



Trade &
Investment
Mine Safety

NSW CODE OF PRACTICE | WHS LEGISLATION

Emergency planning for 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 Emergency Planning in Mines on 23 January 2015. This code of practice commenced on 1 February 2015

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NSW code of practice – Emergency planning for mines

More information

www.resourcesandenergy.nsw.gov.au/safety

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Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (February 2015). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of the NSW Department of Trade and Investment, Regional Infrastructure and Services or the user's independent advisor.

Foreword

This NSW Code of Practice: Emergency planning for 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 the *Work Health and Safety (Mines) Regulations 2014* (WHS (Mines) Regulations)¹.

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, although designed to be structured and customised differently in each of these states.

This code has been prepared in consultation with the following stakeholders from the mining industry in the tri-states:

- NSW Minerals Council
- Coal Services NSW (Mines Rescue)
- Construction, Forestry, Mining and Energy Union (CFMEU) – NSW and Queensland
- Cement, Concrete and Aggregates Australia
- NSW Trade & Investment Mine Safety
- Queensland Resources Council
- Qld Mines Rescue
- Queensland Department of Natural Resources and Mines
- WA Department of Mines and Petroleum
- Minerals Council of Australia (for model national code development only)

¹ It will sometimes be convenient to refer generally to 'WHS laws', 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.

The code will be reviewed as required or when legislation is reviewed.

Contents

1	Introduction	3
1.1	What is emergency planning?	3
1.2	Risk management in emergency planning.....	4
1.3	Who has duties for an emergency plan?	5
2	Establishing the context for emergency planning	8
2.1	Mine safety management system.....	8
2.2	Legislation framework – considerations	9
2.3	WHS and emergency management related legislation	9
2.4	Related emergency management legislation in NSW.....	11
2.5	Applying the NSW emergency framework to mines.....	11
3	Preparing the emergency plan	12
3.1	Overview of plan and contents	12
3.2	Initiating the development of the emergency plan	12
3.3	The possible appointment and responsibilities of an emergency planning group	13
3.4	Membership of the EPG.....	13
3.5	Consultation with emergency services	13
3.5.1	Surface mines	15
3.5.2	Primary emergency services	15
3.5.3	Initial and ongoing consultation.....	15
3.5.4	Specific consultation requirements and agreements.....	15
3.5.5	Planning the consultation.....	16
3.5.6	Further sources and systems.....	17
4	Identify, assess and control emergencies	17
4.1	Identification of potential emergencies	17
4.2	Assessment of the potential emergencies	18
4.3	Controls	18
4.4	Procedures	18
4.5	Equipment.....	18
4.6	Adequate number of people who are trained.....	19
4.7	Additional considerations	19
4.8	First aid.....	19
5	Emergency plan contents	20
5.1	Structure of emergency plan	20
5.2	Considerations for developing the emergency plan content	20
5.3	Emergency plan contents.....	21
6	Emergency procedures	30
6.1	General.....	30
6.2	Notifying people at the mine and emergency services	31

6.3	Evacuation procedures general requirements	31
6.3.1	Decision to evacuate	31
6.3.2	Evacuation procedures - considerations	31
6.3.3	Communication during evacuation.....	32
6.4	Withdrawal.....	32
6.5	Re-entry to any part of a mine – during or after an emergency.....	33
7	Emergency response.....	34
7.1	Introduction.....	34
7.2	Preparedness	34
7.3	Response capability.....	34
7.4	Emergency command structure	35
7.5	Control room or dedicated person.....	36
7.6	Establishing communication.....	36
7.6.1	Communication – from incident location to control room.....	38
7.6.2	Communication to those who may be affected	38
7.6.3	Immediate and ongoing command structure	38
7.7	Planning for resources and equipment.....	39
7.8	Providing and maintaining resources	40
8	Information, training and instruction.....	40
8.1	General.....	40
8.2	Rescue equipment training	42
9	Testing.....	43
9.1	General.....	43
9.2	Frequency and nature of testing.....	44
9.3	Initial testing of emergency plan.....	44
9.4	Emergency exercises.....	44
9.5	Conducting exercises and reviewing	45
10	Maintenance and review of the emergency plan.....	45
10.1	Records	45
10.2	Monitoring.....	46
10.3	Review.....	47
10.4	Audit	48
11	Underground mines.....	49
11.1	Introduction.....	49
11.2	Emergency exits	49
11.3	Communications	51
11.4	Escape strategies	53
11.5	Self-rescuers and refuge chambers	55
11.6	Personal protective equipment for first aid and rescue.....	56
11.7	Air monitoring and warning systems.....	57

11.8	Fire	57
11.9	Re-entry after an emergency	59
11.10	Sealing and inertisation.....	59
Appendix A	– Examples of duty cards	65
	(1) Metalliferous Mine	65
	(2) Medium sized open cut mine	66
Appendix B	- Example of a medium sized surface mine TARP.....	67
	Severe Weather Event.....	67
Appendix C	- Example of TARP (part only) for a quarry/extractive industries mine.....	68
	Fire Event	68
Appendix D	- Example of a response and recovery flowchart for a large mine	69
Appendix E	- Example of an underground emergency TARP for a large metalliferous mine (in part)	70
Appendix F	– NSW emergency management framework and mines	71
	Emergency service organisations	71
	Trigger thresholds and notification	71
	Seamless integration between mines and emergency services/agencies	71
	Australasian Inter-service Incident Management System (AIIMS)	72

Scope and application

This code provides a practical guide for developing and maintaining an effective emergency plan to meet the requirements under the WHS laws. The aim is to provide for all people to be safely managed when an emergency occurs, or is likely to occur, at a mine.

This code should be used by mine operators when preparing an emergency plan for a mine. Other persons conducting a business or undertaking (PCBUs) may also refer to this code when consulting, cooperating and coordinating with the mine operator regarding emergency arrangements. Workers at a mine may use this code to help them when consulting with PCBUs about preparing, testing or reviewing the emergency plan.

This code is not intended to address the rescue and/or recovery of people using specialist agencies, except to the extent that those services are to be included in an emergency plan as required by WHS laws. This code does not directly address managing other emergencies, such as damage to property or environment, although there is an advantage in applying the same approach to them as set out in this code so they work in harmony.

Some larger organisations may have crisis management plans or response and recovery plans. The emergency plan may be a major part of those plans. For example, see the response and recovery flowchart for a large mine in Appendix D.

The emergency plan is part of a mine safety management system (SMS) as a Principal Control Plan (PCP). Further information on developing an SMS can be found in the *NSW Code of Practice: Safety management systems for mines*.

How to use this code of practice

This code includes references to both mandatory and non-mandatory actions. The references to legal requirements contained in the WHS Act and Regulations, and the WHS (Mines) Act and 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 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](http://www.legislation.nsw.gov.au) (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' indicate that legal requirements exist and must be complied with. The word 'should' indicates a recommended course of action, while 'may' indicates an optional course of action.

Unless otherwise indicated in the text, lists of points in the code should not be read as exhaustive.

Every process developed or document prepared for a mine should be developed to suit the nature, complexity and location of the particular mining operation and the risks associated with that mining operation. The examples provided in Appendices A-E are based on documents used to respond to emergencies in specific mining environments. The emergency responses documents in the appendices may therefore not be relevant to a particular mine. For example, the triggers in the TARP set out in Appendix B have been designed to monitor the critical factors that, in that environment, indicate that a certain level of emergency response may be or is required. The actions/responses are similarly specific to the environment. Some of the examples integrate priorities and compliance issues that are unrelated to work health and safety, such as corporate governance, business management etc.

