedes passage, extends beyond the bolted zone or disrupts production or ventilation,
- (d) a failure of ground support where persons could potentially have been present,
- (e) the burial of machinery such that it cannot be recovered under its own tractive effort,
- (f) progressive pillar failure or creep,
- (g) a sudden pillar collapse,
- (h) an electric arc occurring in the hazardous zone that is directly observed or that leaves visible evidence on an electric cable,
- (i) the failure of the explosion-protection characteristics of explosion-protected plant while that plant is in service in an underground coal mine
- (j) a misfire or unplanned explosion of an explosive or explosive precursor (but not in the case of a misfire at a mine other than a coal mine if the misfired explosive can be fired without any significant risk to a person),
- (k) an unplanned event that causes the withdrawal of more than one person from the mine or part of the mine,
- (l) an unplanned event that causes less than 2 exits from the mine to be available for

use,

- (m) any indication from monitoring data of the development of subsidence which may result in any incident referred to in clause 179 (a) (xvi) or (xvii),
- (n) an injury to a person (supported by a medical certificate) that results in or is likely to result in the person being unfit, for a continuous period of at least 7 days, to perform person's usual activities at the person's place of work,
- (o) the illness of a person (supported by a medical certificate) that is related to a work process and that results in or is likely to result in the person being unfit, for a continuous period of at least 7 days, to perform the person's usual activities at the person's place of work.

**Note:** This clause does not apply in relation to notifiable incidents about which notification must be given under Part 3 of the WHS (Mines) Act.

The mine operator should develop procedures for incident response and investigation to address the following:

- what incidents are reportable
- by what means the regulator is immediately notified in the event of a notifiable incident and what details are needed for the notification
- how a written notification is to be provided to the regulator, if requested, and how it is to be kept
- actions that may be necessary as a result of the incident e.g. preserving the site, isolating the areas and ceasing work if required for a site
- in the instance of an inspector attending, assistance to be provided to the inspector and responses to directions from them such as seizure of items.

It may be helpful to develop a procedure that documents the process used to investigate any incidents. The basic elements of the procedure should be to:

- identify factors that contributed to the incident
- identify necessary corrective action(s) to prevent it or a more serious incident happening again
- implement or modify controls to at least further minimise the risks
- review and, if required, revise the SMS or the relevant parts.

It is recommended that all incidents including near misses are investigated. If corrective actions are required to prevent a similar or a more serious incident in the future, this should be documented in the results of the investigation.

Where possible, workers who were affected by the incident should be involved in the investigation and where appropriate, even be part of the investigating team, and this may be necessary as part of their safety role involving PMHs. Therefore training of workers in carrying out an incident investigation is important to help them provide constructive input.

### 3.6 Health monitoring

The mine operator must provide health monitoring to workers if there is a significant risk of an adverse effect on the workers' health because of exposure to a hazard associated with mining (if the exposure can be detected). For example, exposure to silica in dust can cause silicosis but exposure can be tested by periodic chest x-rays (set out in part 3 of the WHS (Mines) Regulations, see below) which must be described in the mine's SMS and health control plan.

Monitoring of the environment is an important part of controlling exposures.

## WHS (Mines) Regulations

### 109 Health monitoring of worker (cl 675F model WHS Regs)

- (1) The mine operator of a mine must ensure that health monitoring is provided in accordance with subclause (3) to a worker at a mine engaged to carry out work at a mine if:
  - (a) there is a significant risk of an adverse effect on the worker's health because of the worker's exposure to a hazard associated with mining, and
  - (b) valid techniques are available to detect that effect on the worker's health.(details of penalty omitted)
- (2) The mine operator of a mine must also ensure that health monitoring is provided in accordance with subclause (3) to a worker at the mine, or in relation to a specific hazard at the mine, if the regulator so directs.  
(details of penalty omitted)
- (3) The health monitoring must be carried out:
  - (a) in accordance with this Part, and
  - (b) at intervals determined by a registered medical practitioner with experience in health monitoring.
- (4) The mine operator of a mine must ensure that a worker who has experienced adverse health effects from exposure to a hazard at the mine is removed from the hazard.  
(details of penalty omitted)

### 3.7 Emergency plan

Mine operators must prepare an emergency plan, an element of the SMS, and document it in a way that is understandable by those who may have to use it. The plan must include information on what has to be done to respond effectively to emergencies by addressing matters in the:

- WHS Regulations, including clause 43
- WHS (Mines) Regulations, including:
  - clause 88 for what the emergency plan must include and address
  - clause 89 with respect to consultation when preparing an emergency plan
  - 'Schedule 7 Matters to be included in an emergency plan for a mine', which covers the site/ hazard, command structure and personnel, notifications, resources and equipment and procedures.

When preparing the emergency plan, the mine operator of a coal mine or underground mine (with 5 or more workers) must, so far as is reasonably practicable, consult with the primary emergency service and any other emergency service organisation that may be involved in an emergency and:

- address any recommendations they make about testing of the plan and notify them of incidents at the mine
- have regard to other recommendations or advice given about the plan.

If there is a risk to the health and safety of people in the surrounding area from a principal mining hazard, the mine operator of a coal mine or underground mine (with five or more workers) must also consult with the local authority about the possible impact.

Mine operators of mines, other than coal mines or underground workers with less than five workers, should also consider consulting with emergency service organisations to satisfy their requirements for Schedule 7 by cooperating and coordinating with emergency services.

Once the plan is prepared, the mine operator must:

- provide the resources and equipment listed in the plan (e.g. breathing apparatus, lifting gear, fire fighting equipment). See further guidance below.
- must ensure the resources and personnel allocated are adequate for an emergency continuing for more than a single shift
- have a copy of the plan available to the emergency services that have been consulted with upon request
- test the plan at least at intervals no more than 12 months
- review the plan as required – refer to clause 94WHS (Mines) Regulations.

If the mining operation is underground, the WHS (Mines) Regulations specify a range of additional and specific measures required for an emergency plan (see clauses 96 - 102) relating to:

- emergency exits
- safe escape and refuge
- signage for refuges
- self-rescuers
- personal protective equipment
- having competent people at the surface.

The plan requires appointing and training competent people to be responsible for the control of emergency situations. Emergency instructions, including the names and control details of key people, must be clear and accessible to the people who need them.

The mine operator must provide adequate resourcing for the mine emergency plan facilities and equipment.

## WHS (Mines) Regulations

### 92 Resources for emergency plan (cl 668 model WHS Regs)

The mine operator of a mine must ensure that:

- all resources, including rescue equipment, specified in the emergency plan for the mine are provided in accordance with the plan, and
- all resources required for the effective implementation of the emergency plan are provided, and
- all plant and equipment, including communications systems and rescue equipment, specified in the emergency plan is regularly inspected and maintained in good working order.

(details of penalty omitted)

Items such as emergency equipment, exit signs and alarm systems should be inspected, tested and maintained at regular intervals. The suitability, location and accessibility of emergency equipment should be assessed by competent persons.

For more information on preparing an emergency plan see the *NSW Code of Practice: Emergency planning for mines*.

## 3.8 Withdrawal conditions

Withdrawal of mine workers to a place of safety may occur when there is an increase in a level of a risk. For example: increased water uptake, raised contaminant levels, lower oxygen levels or loss of major controls. A loss-of-control situation would exist, for example, if: there was a loss of firefighting capability; failure of hazard monitoring systems; or loss of communication systems,

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such as if the telephone system was not working and a fire or other incident could not be reported.

Risk management processes should be used to identify and assess scenarios likely to trigger the need for a withdrawal of people.

The withdrawal conditions should include:

1. trigger for withdrawal
2. actions to be taken when the trigger is activated
3. communication of the withdrawal
4. route and method of withdrawal, including the assembly point after the withdrawal
5. checking the withdrawal has been carried out
6. re-entry.