Key terms

Control room – in this code, refers to an emergency management control room.

Contractor – has the same meaning as in clause 3 of the WHS (Mines) Regulations.

Emergency – an emergency due to an actual or imminent occurrence (such as fire, explosion, accident or flooding) that has resulted in the death of, or injury to, a person or is endangering or is threatening to endanger the life or physical well-being of a person.

EPG – Emergency planning group organised by the mine operator for planning and developing an emergency plan

Inertisation – the process of rendering an atmosphere inert (low oxygen) by introducing an inert gas, such as nitrogen, or by allowing naturally occurring seam gases to build up. It may be used as a tool in underground mines (principally coal) to fight fires.

Irrespirable atmosphere – an atmosphere that may be unsafe for a person to breathe as a result of either oxygen depletion or the presence of toxic fumes, gases or contaminants.

PCBU or person conducting a business or undertaking – has the same meaning as in section 5 of the WHS Act.

Initial emergency response – the initial response from the mines resources in the early stages of an emergency,

Refuge chamber (or fresh air base) – a chamber that has an atmosphere that is fit to breathe. It provides resources necessary to sustain life for a defined period and for a defined number of people when exit to the surface of an underground mine is impractical.

Respirable air changeover station – an area (generally a purpose-built chamber) that is known to have an atmosphere that is fit to breathe that allows for safe changeover of self-rescuers.

Secondary response – response from off-site the mine to the mines emergency. This may be by Mines Rescue, Fire Brigades, voluntary rescue associations or other organisations.

Self-rescuer or self-contained self-rescuer – a device for providing air or oxygen in underground mines when the air becomes contaminated. Self-rescuers are either chemical self-rescuers that generate oxygen or compressed air breathing apparatus (CABA).

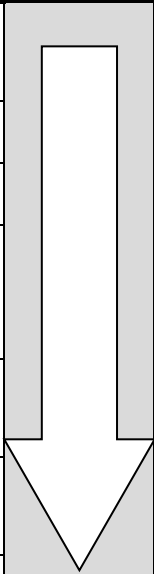
TARP – Trigger action response plan. A plan designed to prevent a risk from escalating. It identifies potential indicators to the hazard, assigning a hierarchy of alarms, or trigger levels, to each potential indicator, and specifying responses for each trigger level (adapted from Galvin 2008).

1 Introduction

1.1 What is emergency planning?

An emergency at a mine occurs when the mine's controls are no longer able to effectively control the risks to people's health, safety and welfare from the hazard(s). An emergency plan enables a mine to respond and re-establish control of hazards in an emergency. The same principles could be used to manage other events, such as damage to property or the environment.

The emergency planning process may be described as a series of questions the mine operator asks in order to develop an emergency plan that satisfies both legislated and mine requirements. These questions may include:

Emergency planning process questions	
What emergencies could occur at the mine or nearby that involve risks to the health, safety or welfare of mine workers or other people?	
How may the mine respond to each of these emergencies?	
What resources will the mine need to respond to the identified emergencies?	
Who does the mine operator communicate/consult with internally and externally to organise the emergency response plan? How will the communication/consultation be carried out?	
What training, instruction and information must be given to mine workers and other people?	
What is to be written in the emergency plan for the mine and other related documents?	
How is the mine emergency plan to be tested, audited and reviewed to maintain it and to ensure there is an appropriate response when an emergency occurs?	

This emergency planning code provides guidance to mine operators so these questions may be answered during the planning process.

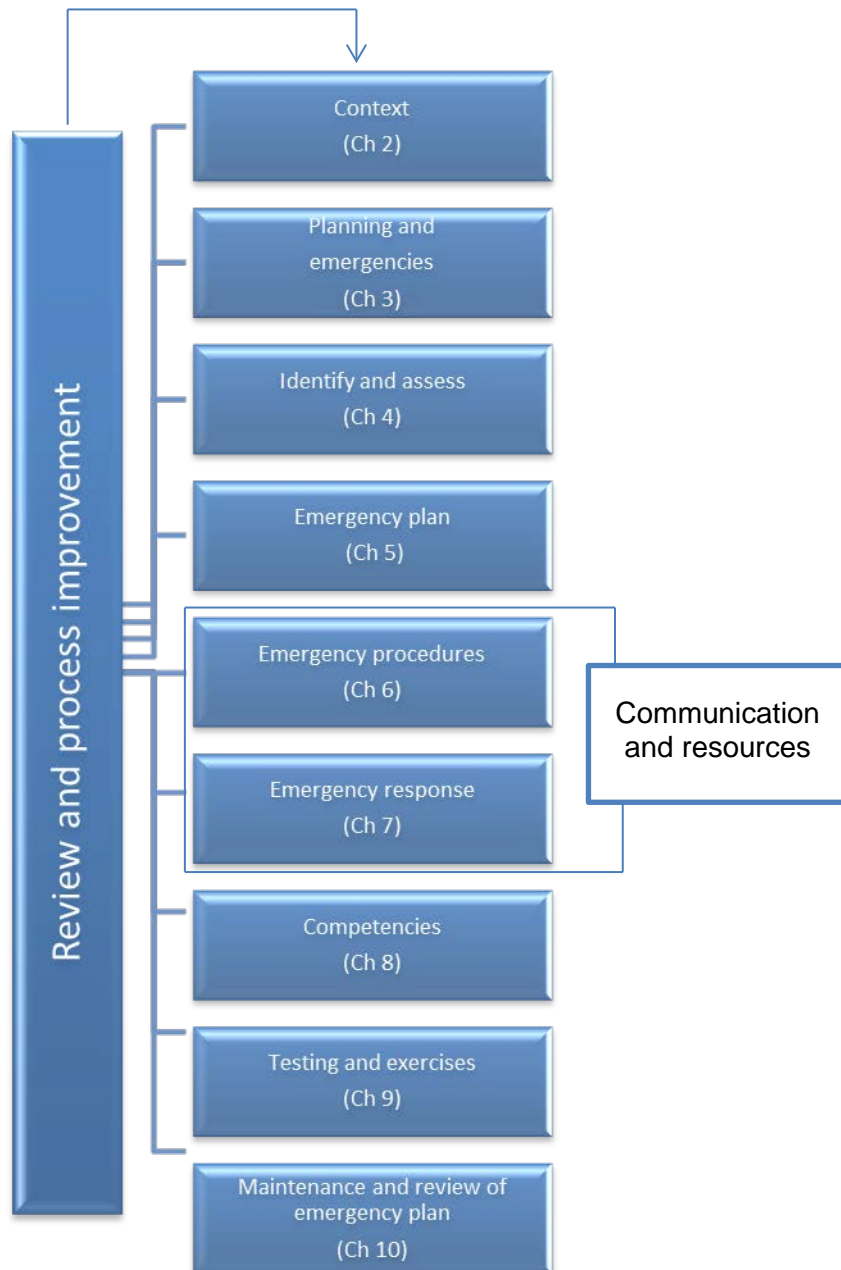
More specifically, emergency planning involves identifying emergency scenarios that could occur at the mine and then risk-assessing the potential hazards and consequences of those scenarios in order to identify effective controls. The purpose of emergency planning is to help prepare the mine's workers to respond to such emergencies and to allow the mine to effectively regain control of all hazards.