The purpose of the withdrawal is to take planned action before the need for an emergency response. Limited activities may have to continue in the affected areas e.g. pumping to continue after production has stopped. Where limited operations are provided for, the withdrawal conditions should specify the activities that may be performed and under what circumstances they are performed.

Withdrawal conditions may be documented as a trigger action response plan (TARP). For further information on TARPs see 4.4 Controlling risks.

## 4 Developing controls and implementing a safety management system

This chapter provides additional guidance on developing control measures to manage risks and recommendations on how to implement an SMS at a mine.

The obligations of a mine operator to consult with workers and any health and safety representative or safety and health representative (formerly check inspectors - set out in 3.2 above) also apply to implementing an SMS.

### 4.1 Managing risk

At the core of an SMS is the process or processes for managing risks, in particular those posed by PMHs. The process selected must comply with the requirements of the WHS (Mines) Regulations relating to managing risks (see below) and should be able to deliver the work health safety objectives defined by the mine's health and safety policy.

Effective risk management starts with a commitment to health and safety from those who operate and manage the business or undertaking. It also needs the involvement and co-operation of workers. If the operator of a mine shows it is serious about health and safety, its workers will be more likely to follow suit.

#### 4.1.1 A step-by-step process

A safe and healthy workplace does not happen by chance or guesswork. Thought must be given to what could go wrong in a workplace and the possible consequences. Then whatever is possible must be done (in the language of the WHS (Mines) Regulations, whatever is 'reasonably practicable') to eliminate or minimise health and safety risks arising from a business or undertaking at a mine.

This process is known as risk management and involves the four steps:

- **identify hazards** – find out what could cause harm
- **assess risks if necessary** – understand the nature of the harm that could be caused by the hazard, how serious the harm could be and the likelihood of it happening

- **control risks** – eliminate the risk or, if this is not possible, minimise the risk through risk control measures
- **review** control measures to ensure they are working as planned.

## WHS (Mines) Regulations

### 9 Management of risks to health and safety (cl 617 model WHS Regs)

- (1) A person conducting a business or undertaking at a mine must manage risks to health and safety associated with mining operations at the mine, in accordance with Part 3.1 of the WHS Regulations.

**Note:** See sections 19, 20 and 21 of the WHS Act as applicable (also see clause 4 of this Regulation and clause 9 of the WHS Regulations).

- (2) A person conducting a business or undertaking at a mine must ensure that a risk assessment is conducted in accordance with this clause by a person who is competent to conduct the particular risk assessment having regard to the nature of the hazard.

(details of penalty omitted)

- (3) In conducting a risk assessment, the person must have regard to:

- (a) the nature of the hazard, and
- (b) the likelihood of the hazard affecting the health or safety of a person, and
- (c) the severity of the potential health and safety consequences.

- (4) Nothing in subclause (3) limits the operation of any other requirement to conduct a risk assessment under this Regulation.

**Note:** A number of specific risk control duties are linked to this clause see clauses 28–32, 38, 43, 44, 50, 52 and 65–70.

- (5) A person conducting a business or undertaking at a mine (who is the mine operator of the mine or who is a contractor) must keep a record of the following:

- (a) each risk assessment conducted under this clause and the name and competency of the person who conducted the risk assessment,
- (b) the control measures implemented to eliminate or minimise any risk that was identified through any such risk assessment.

- (6) A person conducting a business or undertaking at a mine is not required to keep a record of a risk assessment if:

- (a) the risk assessment is one that an individual worker is required to carry out before commencing a particular task, and
- (b) the person keeps a record of risk assessments that addresses the overall activity being undertaken (of which the task forms a part) such as risk assessments carried out in relation to the development of the safety management system for the mine or for a principal mining hazard management plan.

- (7) The record kept under subclause (5):

- (a) if kept by a mine operator, forms part of the safety management system of the mine and the records of the mine, or
- (b) if kept by a contractor who has prepared a contractor health and safety management plan forms part of the plan.

### 23 Identification of principal mining hazards and conduct of risk assessments (cl 627 model WHS Regs)

- (1) The mine operator of a mine must identify all principal mining hazards associated with

mining operations at the mine.

...

(details of penalty omitted)

## 4.2 Identifying hazards

Identifying hazards and risks can be achieved by dividing hazards into groups or even sub-groups and addressing each in different ways, for example, their potential to cause harm, as shown in Table 1:

**Table 1: Identifying hazards by dividing into groups**

Level of potential harm	Type of hazards
Multiple fatalities	<ul style="list-style-type: none"><li>• Principal mining hazards (PMHs)</li><li>• Treated separately, and together, because of their potential risk</li></ul>
Serious injury or death	<ul style="list-style-type: none"><li>• Other 'significant hazards' that are not PMHs</li><li>• Examples include:<ul style="list-style-type: none"><li>○ exposure to electricity, explosives, hazardous chemicals or dangerous goods</li><li>○ other plant that is controlled remotely and specialised or regulated equipment (e.g. scaffolding, lifting)</li><li>○ high pressure fluids</li><li>○ hazardous or restricted work areas (e.g. confined spaces, stockpiles)</li><li>○ work environment, particularly if extreme (e.g. noise, temperature)</li><li>○ fitness for work (e.g. fatigue, stress, impairment due to alcohol or drugs)</li><li>○ drilling and resulting holes</li><li>○ open voids</li><li>○ waste disposal or spillage</li><li>○ back-filling.</li></ul></li></ul>
Injury from doing tasks	<ul style="list-style-type: none"><li>• Common 'high frequency' hazards</li><li>• E.g. manual tasks, using power tools, slips, trips and falls</li></ul>

Injury from new or unexpected hazards	<ul style="list-style-type: none"> <li>• As they arise.</li> <li>• Could be difficult to recognise that a situation is presenting new risks unless there is a process to look for these hazards.</li> </ul>
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During the process of identifying hazards, and all subsequent steps in risk management, the following should be taken into account:

- how work is organised, managed, carried out or changes that may occur
- design of workplaces, work processes, materials, plant and equipment
- fabrication, installation, commissioning, handling and disposal of materials, workplaces, plant and equipment
- purchasing of goods and services
- contracting and subcontracting of plant, equipment, services and labour including contract specification and responsibilities to, and by, contractors
- inspection, maintenance, testing, repair and replacement of plant and equipment.

### 4.3 Risk assessment

Certain hazards generally require different assessment methods, as outlined in table 2 below. Note that hazards should be assessed separately and with other hazards where there is a likelihood for some hazards to interact and increase the risks.

**Table 2: Risk assessment methods for types of hazards**

Hazard	Risk assessment
Principal mining hazards	<ul style="list-style-type: none"> <li>• These hazards must be assessed individually and also with other hazards in case there is potential for these hazards to occur together to increase risk.</li> <li>• Requires a comprehensive risk management plan - a PMHMP</li> <li>• The PMHMP must address all aspects of the associated risks.</li> <li>• The investigation and analysis must be specific and appropriate to the hazard and the results documented (see 4.8 below for more detail).</li> <li>• The assessment must state the likelihood and severity of causing harm, preferably before and after controls are implemented.</li> </ul>
Other significant hazards	<ul style="list-style-type: none"> <li>• These hazards may exist at many workplaces and may be suited to more generic risk assessments.</li> <li>• Generic risk assessments may be restricted to determining if there is anything different or unusual about the risk the hazards might pose in particular work areas.</li> <li>• Assessment of these types of hazards should consider relevant standards, procedures and controls that have been developed by</li> </ul>

	<p>industry.</p> <ul style="list-style-type: none"> <li>• The skills and experience of those completing the assessment process should be relevant to these hazards.</li> </ul>
Common 'high frequency' hazards	<ul style="list-style-type: none"> <li>• There is usually industry knowledge available on how to control the risk of well-known or high frequency hazards.</li> <li>• Assessment can often be restricted to determining if there is anything different or unusual about the risk the hazards might pose in particular work areas.</li> </ul>
New or unexpected hazards	<ul style="list-style-type: none"> <li>• These hazards may be assessed with a number of processes from thorough, documented 'management of change' through to a simple on-the-spot JSA (Job Safety Analysis).</li> <li>• Training of workers is essential to enable them to recognise such hazards and either implement the chosen risk assessment process or refer to a supervisor to trigger a more detailed risk assessment.</li> </ul>

In assessing risks, the mine operator should consider the:

- nature of the hazard or risk
- likelihood of the hazard or risk causing harm
- possible severity of the harm
- state of knowledge (what the industry knows) about the hazard or risk and how to eliminate or minimise them.

Other matters that should be considered in assessing risks are:

- the effect of different operating conditions - normal or abnormal (e.g. shut down and start up, weather and possible misuse of equipment due to human error)
- past incidents and potential emergency situations
- past, current and planned activities
- the reliability and adequacy of existing technology used to control risk i.e. engineering controls.

#### 4.3.1 Risk assessment methods for identified PMH

Once a PMH has been identified, the mine operator must use appropriate risk assessment methods to investigate and analyse each PMH identified (see below) before developing the PMHMP.

### WHS (Mine) Regulations

#### 23 Identification of principal mining hazards and conduct of risk assessments (cl 627 model WHS Regs)

- (1) ...
- (2) The mine operator must conduct, in relation to each principal mining hazard identified, a risk assessment that involves a comprehensive and systematic investigation and analysis of all aspects of risk to health and safety associated with the principal mining hazard.  
(details of penalty omitted)
- (3) The mine operator, in conducting a risk assessment under subclause (2), must:

- 
- (a) use investigation and analysis methods that are appropriate to the principal mining hazard being considered, and
  - (b) consider the principal mining hazard individually and also cumulatively with other hazards at the mine.

A range of processes and techniques are used for assessing risk. They range from 'open' brainstorming workshops and 'closed' sessions using checklists to more complex, formal techniques such as qualitative and quantitative risk matrix methods, top-down fault trees and bottom-up event trees to investigate sequence of events, and layers of protection analysis. In some instances, a combination of processes may be necessary to ensure assessment is comprehensive.

Each method and analysis process or technique has limitations and weakness and requires different levels of resources and detail. Some processes may be better suited to particular PMHs and types of mining operations than others.

Whatever the process chosen for a PMH, it should be logical, comprehensive, systematic and repeatable, if it is to be effective.

A process is 'comprehensive' and 'systematic' when it includes all operations, activities, areas or phases of operations and addresses all aspects of the hazard (e.g. likelihood and consequence) carefully, and applies the same process at each step.

Some questions to ask when selecting a process are:

- Is it suitable for the type and complexity of the operation and the nature of all the hazards present?
- Is it workable and not overly complicated for the operation's needs?
- Is it adequate to differentiate between likelihood and consequence?
- Is it able to assist in understanding and selecting the risk control measures?
- Is it capable of assessing cumulative risk and the potential effect of risk reduction measures?
- Does it challenge the assumption that no new knowledge is required about the PMH?
- Does it provide information that can be understood by those exposed to the PMH?
- Does it ensure an appropriate group of workers is consulted about and actively involved in the assessment?
- Is it able to identify and address uncertainties?
- Is it consistent with the operation's safety policy and the SMS?
- Can it document all methods, results, assumptions and data?
- Can it be used for continuous improvement?

The chosen process should deliver these outcomes:

- provide knowledge, awareness and understanding of the risk of the PMH and how to prevent incidents for inclusion in the PMHMP
- identify the major factors contributing to risk
- identify, evaluate, define and justify the selection, or rejection, of risk controls
- allow the adequacy of selected controls to be tested
- demonstrate that risk is eliminated or reduced so far as is reasonably practicable
- identify concerns to be addressed in community consultation, an SMS and emergency plan.

For more information on risk assessment processes that may be suitable for principal mining hazard assessment, see ISO/IEC 31010, *Risk management – Risk assessment techniques*.

## 4.4 Controlling risks

Controlling risks involves eliminating the risk so far as is reasonably practicable. If this is not able to be done, the risk must be minimised so far as is reasonably practicable. The most effective way is to do this is to select control measures in accordance with the hierarchy of controls set out in the WHS Regulations (see below). Some hazards pose such high levels of risk that some control measures are required by the WHS and WHS (Mines) Regulations. These mandatory controls must always be used. Other controls may also be applied to assist in minimising the risk.

### WHS Regulations

#### 33 Specific requirements must be complied with

Any specific requirements under this Regulation for the management of risk must be complied with when implementing the requirements of this Part.

##### Examples.

- 1 A requirement not to exceed an exposure standard.
- 2 A duty to implement a specific control measure.
- 3 A duty to assess risk.

#### 35 Managing risks to health and safety

A duty holder, in managing risks to health and safety, must:

- (a) eliminate risks to health and safety so far as is reasonably practicable, and
- (b) if it is not reasonably practicable to eliminate risks to health and safety— minimise those risks so far as is reasonably practicable.

#### 36 Hierarchy of control measures

- (1) This clause applies if it is not reasonably practicable for a duty holder to eliminate risks to health and safety.
- (2) A duty holder, in minimising risks to health and safety, must implement risk control measures in accordance with this clause.
- (3) The duty holder must minimise risks, so far as is reasonably practicable, by doing one or more of the following:
  - (a) substituting (wholly or partly) the hazard giving rise to the risk with something that gives rise to a lesser risk;
  - (b) isolating the hazard from any person exposed to it;
  - (c) implementing engineering controls.
- (4) If a risk then remains, the duty holder must minimise the remaining risk, so far as is reasonably practicable, by implementing administrative controls.
- (5) If a risk then remains, the duty holder must minimise the remaining risk, so far as is reasonably practicable, by ensuring the provision and use of suitable personal protective equipment.

**Note:** A combination of the controls set out in this clause may be used to minimise risks, so far as is reasonably practicable, if a single control is not sufficient for the purpose.

It is likely that a combination of control measures will be needed.

When selecting controls, a mine operator needs to first look for controls that will prevent the incident occurring (preventive). Any controls that minimise or otherwise lessen (mitigate) the consequences of the incident are only supplementary to prevention.

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The following considerations may be relevant when selecting appropriate controls:

- can hazards be eliminated or minimised at the design stage?
- are competent people available to verify that designs and modifications meet requirements?
- purchasing and receiving procedures to ensure that items and services are provided along with any safety information from the designer, manufacturer or supplier
- 'permit to work' involving high level of risk (e.g. erecting or digging)
- training needs and changes to work procedures
- if PPE is required, training on correct use and maintenance
- supervision to check that tasks are complete and work instructions and procedures are followed
- records of inspection results, maintenance, repair and alteration of plant
- processes for identifying plant requiring registration and ensuring registration is current
- appropriate controls for working on or near plant and equipment being cleaned, serviced, repaired or altered
- verification that plant and equipment is safe after repair or alteration
- procedures for withdrawing damaged or unsafe plant and equipment from service
- procedures to ensure that the workers are competent and, if required, have the appropriate licences to operate high risk plant.

In assessing risk and selecting controls to implement, the reasons for adopting or rejecting controls to manage principal mining hazards must also be documented. Risk controls for PMHs must be documented in the SMS in the form of the PMHMP.

It may be helpful to document controls for other hazards in the same way as for PMPs so that when they are reviewed (e.g. before making changes, following incidents, deficiencies in controls, HSR/SHR requests) the supporting information is readily available. If a control is reviewed in such circumstances, the SMS or its relevant parts must also be reviewed and, as necessary, revised.

#### 4.4.1 Controls involving monitoring

Some mandatory controls under the WHS (Mines) Regulations involve monitoring. For example, the WHS (Mines) Regulations require a mine operator to carry out monitoring in relation to, among other things:

- air quality (exposure to airborne dust must be monitored in all mines and additionally the air quality in underground mines must be monitored)
- ground movement.

It is likely that mine operators will also decide to carry out monitoring as part of their risk management processes.