When normal operational controls for hazards begin to fail, or have failed, a trigger point is reached where the emergency plan is activated and emergency response actions are initiated. The mine operator should establish triggers as a signal to initiate the emergency plan.

1.2 Risk management in emergency planning

This code has adopted the risk-management approach in developing an emergency plan and this is reflected in its structure below:

Figure 1 - Emergency planning code structure



Note: flowchart is based on *ISO 31000 Risk Management - Principles and Guidelines* and, to lesser extent, the superseded *AS 4360 Risk Management*

Chapter 11 deals with the additional factors relevant to risk management and emergency planning in underground mines.

1.3 Who has duties for an emergency plan?

All PCBUs at a mine have the duty to ensure an emergency plan is prepared for their workplace:

WHS Regulations

Part 3.2 General workplace management

Division 4 Emergency plans

43 Duty to prepare, maintain and implement emergency plan

- (1) A person conducting a business or undertaking at a workplace must ensure that an emergency plan is prepared for the workplace, that provides for the following:
 - (a) emergency procedures, including:
 - (i) an effective response to an emergency, and
 - (ii) evacuation procedures, and
 - (iii) notifying emergency service organisations at the earliest opportunity, and
 - (iv) medical treatment and assistance, and
 - (v) effective communication between the person authorised by the person conducting the business or undertaking to coordinate the emergency response and all persons at the workplace,
 - (b) testing of the emergency procedures, including the frequency of testing,
 - (c) information, training and instruction to relevant workers in relation to implementing the emergency procedures.
(details of penalty omitted)
- (2) A person conducting a business or undertaking at a workplace must maintain the emergency plan for the workplace so that it remains effective.
...
- (4) A person conducting a business or undertaking at a workplace must implement the emergency plan for the workplace in the event of an emergency.
(details of penalty omitted)

At a mine, the mine operator has additional requirements for what must be addressed in an emergency plan for the mine:

WHS (Mines) Regulations

88 Duty to prepare emergency plan (cl 664 model WHS Regs)

- ...
- (2) In addition to the matters required by clause 43 (1) of the WHS Regulations, the emergency plan must:
 - (a) address all aspects of emergency response, including by ensuring:
 - (i) the establishment of a system that enables all persons at the mine to be promptly located, and
 - (ii) that a record of all persons who are underground at a mine (other than a coal mine) at any given time and each person's likely location is accurately maintained and is readily available in an emergency, and
 - (iii) the provision of adequate rescue equipment, and

- (iv) that an adequate number of persons trained in the use of rescue equipment are available to respond effectively to the emergency if a person is working at the mine, and
 - (v) the provision of adequate patient transport if a person is working at a mine, and
 - (vi) the provision of appropriate transportation (or suitable means of egress by walking) for persons at risk in the case of an emergency to a place of safety including during an emergency evacuation, and
 - (vii) arrangements are in place for emergency sealing of all or part of an underground coal mine, and
 - (b) include a statement of potential triggers for the activation of the plan, and
 - (c) include all matters specified in Schedule 7, and
 - (d) so far as is reasonably practicable, be set out and expressed in a way that is readily understandable by persons who use it.
- ...

The mine operator must prepare an emergency plan as a principal control plan and include it with emergency procedures in the mine safety management system:

WHS (Mines) Regulation

3 Definitions

...

principal control plan for a mine means:

- (a) each plan required to be prepared for the mine under clause 26, and

Note: Clause 26 makes requirements with respect to the preparation of health control plans, mechanical engineering control plans, electrical engineering control plans and explosives control plans.

- (b) if the mine is an underground mine—the ventilation control plan for the mine, and
- (c) the emergency plan for the mine.

...

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:

...

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

...

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.

...

Note: The ventilation control plan and the emergency plan are also principal control plans.

In preparing, testing and reviewing the plan, the mine operator must consult with workers:

WHS (Mines) Regulation

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:

...

- (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)

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:

...

- (c) conducting risk assessments for principal control plans,
- (d) preparing, testing and reviewing the emergency plan for the mine,

...

(details of penalty omitted)

Depending on the type of mine, the mine operator must also consult with primary emergency services and certain other organisations (refer to Chapter 2 and 3.5 of this code).

All PCBUs at the mine, including the mine operator, must consult, cooperate and coordinate with each other to carry out their duties in relation to emergency plans under the WHS Act section 46.

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.

For instance, a PCBU may need to provide information, or parts of their emergency plan, to the mine operator due to the nature of the work at the mine and the specialised arrangements e.g. for hazardous chemicals. The PCBU, if a contractor at the mine, should set out these specialised arrangements in their contractor health and safety plan provided to the mine operator (if applicable) under clause 22 of the WHS (Mines) Regulation. The mine operator must ensure that the contractor work health and safety plan is integrated and consistent with the mine safety management system.

PCBUs, including mine operators, have a duty to provide a copy of the emergency plan to emergency service organisations if quantities of hazardous chemicals are used at the workplace exceed a certain amount.

WHS Regulations

Chapter 7 Hazardous chemicals

Part 7.1 Hazardous chemicals

Subdivision 3 Emergency plans and safety equipment

Division 5 Control of risk — obligations of persons conducting businesses or undertakings

361 Emergency plans

- (1) This regulation applies if the quantity of a Schedule 11 hazardous chemical used, handled, generated or stored at a workplace exceeds the manifest quantity for that hazardous chemical.
- (2) A person conducting a business or undertaking at the workplace must give a copy of the emergency plan prepared under Division 4 of Part 3.2 for the workplace to the primary emergency service organisation.
(details of penalty omitted)
- (3) If the primary emergency service organisation gives the person a written recommendation about the content or effectiveness of the emergency plan, the person must revise the plan in accordance with the recommendation.
(details of penalty omitted)

In NSW, the primary emergency service organisation to provide a copy of the emergency plan to is Fire & Rescue NSW. For further guidance, refer to their website (www.fire.nsw.gov.au).

Finally, officers, workers and other people must satisfy their general duties under sections 27 to 29 of the WHS Act, as they apply to the emergency plan. Workers must comply with all reasonable instructions and cooperate with any reasonable health and safety policy or procedure, for example procedures in relation to their safety role at the mine.

2 Establishing the context for emergency planning

Before an emergency plan is developed, the context or factors affecting it should be established by the mine operator, including, but not limited to:

- the nature, complexity and risks of the mining operations (see 5.2 below)
- potential emergencies that determine the level of detail in the plan (see 4.1 below)
- the emergency plan and its relationship to other required plans, as part of the mine safety management system (see 2.1 below)
- the relationship between WHS legislation and emergency management legislation (see 2.2 below)
- relevant legislation for emergencies that may apply to the mine (see 2.3 below).

2.1 Mine safety management system

The emergency plan is one of the principal control plans that are part of the mine's safety management system (refer to 1.3 above for who has duties to prepare and maintain the plan).

The mine operator should consider the relationship between any part of the safety management system (e.g. principal mining hazards management plans and other principal control plans) and the emergency plan, so that potential emergencies are identified and planned for.

Further details on the safety management system can be found in the *NSW Code of Practice: Safety management systems in mines*.