For example, monitoring may be used to manage the risks associated with:

- exposure to hazardous chemicals or radiation
- worker fatigue
- consumption of alcohol by workers
- wear or other deterioration of structures or plant.

Matters to consider when selecting monitoring methods:

- determining the correct monitoring intervals (for example, if a failure might take five minutes from first indications, then monitoring should be set for two minute intervals or whatever frequency determined by a risk assessment)
- are parameters and limitations known and how can they be checked?

- 
- how do you verify the effectiveness of the control?
  - what level of maintenance is required to keep the control effective and is it on the maintenance schedule?
  - what are the consequences if the control fails? (for example, is an automatic shut off triggered)
  - what training/re-training is required for workers?
  - how often does the control need reviewing?

#### 4.4.2 Trigger action response plans

There may be instances where monitoring has been put in place to detect a slowly deteriorating trend (e.g. increasing risk of an inundation or inrush).

A trigger action response plan (TARP) is an example of a risk-management tool that triggers a planned early response in these instances. It is widely used in the industry to prevent 'normalisation', which means accepting slow deterioration as 'normal' because it is not much different from day to day. If there is no planned response in place for these particular hazards, a decision to put a risk control in place may be delayed until the hazard cannot be easily controlled.

TARPs summarise the overall monitoring arrangements and include planned actions ready to implement when certain trigger points are detected by monitoring. However, TARPs should be put in place only after a risk assessment has verified the selection of the most effective control measures.

Important factors to be considered when developing TARPs are:

- simplicity - easily understood triggers designed for the people that are expected to identify them
- clear linkage - the actions required are linked to, and appropriate to, the trigger that initiates the action
- clear accountability - the actions are assigned to a person who has the authority and is available to take the appropriate actions
- communication - there is clear communication between all affected people including operators, engineers and between shifts
- escalation - there are escalating actions linked to deteriorating conditions e.g. stopping mining and evacuation at the higher trigger levels.

#### 4.5 Implementing the safety management system

The objective of successfully implementing an SMS is the systematic and coordinated management of hazards: identifying them, assessing associated risks, selecting suitable control measures and applying those control measures at the mine. Maintaining controls and regularly reviewing their effectiveness is essential to ensure health and safety at a mine.

To implement the SMS the mine operator needs to ensure that what is set out in the SMS is followed in practice. Implementing the SMS will include ensuring that risk controls are used and maintained, for example:

- safe work procedures are understood and followed
- equipment is maintained
- required PPE is used
- staff know how to raise safety issues.

Effective risk management also requires monitoring and ongoing assessment as well as regular inspections of a mine's total working environment to ensure that nothing is missed. These arrangements must be described in the SMS and should include:

- 
- specific and general control measures needed for the workplace such as monitoring air quality
  - who will do the monitoring, assessment and inspections, and how often?
  - who will assess results of any monitoring and take any required action?
  - the competency of staff undertaking inspections or monitoring and any training needs they may have
  - procedures for carrying out monitoring, assessments and inspections to ensure they are effective and accurate
  - the scope for inspections and the tools needed e.g. checklists
  - the reporting of results and outcomes and ensuring the actions necessary to deal with any issues are identified and completed
  - auditing and reviewing the activities.

See above for 4.1, 4.3 and 4.4 on managing risk at mines and 4.2 for more on identifying hazards. For more information on risk management see the NSW *Code of practice: How to manage work health and safety risks*.

#### 4.5.1 Resources

The mine operator must have the resources to establish and implement the SMS. Moreover, the mine operator must set out in the SMS the resources needed to implement, maintain and, if required, improve the SMS, and to achieve the health and safety policy's objectives. Resources include people with skills, appropriate time, authority and financial delegation necessary.

The performance standards set for effective operation of the SMS, including auditing and review, will also help determine the types and levels of resourcing required to implement the SMS. For example, a large mine might use work orders to log and process maintenance activities and equipment repairs. If the SMS identifies that 95% of work orders relating to safety hazards are to be completed within 48 hours, the mine operator needs to ensure that sufficient resources are allocated. Reporting and monitoring arrangements should be put in place to measure whether this is being achieved. If not, extra workers may need to be assigned to this work.

Once the level of resources is determined, procedures may need to be developed to co-ordinate their use and to schedule and allocate responsibility for them. Complex mining operations are likely to need more than one person to co-ordinate various resources, such as the number of contractors and PCBUs working together in different parts of the operation.

Coordination of resources may be simpler at smaller mining operations but it is still important to ensure that everyone understands who has responsibilities for safety related tasks and that these tasks are fulfilled. This should include routine matters such as housekeeping and maintenance and less routine matters such as identifying hazards or making changes to equipment or work practices.

#### 4.5.2 Managing change

The SMS must be designed to be used by the mine operator as the primary means of discharging the primary duty towards workers and other persons. As the mine operator's duty is an ongoing duty, it is implicit that the SMS should be designed to address the management of change within the mining operations. Provisions in this regard include the duty to:

- maintain an effective SMS
- select and maintain effective controls
- continually improve the safety management system
- plan for temporary vacancies in the management structure
- adopt a 'life-cycle' approach in relation to plant and electrical installations.

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There are two types of change that should be considered and included in the SMS:

- introduced change - such as changed equipment, staff or procedures; and
- changing conditions or environment.

Both involve similar issues, but it may be helpful to address them separately to better highlight the need to:

- manage the introduction of changes rather than just respond to issues
- monitor conditions to look for any change in hazards or risks.

Managing change should involve implementing methods to identify material changes in working conditions, systems of work and resources etc that may pose a risk to workers. It would also include considering changes to controls. Many serious and fatal accidents have occurred because conditions changed when a task was being completed, and these changed conditions were not adequately controlled. People tend to do what they have always done and not recognise changed conditions. When conditions change, they get caught out. Managing change in relation to every task at the mine should be emphasised by management and supervisors.

Methods of identifying and managing changes may include:

- consultation with people involved in the work
- assessment of the scope of change included in the approval process for plans or procedures
- assessment of the scope of change included in the approval process for recruiting or promoting people
- ensuring all workers do a field risk assessment before starting work on a task, particularly identifying any changed conditions
- before work starts, supervisor procedures/practices require risk identification for any changed conditions to ensure they are controlled adequately, for example:
  - (a) wet haul roads may mean slower vehicle maximum speeds
  - (b) reminding workers of overhead power lines when equipment is being moved
  - (c) a resource change when different or new equipment is introduced. Supervisors should identify the differences in operation each time and ensure workers are familiar with them.

## 4.6 Reviewing controls

Once the selected control measures are in place they must be reviewed under certain circumstances. Note that a review of a control measure also triggers a review of the SMS (see Chapter 5).

### WHS (Mines) Regulations

#### 10 Review of control measures (cl 618 model WHS Regs)

- (1) A person conducting a business or undertaking at a mine must review and as necessary revise control measures implemented under clause 9 in the following circumstances:
  - (a) an audit of the effectiveness of the safety management system for the mine indicates a deficiency in a control measure,
  - (b) a worker is moved from a hazard or assigned to different work in response to a recommendation contained in a health monitoring report provided under Part 3,
  - (c) an incident referred to in clause 128 occurs,
  - (d) any other incident occurs that is required to be notified to the regulator under the WHS laws.

**Note:**

- 1 See sections 19, 20 and 21 of the WHS Act as applicable (also see clause 4 of

this regulation and clause 9 of the WHS Regulations).

2 This requirement is in addition to the requirement under clause 38 of the WHS Regulation (see clause 33 of the WHS Regulation).

3 This clause applies to a mine operator (see section 5 (2) of the WHS (Mines) Act).

(2) The mine operator of a mine must ensure that a control measure that is the subject of a request by a health and safety representative under clause 38 (4) of the WHS Regulations is reviewed and as necessary revised, whether the request is made to the mine operator or notified to the mine operator under subclause (3) by another person conducting a business or undertaking at the mine.