2.2 Legislation framework – considerations

The mine operator should research what legislation applies to the mine and any emergencies that could occur, so that all legal requirements are satisfied in the plan. Apart from the WHS legislation, additional legislation that may apply includes:

- NSW emergency management legislation and the roles of emergency service organisations /related agencies at various incident types. See 2.2 below for where the following Acts and their regulations may apply:
 - *State Emergency and Rescue Management Act 1989*
 - *Fire Brigades Act 1989 and Rural Fires Act 1997*
 - *State Emergency Service Act 1989*
 - *Coroners Act 2009*
 - *Police Act 1990 and Terrorism (Police Powers) Act 2002*
 - *Law Enforcement (Powers and Responsibilities) Act 2002*
 - *Coal Industry Act 2001*
 - *Health Services Act 1997*
- Explosives, including the *Explosive Act 2003*. If storing amounts above the threshold (refer to the *Explosives Regulation 2013* clause 90 for requirements) including submitting a draft emergency plan to the Commissioner of Fire and Rescue NSW
- Dangerous goods, with the *Dangerous Goods (Road and Rail Transport) Act 2008*
- Environmental, including pollution reporting requirements outlined in the *Protection of the Environment Operations Act 1997*
- Aviation, under the *Civil Aviation Act 1988* (Commonwealth) and the Civil Aviation Safety Authority (CASA) requirements, particularly in relation to fly-in fly-out mines

2.3 WHS and emergency management related legislation

This section of the code provides guidance for mine operators on the operation and interaction of WHS laws and emergency management related legislation for mine emergencies. Further details are contained in 2.4, 3.5 and Appendix F below.

Where mine operators have a concurrent duty under the WHS Act with another PCBU or multiple PCBUs, they must consult, co-operate and co-ordinate with each other and their workers, so far as is reasonably practicable (see 1.3 above). This duty includes emergency service organisations who also have the same obligation to consult, cooperate and coordinate with the mine operator and other PCBU's.

In planning for emergencies, it is recommended for mine operators to consult with emergency services organisations beforehand to determine what information, instruction and training their workers will need and accept when attending the mine for an emergency. The consultation should extend to working out arrangements to support the emergency service workers to carry out their duties in a safe manner, such as guiding them around the mine (refer to 3.5 below).

Specifically, under the WHS (Mines) Regulation, the mine operator must ensure suitable and adequate information, training and instruction is provided to all workers (clause 104 – see 8.1 below in this code) that includes the hazards and controls associated with the work being carried out by the worker, relevant parts of the Safety Management System and the Emergency Plan. This may involve the mine operator consulting with the emergency services to ensure their workers have what is required to safely work at the mine. If it is agreed for the mine operator to meet any of these requirements for the emergency services workers (eg. mine site inductions) then a record must be made for any training provided under clause 108 of the WHS (Mines) Regulation, while the worker is engaged at the mine. Refer to the *NSW Code of Practice: Work health and safety consultation, coordination and cooperation* for further guidance in general.

Emergency management related legislation confers on emergency service organisations certain powers, functions and duties including, in some circumstances, the statutory right to enter land

in order to fulfil their duties and functions. A mine operator should be aware that emergency service organisations will be able to enter a mine in response to a particular emergency, to carry out their statutory duties and functions, and a mine's safety management system must facilitate cooperation with these organisations.

Specifically persons, including mine operators and their workers, under the WHS Act section 108 must not coerce or induce a person, but this prohibition does not extend to emergency services workers giving a reasonable direction in an emergency:

WHS Act

108 Prohibition of coercion or inducement

- (1) A person must not organise or take, or threaten to organise or take, any action against another person with intent to coerce or induce the other person, or a third person:
 - (a) to exercise or not to exercise a power, or to propose to exercise or not to exercise a power, under this Act, or
 - (b) to perform or not to perform a function, or to propose to perform or not to perform a function, under this Act, or
 - (c) to exercise or not to exercise a power or perform a function, or to propose to exercise or not to exercise a power or perform a function, in a particular way, or
 - (d) to refrain from seeking, or continuing to undertake, a role under this Act.(details of penalty omitted)

Note: Civil proceedings may be brought under Division 3 of this Part in relation to a contravention of this section.

- (2) In this section, a reference to taking action or threatening to take action against a person includes a reference to not taking a particular action or threatening not to take a particular action in relation to that person.
- (3) To avoid doubt, a reasonable direction given by an emergency services worker in an emergency is not an action with intent to coerce or induce a person.
- (4) In this section, emergency services worker includes an officer, employee or member of any of the following:
 - (a) the Ambulance Service of NSW,
 - (b) Fire and Rescue NSW,
 - (c) the NSW Rural Fire Service,
 - (d) the NSW Police Force,
 - (e) the State Emergency Service,
 - (f) the NSW Volunteer Rescue Association Inc,
 - (g) the New South Wales Mines Rescue Brigade established under the Coal Industry Act 2001,
 - (h) an accredited rescue unit within the meaning of the State Emergency and Rescue Management Act 1989.

Emergency service organisations, with their powers under their governing legislation, means that the mine operator may be required to provide entry and treat them in a similar way to an inspector under the WHS Act. That is for the mine operator to offer information, training and instruction to the person but accept that it may not stop or impair the person from exercising their power of entry and discharging their duties.

2.4 Related emergency management legislation in NSW

The key legislation and documents that provide the framework for emergency management in NSW are:

a) State Emergency and Rescue Management Act 1989 (SERM Act), which provides the general legal framework and governance for emergency management in NSW. It:

- defines 'emergency' as '... requiring a significant and coordinated response'
- establishes emergency management committees at state, regional and local government levels
- provides for arrangements for controlling emergency operations
- provides for the management and coordination of rescues in NSW

b) The State Emergency Management Plan (EMPLAN) provides the comprehensive detailed approach to prevention, preparation, response and recovery functions. EMPLAN's aim is to describe NSW's approach to emergency management, governance and coordination arrangements and the roles and responsibilities of agencies. This includes:

- identifying the combat agency primarily responsible for controlling the response to a particular emergency;
- specifying the tasks to be performed by all agencies in an emergency;
- providing for the co-ordination of the activities of other agencies in support of the combat agencies; and
- specifying the responsibilities of the minister and the state, region, or local emergency operations controller.

The EMPLAN is supported by sub plans and supporting plans.

c) Sub plans: A sub plan is an action plan required for a specific hazard or event from specific NSW government agencies. Sub plans may be prepared when the management arrangements necessary to deal with the effects of the hazard, or the requirements involved in the specific event, differ from the general coordination arrangements set out in the main or supporting plans for the area. A sub plan may be required where the planning is more specialised or detailed than can be provided for in the EMPLAN (refer to www.emergency.nsw.gov.au/publications for details of sub plans).

d) Supporting plan: Supporting plans are prepared by a NSW Government agency or service group (functional area), which describe the support to be provided to the controlling or coordinating authority during emergency operations, and respective roles and responsibilities of the parties identified

e) Emergency service organisation legislation: Various emergency service organisations have specific legislation in addition to that outlined above in 2.3, which outline the roles, functions and powers of the organisation to conduct those activities.

2.5 Applying the NSW emergency framework to mines

Mine operators should consider the other emergency management legislated requirements when preparing their emergency management plan and consulting with any required emergency service organisations. Further specific details to consider are contained in 3.5 and Appendix F below.

3 Preparing the emergency plan

This chapter may assist the mine operator to start preparing an emergency plan. Guidance is provided on processes to develop the plan and its content, including documents to be included or referenced.

However, in addition to this code guidance, further information may be required to complete the mine's emergency plan, such as other legislated requirements identified in establishing the context (refer to previous Chapter 2 above).