**Note:**

1 See sections 19, 20 and 21 of the WHS Act as applicable (also see clause 4 of this Regulation and clause 9 of the WHS Regulation).

2 This requirement is in addition to the requirement under clause 38 of the WHS Regulations (see clause 33 of the WHS Regulation).

(3) A person conducting a business or undertaking at the mine who is not the mine operator of the mine must immediately notify the mine operator of a request made to the person under clause 38 (4) of the WHS Regulations.

(details of penalty omitted)

(4) A health and safety representative for workers at the mine may request a review of a control measure under clause 38 (4) of the WHS Regulation as if the circumstances referred to in subclause (1) were included as a circumstance in clause 38 (4) (a) of the WHS Regulation.

A health and safety representative may also request that a control measure be reviewed if they hold a reasonable belief that a control measure that affects a worker they represent has not been adequately reviewed and that:

- the control measure does not control a risk it was implemented to control
- that a change to the workplace is going to occur that necessitates a change to the control measure
- a new hazard or risk has arisen
- the results of consultation under the WHS laws indicates that a review is necessary.

A review may involve measuring against performance standards to identify any deficiencies in control measures (e.g. an incident or deficiencies found during an audit). Effective review of a control measure may require a level of recording and documentation (i.e. explaining why a review was needed and any corrective changes to controls). The mandatory review of control measures after an incident is required to be documented including details about the incident, the WHS issues, the review undertaken, the recommendations and whether any control measure or part of the SMS needs to be changed. Chapter 5 provides more detail about performance measures and review.

## 4.7 Information, training and instruction

The mine operator has a duty to ensure a range of information, training and instruction is provided to workers, which could be achieved by having an initial induction and orientation for workers, stipulating work requirements or procedures, training and instruction in relation to specific risk-control measures and refresher training. Where the mine operator and other PCBU's at the mine both have duties to provide information, training and instruction to certain workers under clause 39 of the WHS Regulations, they must consult, coordinate and consult with those PCBU's (see 3.4 above). Essential safety information and instruction must also be provided to visitors.

There are specific requirements for mining operations in relation to providing information on the SMS set out in the WHS (Mine) Regulations:

### WHS (Mines) Regulations

#### 103 Duty to inform workers about safety management system (cl 675A model WHS Regs)

- (1) The mine operator of a mine must ensure that, before a worker commences work at the mine:
  - (a) the worker is given a summary of the safety management system for the mine that is relevant to the worker's work at the mine, and
  - (b) the worker is informed of the right to see the documented safety management system for the mine prepared under clause 13, and
  - (c) the worker is given a summary of each principal mining hazard management plan prepared under clause 24 that relates to any risk that may arise in the course of the worker's work at the mine,  
and
  - (d) the worker is informed of the right to see any principal mining hazard management plan prepared under clause 24.

(details of penalty omitted)

- (2) The mine operator must ensure that the documented safety management system is available on request to a worker at the mine.

(details of penalty omitted)

- (3) The mine operator must ensure that each principal control plan for the mine is readily accessible to all workers at the mine.

(details of penalty omitted)

- (4) If the safety management system is revised under clause 17, the mine operator must ensure, so far as is reasonably practicable, that each worker at the mine is made aware of any revision that is relevant to work being carried out by the worker.

(details of penalty omitted)

**Note:** In relation to the provision of information to workers, also see clause 39 of the WHS Regulations and section 19 (3) (f) of the WHS Act.

The mine operator must give workers:

- a summary of the SMS and, if requested, the documented SMS
- details of any revision to the SMS that is relevant to their work
- a summary of each principal mining hazard management plan if the worker is or may be exposed to the risks to which the plan relates and, if requested, the documented principal mining hazard management plan
- access to the SMS and any PMHMP (and be informed of the right to access)
- the ventilation control plan (underground mines only except small gemstone and opal mines)
- the emergency plan
- any other principal control plan prepared for the mine e.g. explosives.

### WHS (Mines) Regulations

#### 104 Duty to provide information, training and instruction (cl 675B model WHS Regs)

- (1) This clause applies in addition to clause 39 of the WHS Regulation.
- (2) The mine operator of a mine must ensure that each worker at the mine is provided with suitable and adequate information, training and instruction in relation to the following:

- (a) all hazards associated with the work being carried out by the worker,
  - (b) the implementation of risk control measures relating to the work being carried out by the worker, including controls in relation to fatigue, the consumption of alcohol and the use of drugs,
  - (c) the content and implementation of the safety management system for the mine,
  - (d) the emergency plan for the mine,
  - (e) the safety role for workers implemented under clause 119.
- (details of penalty omitted).

(3) A person conducting a business or undertaking at a mine must ensure that each worker engaged by the person is trained, and is competent, in basic risk management techniques used at the mine having regard to the nature of the work carried out by the worker.

(details of penalty omitted).

#### **107 Review of information, training and instruction** (cl 675D model WHS Regs)

The mine operator of a mine must ensure that information, training and instruction provided to workers under clauses 103–105 or to visitors under clause 106 are reviewed and as necessary revised to ensure that they remain relevant and effective.

(details of penalty omitted)

#### **108 Record of training** (cl 675E model WHS Regs)

The mine operator of a mine must:

- (a) make a record of any training provided to a worker under clause 104, and
- (b) keep the record while the worker remains engaged at the mine, and
- (c) ensure that the record is made available on request to the worker.

(details of penalty omitted)

Training should take into account the make-up of the workforce (e.g. level of education, literacy and the language spoken), work responsibilities, complexity of hazards and severity of risks. The delivery of information, instruction and training should consider:

- the amount of information and training that is delivered to workers over a period of time so that it is readily understood, within their capabilities
- the information/instructions be set out in a way that best communicates with the potential reader or learner, through the use of pictures, diagrams, flowcharts, headings, lists, examples etc as appropriate.

Training is essential to managing safety and must be documented to ensure consistency, minimise possible gaps and to verify competency was achieved.

Training records must be reviewed to help assess the need for retraining, updating or additional training, particularly if activities, processes or equipment change.

### **4.8 Documentation and records management**

The mine operator must develop procedures for the management of all the records needed to comply with the WHS Act and WHS Regulations. This is a mandatory element of the SMS. These procedures should address matters such as:

- all records that the WHS laws requires the mine operator to have including details of how long they have to be kept
- where records are to be kept so that they are available as required by legislation (e.g. inspection)
- the provision of records to the regulator as provided for under legislation
- the auditing and reviewing of records management as part of requirements for the SMS

- where and how the mine record (part 7 of the WHS (Mines) Regulations) is to be maintained
- where and how the mine record is to be kept for seven years
- how people can access the mine record.

Procedures to manage records also should ensure that access to SMS documentation is 'controlled'. This means:

- only the current version is available and any supporting documentation, or data, is up-to-date
- versions are identified and dated for periodic review
- documents are approved for use by the responsible person
- documents are accessible and kept in good condition
- obsolete documents are removed and archived for reference and to satisfy legal requirements.

However, document control should never restrict access to information necessary for implementing the SMS.

## 5 Performance measures, reviews and audits

This chapter provides guidance on what is involved in ongoing measurement of the effectiveness of the mine's SMS performance and the requirement for a full review of the SMS.

### 5.1 Performance measurement

A mine operator must have a procedure for measuring how the mine's SMS is performing against set performance standards and a system for auditing to ensure the SMS remains effective. The procedures should be documented and must be described in the SMS:

#### WHS Regulations

##### 15 Performance standards and audit (cl 623 model WHS Regs)

The safety management system for a mine must include the following:

- (a) performance standards for measuring the effectiveness of all aspects of the safety management system that:
  - (i) are sufficiently detailed to show how the mine operator will ensure the effectiveness of the safety management system, and
  - (ii) include steps to be taken to continually improve the safety management system,
- (b) the way in which the performance standards are to be met,
- (c) a system for auditing the effectiveness of the safety management system for the mine against the performance standards, including the methods, frequency and results of the audit process.

#### 5.1.1 Selecting performance standards

A 'performance standard' may be defined as a target or required level of performance for a particular safety matter and the measurement to determine whether it is achieved. If the selected standards are not being met, it is an indication of deficiencies requiring investigation and corrective actions. It may also indicate that it is time for a review of the SMS.

The operator must develop and apply performance standards for the SMS. These standards must be appropriate measures for the systems and procedures described in the mine's SMS to ensure that it is achieving the objectives set out in the mine's health and safety policy.

The performance standards may be designed to measure either sections of or the entire SMS. Performance standards need to have a meaningful measure and be sufficiently detailed and clear in what they are measuring. One common principle used in defining performance standards is 'SMART' (specific, measurable, achievable, realistic and targeted).

In particular performance standards need to measure if:

- risk controls are effective
- the application of the SMS has been consistent
- there has been compliance with WHS laws.

The matters to consider when developing suitable performance standards include:

- measures to identify and implement continuous improvement
- performance standards for measuring at different levels of the SMS e.g. at a high level for the system as a whole, and at a lower level for individual elements of the system
- measures for meeting overall targets within specified timeframes
- a combination of performance standards e.g. proactive standards (ones that measure the activities or inputs for managing safety) and reactive standards (ones that measure the outputs or actual performance achieved).

Examples of performance standards to help measure the effectiveness of the SMS in part or whole are:

- ventilation airflow maintained at no more than 1% outside the set airflow range
- completion of work orders related to the SMS, or level of compliance with audit and review requirements of the SMS
- number of alarms generated
- reliability of safety critical equipment
- reporting and investigating all incidents.

A more complex SMS will usually need performance standards in a range of areas. This is needed to adequately identify the effectiveness of individual elements of the SMS as well as the overall effectiveness of the SMS. This is important to identify improvement opportunities as well as identifying the requirement for corrective actions.

Information on the SMS performance should be reported to and reviewed by appropriate people identified in the SMS. Any consequent improvement in aspects of the SMS such as control measures or training provide evidence of meeting the requirement for the performance standards to be linked to continuous improvement. Reviewing performance against the performance measures should include taking actions to improve the adherence to the performance standards and the review of the performance standards to check they are representative of the SMS.

See table 3 below for other performance standards that may be suitable for an SMS, depending on the risks, size and complexity of a mining operation.

**Table 3 – Examples of performance standards for SMS**

<b>Performance standard</b>	<b>What it measures</b>
System expectation (related to safety-critical equipment)	The system in place to identify test and maintain the equipment to ensure the required design and reliability standards for safety critical equipment are met.
Process measures	<ul style="list-style-type: none"> <li>• Selection, design, modification etc. in accordance with company standards.</li> <li>• Equipment tested to schedule.</li> <li>• Audits of the above processes completed to schedule.</li> </ul>

Outcome measure	<ul style="list-style-type: none"> <li>• Results from scheduled testing.</li> <li>• Results from breakdown maintenance.</li> <li>• Results from incident investigations where safety critical equipment caused or contributed to incident.</li> <li>• Actions from audits, testing and incidents etc relating to safety-critical equipment is completed to schedule.</li> </ul>
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## 5.2 Audits

The primary purpose of an audit is to determine whether the risk management arrangements set out in the SMS are being implemented effectively. The mine operator must carry out audits of the SMS:

### WHS Regulations

#### 15 Performance standards and audit (cl 623 model WHS Regs)

The safety management system for a mine must include the following:

...

- (c) a system for auditing the effectiveness of the safety management system for the mine against the performance standards, including the methods, frequency and results of the audit process.

There are several types of auditing systems suitable for mining operations including:

- adequacy audit: determines if procedures meet the requirements of an applicable minimum standard e.g. company or Australian Standards
- compliance audit: establishes the extent the documented system has been implemented and followed by the workforce (may be undertaken internally or by external parties)
- internal audit: where a mine operator looks at whether the mine's systems, procedures and activities are adequate and being complied with
- external audit: where an external body undertakes an audit against the performance measures or more commonly against a defined external standard e.g. AS4801, a quality standard such as ISO90001 or legislative compliance.

Mine operators would normally undertake a compliance or internal audit. The methods used in audits may include:

- interviews
- physical verification
- statistical methods
- document review including records and reports
- checklists
- observations of the work area.

The methods selected will depend on a number of factors including the nature of what is being audited and the risks associated with the element of the SMS being audited.

#### 5.2.1 Scope of audit

The activities of the audit, the areas to cover and the performance standards to be audited against must be documented, and will define the scope of the audit.

A typical mine audit would involve looking at whether:

- 
- systems are in place for controlling the work processes, for example, plans such as PMHMPs and PCPs as well as subsidiary documentation (procedures and technical documents)
  - workers understand their responsibilities
  - training has been delivered
  - required equipment is available and working properly
  - inspections specified in the SMS have been undertaken
  - responses were activated if triggers were initiated
  - required reports have been completed.

### 5.2.2 Conducting an audit

The SMS should specify who is responsible for conducting the audit. These responsibilities may include:

- selecting the auditor
- identifying resources required for the audit
- preparing the audit documents
- maintaining the audit records
- checking audits are carried out in the specified time frame
- ensuring results and corrective actions identified are acted upon in a timely manner.

The mine operator may select people within the organisation or external persons to carry out the audit. In either case the person carrying out the audit should do so competently, impartially and objectively. Where possible, the auditor should be independent of the process being audited.

### 5.2.3 Frequency

An audit's frequency should be determined by an assessment of how critical each SMS element is to maintaining work health and safety and what may be necessary based on the results of previous audits.

Audits may have to be done at different times, depending on the work processes being audited. Consideration should be given to:

- pre-commencement audits - carried out before a work process begins to determine that all specified work arrangements are in place
- implementation audits - carried out after the work process has commenced to determine the effectiveness of the implementation of the specified work arrangements
- routine audits - regular audits aimed at checking ongoing compliance with the specified work arrangements. The frequency should be at least half the time frame for routine reviews of the SMS so that there is at least one audit during the life of the SMS
- pre-review audits - an audit carried out near the due date for a review of the system so that the findings can be considered in the review process.

A large, complex mine may have individually documented plans for specific areas existing under the umbrella of an overarching SMS. Due to the scale of this type of SMS, it may be necessary to divide the audit program along the lines of the structure of that SMS.

### 5.2.4 Results

If the result of the audit shows deficiencies in the performance of the SMS, the result needs to be considered and acted upon. Where possible, results should be ranked in order of priority for attention. A common ranking scale consists of three levels of non-conformance:

- minor (no change to risk level)
- medium (loss of mitigating controls, no increased likelihood of incident)

- major (increase in risk to workers).

The audit results should be reviewed by a person who has sufficient authority to take action on the non-conformances.

Where the audit identifies that an amendment to the SMS (or part of the SMS) is required, then those changes should be made in accordance with the consultation and document control requirements of the SMS.

### 5.3 Review

The purpose of a review of the SMS is to check its continuing suitability, adequacy and effectiveness in ensuring the health and safety of workers and other persons at a mine are not put at risk from the work carried out as part of mining operations.

A mine operator must conduct a full review of the SMS, within 12 months of commencing mining operations and at least every three years after that (see below), and, if necessary, revise the SMS. In addition if a risk control measure is revised under clause 38 of the WHS Regulations or clause 10 of the WHS (Mines) Regulations, the mine operator must ensure that the SMS for the mine is reviewed and, if necessary, revised in relation to all aspects of risk control addressed by the revised control measure. If the risk control is specified in a principal hazard management plan, the PMHMP must also be reviewed.