3.1 Overview of plan and contents

The mine operator should prepare an initial overview of what its emergency plan may contain in order to ensure that, once developed and finalised, it will satisfy the requirements in clause 43 of the WHS Regulations and clause 88 and schedule 7 of the WHS (Mines) Regulations. This may simply involve the mine operator preparing a draft of its plan that contains headings and initial information available. Other mine operators preparing large plans may put together a plan overview to enable workers to understand the plan's proposed extensive contents and referenced documents. The overview may be retained in the emergency plan to satisfy WHS (Mines) Regulations clause 88(2)(d) requirements as follows:

WHS (Mines) Regulations

88 Duty to prepare emergency plan (cl 664 model WHS Regs)

...

- (2) In addition to the matters required by clause 43 (1) of the WHS Regulations, the emergency plan must:

...

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

...

The overview may also be used in consultation with workers and other PCBUs in the development of the emergency plan.

For further detailed guidance, refer to Chapter 5 below for emergency plan contents.

3.2 Initiating the development of the emergency plan

WHS (Mines) Regulation

88 Duty to prepare emergency plan (cl 664 model WHS Regs)

- (1) The mine operator of a mine must prepare an emergency plan for the mine in accordance with this Subdivision.

(details of penalty omitted)

The mine operator must prepare an emergency plan for the mine. The mine operator must as a minimum prepare the plan in consultation with workers as required under WHS laws. Specifically this includes the WHS (Mines) Regulation clauses 120-121 for the worker safety role and the risk assessment for controls (see 1.3 above for who has duties and *NSW Code of Practice: Work health and safety consultation, coordination and cooperation*).

There are a number of ways in which this may be carried out, depending on the mine and the number of workers. The approach outlined below in 3.3 is one based on the mine operator organising and consulting with a group to assist in preparing the plan for the mine. The group may be an existing one at the mine or newly created. Alternatives to the group approach are set out in 3.4.

3.3 The possible appointment and responsibilities of an emergency planning group

The mine operator may appoint an emergency planning group (EPG) to help prepare, implement and review the emergency plan. This group may operate under various other titles at mines, such as an emergency team, but it should have similar responsibilities.

The mine operator should be a member of the EPG, or their representative, and retain active oversight of the EPG because many of the WHS duties and associated penalties rest with the mine operator and cannot be delegated: see section 14, WHS Act.

The mine operator should ensure that the EPG consults mine workers and other people who carry out these activities, including other PCBUs who work at the mine, as well as emergency services.

Under the WHS (Mines) Regulations, the mine operator must consult with emergency services. For further guidance, see 3.5 below.

The emphasis should be on consulting with all those who have duties in relation to developing and implementing the emergency plan. The mine operator or the EPG should consider incorporating into the mine's emergency plan any relevant emergency plans or information other PCBUs may have, such as when working with specialised equipment and/or carrying out any specialised activities.

This information may be available in contractor health and safety management plans that have been submitted to the mine operator, as required by clause 22 of the WHS (Mines) Regulations, to form part of the mine safety management system (refer to 1.3 Who has duties for an emergency plan?).

The EPG may meet as regularly as necessary to develop the emergency plan and then at least annually meet to review the plan to assist the mine operator.

3.4 Membership of the EPG

If an EPG is appointed by the mine operator, the group should consist of key stakeholders and duty holders at a mine, including the mine operator themselves or their representative. Generally, membership is derived from a representative cross-section of the workforce and mining operations, including senior management, mine workers and other relevant PCBUs and people, including contractors. Additional assistance may be sought from external people with specific experience and expertise. For further information, refer to *Australian Standard AS3745 Planning for emergencies in facilities* (see References section).

For a smaller mine with few workers, the EPG may consist of the mine operator with some or all workers, contractors and possibly an external person who has experience with a similar type of mine and who may be able to provide further information and assistance to benefit the planning process.

For larger or higher risk profile mines, the mine operator may develop the emergency plan through existing group at the mine, such a health and safety committee, which has the appropriate membership, and could convene as the EPG.

3.5 Consultation with emergency services

Mine operators of coal mines and underground mines (excepting opal mines) must consult with emergency services in preparing the emergency plan, as required under clause 89 of the WHS (Mines) Regulations:

WHS (Mines) Regulations

89 Consultation in preparation of emergency plan (cl 665 model WHS Regs)

- (1) In preparing an emergency plan, the mine operator of a coal mine or an underground mine must, so far as is reasonably practicable, consult with:
 - (a) the primary emergency services with responsibility for the area in which the mine is located, and
 - (b) in the case of a coal mine, any other emergency service organisation, including the New South Wales Mines Rescue Brigade established under the Coal Industry Act 2001, that may be required to participate in implementing the emergency plan, and
 - (c) in relation to the principal mining hazards that may cause or contribute to an incident that may adversely affect the health and safety of persons in the area surrounding the mine—the local authority for the local authority area in which the mine is located.
- (2) The mine operator must ensure that the emergency plan addresses any recommendation made by the emergency service organisations consulted under subclause (1) in relation to:
 - (a) the testing of the emergency plan, including the way in which it will be tested, the frequency of testing and whether or not the emergency service organisations will participate in the testing, and
 - (b) what incidents or events at the mine should be notified to the emergency service organisations.
- (3) The mine operator must have regard to any other recommendation or advice given by a person consulted under subclause (1).
- (4) This clause does not apply to an opal mine or an underground mine having less than 5 workers (unless the mine is an underground coal mine).
- (5) In this clause:

local authority means:

 - (a) the council, within the meaning of the Local Government Act 1993, if the mine is located on land in a local government area, or
 - (b) the Western Lands Commissioner if mine is located on land in the Western Division.

Key considerations when consulting local emergency services to fulfil the legislated requirements may include:

- what emergencies could potentially occur at the mine
- what risks to emergency services exist at the mine, and control measures required, including written information packs and site familiarisation activities (see 2.3 above).
- what resources the local services may contribute to responding to emergencies at the mine
- what resources the mine might need to have on hand to ensure that the equipment used by the local emergency services is able to function effectively
- compatibility of mine and emergency services' equipment
- the control and coordination arrangements for possible emergencies
- the integration arrangements of incident management staff and response teams
- the time it would take for emergency services to respond to any emergency at the mine.

The mine operator should consider being as self-sufficient as possible and consider the above matters. The impact on the community when including emergency services in the emergency planning should also be considered.

3.5.1 Surface mines

While surface mines, other than coal mines, are not required to consult with emergency services, the mine operator of larger and more complex surface mines should consider doing so as part of their duties to:

- a) ensure the health and safety of workers at the mine, including emergency service workers
- b) to develop a SMS, with the emergency plan as a component, to manage all risks at the mine.
- c) comply with schedule 7 of the WHS (Mines) Regulations in the mine emergency plan for arrangements to assist emergency services and facilitating off site resources to be used at the mine (refer above)

Operators of smaller and less complex surface mines may be able to rely on information provided by the emergency organisations or from NSW Trade & Investment guidance material in developing their plan.

3.5.2 Primary emergency services

Primary emergency services for the purpose of the Clause 89(1)(a) should include as a minimum:

- NSW Police Force
- Ambulance Service NSW
- Fire Brigade responsible for the area in which the mine is located (in rural fire districts, the NSW Rural Fire Service or in Fire Districts, Fire & Rescue NSW)
- any other emergency services identified as participating in the emergency plan arrangements that should also be consulted.