## WHS (Mines) Regulations

### 10 Review of control measures (cl 618 model WHS Regs)

- (1) A person conducting a business or undertaking at a mine must review and as necessary revise control measures implemented under clause 9 in the following circumstances:
  - (a) an audit of the effectiveness of the safety management system for the mine indicates a deficiency in a control measure,
  - (b) a worker is moved from a hazard or assigned to different work in response to a recommendation contained in a health monitoring report provided under Part 3,
  - (c) an incident referred to in clause 128 occurs,
  - (d) any other incident occurs that is required to be notified to the regulator under the WHS laws.

**Note:**

- 1 See sections 19, 20 and 21 of the WHS Act as applicable (also see clause 4 of this Regulation and clause 9 of the WHS Regulations).
- 2 This requirement is in addition to the requirement under clause 38 of the WHS Regulation (see clause 33 of the WHS Regulation).
- 3 This clause applies to a mine operator (see section 5 (2) of the WHS (Mines) Act).

- (2) The mine operator of a mine must ensure that a control measure that is the subject of a request by a health and safety representative under clause 38 (4) of the WHS Regulations is reviewed and as necessary revised, whether the request is made to the mine operator or notified to the mine operator under subclause (3) by another person conducting a business or undertaking at the mine.

**Note:**

- 1 See sections 19, 20 and 21 of the WHS Act as applicable (also see clause 4 of this Regulation and clause 9 of the WHS Regulations).
- 2 This requirement is in addition to the requirement under clause 38 of the WHS Regulation (see clause 33 of the WHS Regulation).

- (3) A person conducting a business or undertaking at the mine who is not the mine operator of the mine must immediately notify the mine operator of a request made to the person under

clause 38 (4) of the WHS Regulations.

(details of penalty omitted)

- (4) A health and safety representative for workers at the mine may request a review of a control measure under clause 38 (4) of the WHS Regulations as if the circumstances referred to in subclause (1) were included in clause 38 (4) (a) of the WHS Regulations.

#### **17 Review** (cl 625 model WHS Regs)

- (1) The mine operator of a mine must ensure that the safety management system for the mine is reviewed within 12 months of the commencement of mining operations at the mine and at least once every 3 years after that to ensure it remains effective.

(details of penalty omitted)

#### **Note:**

Regular testing of the emergency plan is also required (see clause 93).

- (2) In addition, if a risk control measure is revised under clause 38 of the WHS Regulations or clause 10 of this Regulation, the mine operator must ensure that the safety management system for the mine is reviewed and as necessary revised in relation to all aspects of risk control addressed by the revised control measure.

(details of penalty omitted)

#### **25 Review** (cl 629 model WHS Regs)

- (1) The mine operator of a mine must ensure that a principal mining hazard management plan is reviewed and as necessary revised if a control measure specified in the plan is revised under clause 38 of the WHS Regulations or clause 10 of this Regulation.

(details of penalty omitted)

...

A review of a control measure as the result of the triggers listed previously, does not satisfy the requirement for the regular, full review of the SMS.

The scope of a full review should be comprehensive, but not all elements of the SMS need to be reviewed at once.

The review may take place over a period of time but should be structured and scheduled so that all elements of the SMS are reviewed at least every three years.

The full review should start with a review of the underpinning risk assessment elements of the SMS to determine if they are still appropriate for the management of the relevant hazards at the mine.

The review may include consideration of:

- results from audits
- health and safety performance reports
- the extent to which performance standards have been met
- industry events relevant to the elements being reviewed
- incident reports
- hazard identification reports
- the continuing suitability of the controls in the SMS (including procedures and administrative arrangements in relation to changing conditions)

- 
- technological changes relevant to the element/s being reviewed
  - corrective action reports
  - changes in regulatory requirements
  - changes to community expectations
  - concerns of relevant interested parties.

In undertaking the review, workers and their HSRs/SHRs must be consulted in accordance with the WHS laws. The person or people carrying out the review must have the appropriate skills and knowledge relevant to the elements of the SMS being reviewed.

Where a review identifies that a revision to the SMS (or part of the SMS) is needed, those changes should be made in accordance with the consultation and document control requirements of the SMS.

## APPENDIX A – Principal mining hazard management plans

Schedule 1 of the WHS (Mines) Regulations (Principal Mining Hazard Management Plans – additional matters to be considered) sets out what has to be considered when developing PMHMPs relating to each PMH. It is copied below for ease of reference.

Codes are available for certain principal mining hazards. Contact the regulator if you require further information.

### WHS (Mines) Regulations

#### Schedule 1 Principal mining hazard management plans—additional matters to be Considered (Clause 23) (Sch 19 model WHS Regs)

##### 1 Ground or strata instability

- (1) The following matters must be considered in developing the control measures to manage the risks of ground or strata failure:
  - (a) the local geological structure,
  - (b) the local hydrogeological environment, including surface and ground water,
  - (c) the means by which water may enter the mine, and the procedures for removing water from the mine and the effect that those procedures have on rock stability over time,
  - (d) the geotechnical characteristics of the rocks and soil, including the effects of time, oxidation and water on rock support and stability,
  - (e) the timing of installation of ground and strata support for the mine, taking into account the geotechnical conditions and behaviour of the rocks and soil,
  - (f) the collection, analysis and interpretation of relevant geotechnical data, including the monitoring of openings and excavations,
  - (g) any natural or induced seismic activity,
  - (h) the equipment and procedures used to record, interpret and analyse data from the monitoring of seismic activity,
  - (i) the location and loadings from existing or proposed mine infrastructure such as waste dumps, tailings storage, haul roads and mine facilities,
  - (j) any previously excavated or abandoned workings,
  - (k) the proposed and existing mining operations, including the nature and number of excavations, the number and size of permanent or temporary voids or openings, backfilling of mined areas and stopes, abutments, periodic weighting and windblast or airblast,
  - (l) the proposed blasting activities (including the design, control and monitoring of each blast),
  - (m) the design, layout, operation, construction and maintenance of any dump, stockpile or emplacement area at the mine, including any open cut dumps or stockpiles,
  - (n) the filling requirements for mined areas and the material to be used as fill,
  - (o) the stability of any slopes,
  - (p) the design, control and monitoring of production and development blasts,
  - (q) the size and geometry of the mine's openings,
  - (r) the use of appropriate equipment and procedures for scaling,
  - (s) the design, installation and quality of rock support and reinforcement,

- (t) in the case of an underground mine, the stope and pillar dimensions,
  - (u) in the case of an underground coal mine, the strata support requirements for the mine and the pillar strength and stability required to provide that support and the probability of instability of any pillar taking into account the pillar's role,
  - (v) in the case of highwall mining, pillar and highwall support, the interaction of persons and plant.
- (2) In determining the strata support requirements under subclause (1) (u), the maximum width between pillars and the minimum possible dimension of any such pillar for each part of the mine are to be included in the principal mining hazard management plan along with the calculations used to determine those matters.
- (3) A principal mining hazard management plan that addresses ground and strata support is to include a statement that makes clear that any requirements in the plan for ground and strata support are a minimum requirement only and additional strata support such as more frequent rock bolt installations is always permitted.

## 2 Inundation and inrush

- (1) The following matters must be considered in developing the control measures to manage the risks of inundation and inrush of any substance:
- (a) the potential sources of inundation, including extreme weather, overflow or failure of levies and dam structures, failure or blocking of flow channels (including regular, overflow or emergency flow channels),
  - (b) the location, design and construction of dams, lagoons, tailings dams, emplacement areas and any other bodies of water or material that could enter the mine, including any such entry because of extreme weather conditions such as a cyclone,
  - (c) the potential sources of inrush including current, disused or abandoned mine workings, surface water bodies and backfill operations, highly permeable aquifers, bore-holes, faults or other geological weaknesses,
  - (d) the location of other workings and the strength of the ground (including the geotechnical characteristics of the rock) between those workings,
  - (e) the potential for the accumulation of water, gas or other substances or materials that could liquefy or flow into other workings or locations,
  - (f) the magnitude of all potential sources and maximum flow rates,
  - (g) the worst possible health and safety consequences of each potential source, including the accuracy of plans of other workings, variation in rock properties and geological weaknesses,
  - (h) survey plans of the mine including any historical survey plans.
- (2) A principal mining hazard management plan that addresses inundation and inrush of any substance is to include details of any special systems of working developed for inrush control zones established under clause 45 of this Regulation and the assumptions underpinning the development of any such system.