3.5.3 Initial and ongoing consultation

Clause 89(1) refers to consultation requirements in the 'preparation' of the mine emergency plan in a coal or underground mine. It is expected that consultation which takes place upon the initial preparation of a new mine emergency plan would be comprehensive. This would also apply during the transition of existing plans to the WHS (Mines) Act and Regulations framework, where consultation for the purposes of this clause has not already taken place. Ongoing development of the plan throughout its lifecycle, whether or not conducted in response to review and revision requirements (see clause 94 and 10.3 of this code) or other reasons, should initiate consultation where appropriate, for example:

- changes to circumstances agreed upon during initial consultation
- significant changes to mining operations, workforce, or potential emergencies that affect the emergency plan
- significant changes to site emergency response arrangements, capabilities, equipment or structures
- changes to the local emergency services arrangements within the scope of the mine emergency plan
- significant time has elapsed since the last consultation

3.5.4 Specific consultation requirements and agreements

The *Coal Industry Act 2001* provides for rescue arrangements at underground coal mines. The mine operator of an underground coal mine must consult with the approved mines rescue company (New South Wales Mines Rescue Brigade) when developing the plan (refer to clause 89(1)(b) above). Division 3 of Part 3 of the *Coal Industry Act 2001* has details of the roles and functions of the approved mines rescue company(s).

A mine operator may reach agreements with any number of involved emergency services, which may be combined with other arrangements made with neighbouring mines, as the operator considers appropriate. These agreements should be in alignment with the State Emergency Plan and any sub plan (refer to www.emergency.nsw.gov.au/publications for details of sub plans).

Emergency service organisations may be reluctant to enter into formal agreements with individual mines, but arrangements should be documented in similar manner as to those between the mine operator and PCBUs working at the mine, under WHS laws requirements.

3.5.5 Planning the consultation

Specifically the mine operator, possibly through its EPG, should plan its consultation with emergency services to meet the above legislated requirements and considerations. This planning may include:

3.5.5.1 Identify emergency providers and contact arrangements

Confirm common callout arrangements, mixed response and point of contact.

In some cases, 000 may be sufficient, but in other areas the operator may have to call each emergency service individually to obtain services.

3.5.5.2 Discuss/decide role of emergency services in initial identification and assessment of emergencies

- a) what information may be supplied before the identification and assessment
- b) what participation, if any, is desirable given the nature and hazards at mining operations and locations, among other factors
- c) reviewing the identification and assessment of emergencies.

3.5.5.3 Discuss role/capability of emergency services internally and then with them, as appropriate

These discussions should include control and coordination arrangements for different types of emergencies and when the emergency service organisation is required by their governing legislation to take control of an incident. They should also include:

- a) distance limitation from bases and the mine location
- b) time to respond to emergencies
- c) equipment and personnel description and capability
- d) duration of response capability i.e. will it cover the length of the mining operations, particularly with 24 hour mining operations
- e) priority of other emergencies that may mean it is not available for the mine's emergencies
- f) initial management of incident until emergency services arrive.

3.5.5.4 Information/equipment to be supplied by mine

- a) compatibility of mine equipment with emergency providers
- b) on-site storage of equipment supplied by the mine e.g. fire-fighting equipment, foam, first aid supplies etc
- c) special hazards, for example fuel storage and chemicals.

3.5.5.5 Emergency plan operation

- a) access and escort arrangements for the emergency services upon arrival
- b) (b) mine induction requirements, including site familiarisation for emergency services workers
- c) site plans and contact points being established
- d) emergency drills and tests involving emergency services should be conducted, debriefed and their recommendations considered
- e) contact details being maintained.

3.5.5.6 Agreements

- a) discuss and implement appropriate arrangements

-
- b) discuss reciprocal agreements, such as assistance to emergency services in agreed circumstances. As part of this, consider any legislative requirements for how this is to be conducted
 - c) discuss exercises and cross-training opportunities
 - d) record the outcomes of the agreements reached and any recommendations developed as part of the process.

3.5.6 Further sources and systems

The mine operator should consider the recommendations made by the Hazelwood Mine Fire Inquiry Victoria, August 2014 (source: www.hazelwoodinquiry.vic.gov.au) for the development of integrated response arrangements, and the use of the Australasian Inter-service Incident Management System concepts in the process.

4 Identify, assess and control emergencies

This chapter provides guidance on identifying emergencies and assessing risks in order to develop emergency response controls that are documented in the emergency plan.

The mine operator, possibly through its EPG, should identify and assess emergencies in consultation with appropriate people, including workforce health and safety representatives. The mine operator may also consider the inclusion of relevant emergency services to assist the EPG with the identification and assessment of emergencies.

4.1 Identification of potential emergencies

Types of emergencies that may be identified include, but may not be limited to, the following (see glossary meaning of 'emergency'):

- personal injury
- unplanned explosion
- fires, including for tyres and explosives
- strata or ground failure
- entrapped or missing workers
- inundation or inrush
- outburst
- irrespirable or noxious atmospheres
- hazardous material incident
- explosives incident
- vehicle or machinery accidents
- air blast or wind blast
- significant ventilation failure
- mechanical or electrical equipment out of control
- natural disasters, such as bushfires, flooding, earthquakes, cyclones
- civil disturbances or criminal activities, including bomb threats
- medical emergencies e.g. stroke
- spontaneous combustion
- structural failure (plant)
- loss of radiation sources
- intersection of utilities (gas pipeline, underground water/power).

The mine operator should also consider information contained in industry safety alerts and bulletins that may identify other emergencies.

The process of identification of emergencies may be carried out in many different ways:

1. Review above list for potential emergency scenarios
2. Review of principal mining hazards to determine in which ways these hazards may become out of control
3. Carry out an energy trace, which involves identifying the energy sources at the mine (including energies such as biomechanical, thermal and gravity).
4. Search on the regulator's fatality database
5. Review safety alerts and bulletins from the regulator and other sources
6. Brainstorm with people who have extensive experience in the mining or specialist-related areas (internal and/or external).

A common issue with the identification of potential emergencies is to discount the possibility of low frequency/high consequence events (commonly called catastrophic events or a principal mining hazard) on the basis they are "highly unlikely" at a particular mine. These catastrophic events should be risk assessed by the mine operator to consider if emergencies have occurred at a similar mine and should be addressed in the plan.

At some mines, first aid incidents are responded to under the emergency plan, but still would not require all aspects of the emergency plan to be implemented. At other mines, first aid incidents are responded to under normal operational procedures.

4.2 Assessment of the potential emergencies

As part of the assessment process the mine operator should consider a number of factors:

1. What is the threshold for an incident to be called an emergency at that mine?
2. To what extent should the emergency plan be implemented for each potential incident? (i.e. in full or in part)
3. The most likely outcome of each potential emergency
4. The maximum consequence that could be reasonably expected to occur for each emergency outcome

This four-step process should help identify potential emergencies that have similar outcomes. For example, medical emergencies and injuries to people may have a similar outcome to that of a person requiring initial first aid, followed by medical treatment.

4.3 Controls

After assessing the emergencies and their outcomes, the mine operator or its EPG should then organise the controls in the plan, as per the WHS Regulations clause 43 and WHS (Mines) Regulations clause 88 and Schedule 7 (see Chapter 5 Emergency plan contents for legislative requirements).

Emergency plan controls are different from other risk controls in that they generally start after the hazard is out of control and the situation has reached the emergency threshold. Controls included in the plan may include any of the following categories and the mine operator should assess what it needs for the plan, given the WHS laws requirements:

4.4 Procedures

Emergency procedures are covered extensively in Chapter 6.

4.5 Equipment

Refer to clause 4 Schedule 7 WHS (Mines) Regulations for resources and equipment to be considered for use. In addition, the mine operator must consider what is adequate for the provision of rescue equipment and patient transport to be reasonably practical for their mine. See Chapter 7 below for more guidance.

4.6 Adequate number of people who are trained

The mine operator should consider the nature of the operations to determine this, including such factors as:

- number of shifts or hours worked at the mine
- the type of equipment used
- accessibility to parts of the mining operation such as underground.

The above three categories of controls are considered pre-planned actions and resources to be taken in response to each emergency.

Refer to Chapter 8 for more guidance.

4.7 Additional considerations

Other considerations during the identification and assessment process may include:

- identifying any additional hazards produced as a result of the emergency
- understanding that an emergency may escalate, requiring more resources and equipment or a change in strategy
- determining how off-site emergency services would find the mine, especially exploration sites
- clearly identifying buildings and other facilities at the mine, and their functions
- identifying critical infrastructure, such as communications, power or water, and its ability to continue functioning in an emergency.

4.8 First aid

There are specific requirements for first aid that must be addressed in the emergency plan:

WHS Regulations

42 Duty to provide first aid

- (1) A person conducting a business or undertaking at a workplace must ensure:
 - (a) the provision of first aid equipment for the workplace, and
 - (b) that each worker at the workplace has access to the equipment, and
 - (c) access to facilities for the administration of first aid.
(details of penalty omitted)
- (2) A person conducting a business or undertaking at a workplace must ensure that:
 - (a) an adequate number of workers are trained to administer first aid at the workplace, or
 - (b) workers have access to an adequate number of other persons who have been trained to administer first aid.
(details of penalty omitted)
- (3) For the purposes of this clause, the person conducting the business or undertaking must have regard to all relevant matters, including the following:
 - (a) the nature of the work being carried out at the workplace,
 - (b) the nature of the hazards at the workplace,
 - (c) the size and location of the workplace,
 - (d) the number and composition of the workers and other persons at the workplace.

For considering first aid requirements at the mine, the mine operator should refer to the *NSW code of practice: First aid in the workplace*, including the processes for determining their needs and what should be included in first aid kits etc. In many cases, mines may be regarded as high risk workplaces for the purposes of that code.

Specifically for mines, the following should be considered as particularly relevant to determine first aid needs for emergencies:

- the layout of the mine and the provision of first aid equipment and trained workers in first aid at remote locations within the mine
- the operations of the mine and the types of the first aid equipment/items available eg. pain relief, crush injury management. See references section of this code for information about crush injury.
- the geographical location of the mine relevant to available services. In some cases, a first aid room and/or a helipad may be determined as necessary.

5 Emergency plan contents

5.1 Structure of emergency plan

The mine operator should decide the emergency plan's structure. The structure must meet the minimum legislative requirements and give sufficient detail to manage any emergency at the mine as set out in 1.3 of the code above for who has duties and 5.2 – 5.3 below for the contents of an emergency plan.

As stated in WHS (Mines) Regulation clause 88(5), the emergency plan at a mine may be referred to instead as an emergency response control plan.

Reference should also be made to the *NSW code of practice: Managing the work environment* and facilities for developing the emergency plan and its procedures.

5.2 Considerations for developing the emergency plan content

The WHS Regulations and WHS (Mines) Regulations also have considerations for each of the prescribed components of the emergency plan (for subclauses 43(1) and (2) see 1.3 above):

WHS Regulations

43 Duty to prepare, maintain and implement emergency plan

...

- (3) For the purposes of subclauses (1) and (2), the person conducting the business or undertaking must consider all relevant matters, including the following:
 - (a) the nature of the work being carried out at the workplace,
 - (b) the nature of the hazards at the workplace,
 - (c) the size and location of the workplace,
 - (d) the number and composition of the workers and other persons at the workplace.
- (4) A person conducting a business or undertaking at a workplace must implement the emergency plan for the workplace in the event of an emergency.
(details of penalty omitted)

WHS (Mines) Regulations

88 Duty to prepare emergency plan (cl 664 model WHS Regs)

...

- (2) In addition to the matters required by clause 43 (1) of the WHS Regulations, the emergency plan must:

...

- (d) so far as is reasonably practicable, be set out and expressed in a way that is readily understandable by persons who use it.
- (3) The emergency plan for a mine must comply with the matters in subclause (2) (a)–(c) to the extent that the matters are applicable to the mine having regard to:
- (a) the nature, complexity and location of the mining operations, and
- (b) the risks associated with those operations.
- (4) The emergency plan for a mine must contain an appropriate level of detail about the matters set out in subclause (2) (a)–(c) having regard to all relevant matters including:
- (a) the nature, complexity and location of the mining operations, and
- (b) the risks associated with those operations.

...

For each prescribed component of the emergency plan, the requirements have to be considered. For example, when identifying the required training for mine workers, the number of workers and their location, the nature of the work and hazards will all impact on the scope and frequency of relevant training required for each worker. These considerations should be used for every other aspect of the emergency plan, where appropriate, such as communication systems and testing of the system.

To be readily understood by people who access it, the plan may be set out in one document for ease of access and simplicity to use. However, in larger and/or higher risk mines, a mine operator may have a summary document which gives an overview of the plan and then references and explains key documents that form part of it. Refer to Chapter 3 for more details of creating an overview document.

The plan may be read and used in part or in full by people, so each part of it must contain details that are appropriate for their potential needs. For example, emergency fire drill or evacuation procedures may be contained in separate documents that are available around the mine so people can refer to them quickly. The use of headings, diagrams and common words within the documents may also assist understanding.

Mines should consider developing their emergency plan in line with the principles outlined by the Australasian Fire & Emergency Services Authorities in the *Australian Inter-service Incident Management System*. Mine emergency plans should be written using common terminology and similar formatting used by emergency service organisations (refer to 7.4 below for more details).

5.3 Emergency plan contents

The WHS legislation requirements for specific items to be addressed in the emergency plan are set out in the shaded column of the table below. The table addresses the general requirements in WHS Regulations clause 43 for all PCBUs, and then the specific requirements for mine operators prescribed in clause 88 and schedule 7 of the WHS (Mines) Regulations. Guidance on what details may be included in the plan to fulfil the legislative requirements appears in the unshaded column of the following table:

WHS (Mines) Regulations (unless referenced as WHS Regulations provisions)	Considerations on what may be included in the plan content to satisfy the legislation
<p>WHS Regulations</p> <p>43 Duty to prepare, maintain and implement emergency plan</p> <p>(1) A person conducting a business or undertaking at a workplace must ensure that an emergency plan is prepared for the workplace, that provides for the following:</p> <p>(a) emergency procedures, including:</p>	<p>There are a range of procedures that the mine operator must or may provide, including the mandatory ones below:</p>
<p>(i) an effective response to an emergency, and</p>	<p>Any other procedure that the mine operator identifies as necessary, in addition to those required to be included in the plan from Schedule 7 clause 5 of the WHS (Mines) Regulations (see below for further guidance)</p>
<p>(ii) evacuation procedures, and</p>	<p>See guidance in Chapter 6 on Emergency procedures</p>
<p>(iii) notifying emergency service organisations at the earliest opportunity, and</p>	<p>Follow Schedule 7 clause 3 of the WHS (Mines) Regulations for how this may be addressed</p>
<p>(iv) medical treatment and assistance, and</p>	<p>This must include first aid equipment, facilities, services and personnel, plus adequate patient transport, among others</p>
<p>(v) effective communication between the person authorised by the PCBU to coordinate the emergency response and all people at the workplace;</p>	<p>Follow Schedule 7 clause 2 of the WHS (Mines) Regulations below for how this may be addressed</p>
<p>88 Duty to prepare emergency plan</p> <p>...</p> <p>(2) In addition to the matters required by clause 43 (1) of the WHS Regulations, the emergency plan must:</p>	<p>A mine operator must ensure the emergency plan covers the elements set out by clause 43 above and the emergency legislated elements below which are specific to mines.</p>
<p>(a) address all aspects of emergency response, including by ensuring:</p>	<p>Clause 88 is only setting out the minimum necessary for all mines but each mine should include any other relevant aspects such as requirements for mine specific principal mining hazards.</p>
<p>(i) the establishment of a system that enables all persons at the mine to be promptly located,</p>	<p>(i) This applies to all mines (except opal mines). Small operations with limited working areas may meet this requirement with a simple sign-on sheet. This may be because persons</p>