## 3 Mine shafts and winding systems

The following matters must be considered in developing the control measures to manage the risks associated with mine shafts and winding systems:

- (a) the potential for instability and loss of integrity of the shaft,

- (b) the potential for fires in underground operations, the shaft or winder areas,
- (c) the potential for any unintended or uncontrolled movement of conveyances within the shaft,
- (d) the potential for a conveyance to fall down the shaft,
- (e) the potential for failure of, or damage to, equipment and controls, including the following:
  - (i) control measures that are intended to prevent any shaft conveyance from overwind, excessive acceleration or deceleration, unsafe or excessive speeds or uncontrolled movement,
  - (ii) control measures that are intended to detect the presence of slack rope, drum slip conditions or unsafe tail rope conditions,
  - (iii) braking systems and systems performing an equivalent function that are intended to ensure that the winder remains under control,
  - (iv) warning systems that are intended to alert persons at the mine to any emergency in a winding system,
  - (v) communication systems,
- (f) the potential for injury to a person from:
  - (i) material being carried in a conveyance with the person, or
  - (ii) material falling from a conveyance, or
  - (iii) the person falling from a conveyance, or
  - (iv) a part of the person extending out of the conveyance,
- (g) provision for the emergency egress of persons from a conveyance.

#### **4 Roads and other vehicle operating areas**

The following matters must be considered in developing the control measures to manage the risks of roads and other vehicle operating areas:

- (a) mobile plant characteristics, including stopping distances, manoeuvrability, operating speeds, driver position, driver line of sight and remote control mobile plant,
- (b) the effect on road conditions of expected environmental conditions during operating periods (including time of day, weather, temperature and visibility),
- (c) the impact of road design and characteristics, including grade, camber, surface, radius of curves and intersections,
- (d) the impact of mine design, including banks and steep drops adjacent to vehicle operating areas,
- (e) the volume and speed of traffic and the potential for interactions between mobile plant with different operating characteristics, including heavy and light vehicles,
- (f) the potential for interactions between mobile plant and pedestrians, including consideration of park up areas and driver access,
- (g) the potential for interaction between mining mobile plant and public traffic,
- (h) the potential for interaction between mobile plant and fixed structures, including overhead and underground power lines, tunnel walls and roofs.

## **5 Air quality, dust and other airborne contaminants**

The following matters must be considered in developing the control measures to manage the risks of air quality, airborne dust and other airborne contaminants:

- (a) the types of dust and other chemical and biological contaminants likely to be in the air from both natural sources, including naturally occurring asbestos, and introduced sources,
- (b) the levels of oxygen, dust and other contaminants in the natural or supplied air of a mine,
- (c) the temperature and humidity of the air,
- (d) the length of exposure, having regard to extended shifts and reduced recovery periods.

## **6 Fire and explosion**

(1) The following matters must be considered in developing the control measures to manage the risks of fire and explosion:

- (a) the potential sources of flammable, combustible and explosive substances and materials, both natural and introduced, including gas, dust, ores, fuels, solvents and timber,
  - (b) the potential sources of ignition, fire or explosion, including plant, electricity, static electricity, spontaneous combustion, lightning, light metal alloys, hot work and other work practices,
  - (c) the potential for propagation of fire or explosion to other parts of the mine,
  - (d) the potential sources of flammable material with a flash point of less than 61° celsius, including materials on the top of any shaft or outlet at the mine,
  - (e) arrangements for the management and control of the transport and storage of combustible liquids,
  - (f) arrangements for the prevention of fires including the types and location of systems for the early detection and suppression of fires,
  - (g) the equipment for fighting fire at the mine,
  - (h) in the case of an underground mine, the arrangements for the management and control of volatile or hazardous materials.
- (2) A principal mining hazard management plan that addresses fire and explosion is to include details of any procedures to be used for carrying out hot work at the mine.

## **7 Gas outbursts**

The following matters must be considered in developing the control measures to manage the risks of gas outbursts:

- (a) the potential for gas to be released into the working area of a mine from both natural and introduced sources in a concentration that could lead to fire, explosion or asphyxiation,
- (b) the potential for the accumulation of gas in working areas and abandoned areas of the mine,
- (c) the nature of the gas that could be released,
- (d) the gas levels in the material being mined,

- (e) gas seam pressures,
- (f) in the case of a coal mine, Australian Standard AS 3980 1999 *Guide to the determination of gas content of coal—Direct desorption method*.

## 8 Spontaneous combustion

The following matters must be considered in developing the control measures to manage the risks of spontaneous combustion:

- (a) the potential for spontaneous combustion to occur in the material being mined, including by:
  - (i) evaluating the history of the mine in relation to spontaneous combustion, and
  - (ii) evaluating any adjacent or previous mining operations in the same seam, and
  - (iii) conducting of scientific testing,
- (b) mine ventilation practices,
- (c) the design of the mine,
- (d) the impact of gases generated by spontaneous combustion on mine environmental conditions.

## 9 Subsidence

The following matters must be considered in developing the control measures to manage the risks of subsidence:

- (a) the characteristics of all relevant surface and subsurface features,
- (b) the characteristics of all relevant geological, hydrogeological, hydrological, geotechnical, topographic and climatic conditions, including any conditions that may cause elevated or abnormal subsidence or the formation of sinkholes,
- (c) the characteristics of any previously excavated or abandoned workings that may interact with any proposed or existing mine workings,
- (d) the existence, distribution, geometry and stability of significant voids, standing pillars or remnants within any old pillar workings that may interact with any proposed or existing mine workings,
- (e) the predicted and actual nature, magnitude, distribution, timing and duration of subsidence,
- (f) the rate method, layout, schedule and sequence of mining operations.

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## APPENDIX B – Other useful information

Below is a list of some published documents that may be useful in developing, maintaining or reviewing a safety management system for a mine. These documents, whether or not referred to in the text of this code, do **not** form part of this code.

**Please note:** the list below is not an exhaustive list of references that may be relevant to safety management systems in mines and compliance with any one or more of the following documents does not guarantee compliance with WHS laws.

### Document list

#### Australian Standards

- AS/NZ 4801 Occupational health and safety management systems
- AS/NZ 4804 Occupational health and safety management systems - General guidelines on principles, systems and supporting techniques
- AS/NZS 4804: 2001 OH&S Management Systems (Section 4.3.3.2 – Reporting)
- ISO 15489.1: 2002 Records Management, Part 1 - General
- ISO 15489.2: 2002 Records Management, Part 2 - Guidelines
- ISO 3100:2009 Risk management - Principles and Guidelines
- OHSAS 18001 Occupational health and safety management systems standards
- ISO/IEC 31010 Risk management - Risk assessment techniques

<http://infostore.saiglobal.com/store/>

#### Other publications

- NSW Minerals Council Contractor Management guidance material
- *Small mine safety management kit*  
*Contractor OHS Assessment Tool*  
NSW Trade & Investment  
[www.resourcesandenergy.nsw.gov.au/safety](http://www.resourcesandenergy.nsw.gov.au/safety)

#### Websites

- NSW Trade & Investment (Mine Safety)  
[www.resourcesandenergy.nsw.gov.au/safety](http://www.resourcesandenergy.nsw.gov.au/safety)
- Queensland Department of Natural Resources and Mines, Mines Inspectorate –  
[www.dnrm.qld.gov.au](http://www.dnrm.qld.gov.au)
- The OHS Body of Knowledge  
[www.ohsbok.org.au](http://www.ohsbok.org.au)
- WA Department of Mines and Petroleum  
[www.dmp.wa.gov.au](http://www.dmp.wa.gov.au)