WHS (Mines) Regulations (unless referenced as WHS Regulations provisions)	Considerations on what may be included in the plan content to satisfy the legislation
<p>and</p> <p>(ii) that a record of all persons who are underground at a mine (other than an opal mine) at any given time and each person's likely location is accurately maintained and is readily available in an emergency, and</p>	<p>are within visual range at all times.</p> <p>(ii) More complex mines will require systems that adequately locate people in a dynamic mining environment. This may include forms of electronic tracking and recording of all people at the mine.</p>
<p>(iii) the provision of adequate rescue equipment, and</p>	<p>Potential emergency situations identified need to have an effective solution. Consideration should be given to how much reliance a mine places on external provision of resources, including the availability of emergency services, given other emergencies that may occur in the community. See Chapter 11, Underground mines, for further guidance.</p>
<p>(iv) that an adequate number of persons trained in the use of rescue equipment are available to respond effectively to the emergency if a person is working at the mine, and</p>	<p>This should also take into account the shift arrangements at the mine so that there are an adequate number of trained persons whenever the emergency occurs. See Chapter 8 for further guidance.</p>
<p>(v) the provision of adequate patient transport if a person is working at a mine, and</p>	<p>The plan must cover internal transport of patients if required, such as from the underground workings to the surface of the mine, or from a remote surface location to the first aid facilities.</p> <p>Consideration should be given to the availability of ambulance services and the distance to medical facilities.</p> <p>See 7.2 Equipment and 7.7 Planning for resources and equipment– underground mines for further guidance.</p>
<p>(vi) the provision of appropriate transportation (or suitable means of egress by walking) for persons at risk in the case of an emergency to a place of safety including during an emergency evacuation, and</p>	<p>Appropriate transportation for persons around the mine or offsite or by walking to a place of safety should consider:</p> <ul style="list-style-type: none"> • number of people working in each area of the mine • distance to a place of safety • the travelling/walking conditions to the place of safety e.g. slope gradient

WHS (Mines) Regulations (unless referenced as WHS Regulations provisions)	Considerations on what may be included in the plan content to satisfy the legislation
(vii) arrangements are in place for emergency sealing of all or part of an underground coal mine, and	<p>Arrangements will be dependent on what foreseeable emergencies are identified that may require sealing.</p> <p>The mine operator must ensure compliance in their arrangements for the following clauses of the WHS (Mines) Regulations:</p> <ul style="list-style-type: none"> • clause 68 - Sealing • clause 77 - Post-incident monitoring
(b) include a statement of potential triggers for the activation of the plan, and	<p>The statement should include when and how the emergency plan will be activated.</p> <p>Mines may select a low threshold for emergencies, such as any injuries suffered by workers. Other mines may decide to implement the emergency plan only at a more serious incident level, such as serious bodily injury, fire or entrapped workers.</p> <p>The trigger may only activate a specified part of the emergency plan relevant to the level of the incident. For example, a worker's injury may activate only a first aid response initially, not a full scale mines rescue.</p>
(c) include all matters specified in Schedule 7, and	See below in table for further guidance.
(d) so far as is reasonably practicable, be set out and expressed in a way that is readily understandable by persons who use it.	The plan may be read and used in part or in full by persons, and must have an appropriate level of detail for the potential needs. The use of headings, diagrams and common words may aid understanding.
<p>Schedule 7 Matters to be included in emergency plan for a mine (Clause 88) (Sch 22 model WHS Regs)</p> <p>1 Site and hazard detail</p> <p>(1) The location of the mine, including its street address and the nearest intersection (if any).</p> <p>Note. Sufficient detail must be provided to enable a person not familiar with the site to find it.</p>	May include directions from the main public road and each access road or track to the mine, for the benefit of the emergency services that may use their copy of the plan. Latitude and longitude coordinates (e.g. GPS details) may also be provided.
(2) The current mine survey plan or mine plan required under Part 5.	Include copy of mine survey plan(s) or mine plan, which details the layout of the mine and facilities etc.
(3) A brief description of the nature of the mine and mining operations.	May include whether it is a surface and/or underground mine, material mined, hours of

WHS (Mines) Regulations (unless referenced as WHS Regulations provisions)	Considerations on what may be included in the plan content to satisfy the legislation
	operation and the mining methods.
(4) The maximum number of persons, including workers, likely to be present at the mine on a normal working day.	<p>May include visitors and infrequent contractors, and the relevant breakdown in the numbers between those working on the surface and in any underground mining operations.</p> <p>Note that a mine operator must know who is at a mine at any given time. Refer to clause 88(2)(a)(i) WHS (Mines) Regulations.</p>
(5) The emergency response control planning assumptions for different emergencies, and likely areas affected.	These are the assumptions documented in the identification and assessment stage of developing the plan. The assumptions may include the availability of external resources, the potential for hazardous substances to be on site or the likelihood of a certain type of incident occurring.
(6) The protective resources available to control an incident that could result in an emergency.	This includes monitoring and equipment. This is also covered in clause 4 of this schedule in table below.
(7) The emergency response procedures, including procedures for isolating areas of the mine in an emergency.	Procedures developed for the plan may be included in the plan or referenced, possibly depending on the amount of detail contained in them and ease of access. This is also covered in clause 5 of this schedule in the table below.
(8) The infrastructure likely to be affected by an emergency.	Infrastructure may be items such as power and water supplies, and first aid facilities. It may be considered to include the plans for alternate resources, if the infrastructure that may be affected, is required during the emergency
2 Command structure and site personnel	
(1) The command philosophy and structure to be activated in an emergency, so that it is clear what actions will be taken, who will take these actions and how, when and where they will be taken.	Indicate the responsibilities and accountabilities for persons involved in managing an emergency. It may include details of alternates for each position to ensure each required role is filled during an emergency. In providing details, consideration should be given to the required time for response, the hours of work at the mine and the appropriate level of authority.
(2) Details of the person who can clarify the content of the emergency response control plan if necessary.	Details of the person by position and/or name that should have a working knowledge of the plan, and be available to give advice on the

WHS (Mines) Regulations (unless referenced as WHS Regulations provisions)	Considerations on what may be included in the plan content to satisfy the legislation
	plan to internal and external bodies.
(3) The contact details of, and the way to contact, the persons at the mine responsible for liaising with emergency services.	Details of the person by position or name that should have a working knowledge of the plan and be available to give advice on the plan to external bodies. The person should be familiar with the range of emergency services that may be needed in an emergency e.g. fire, rescue.
(4) A list of 24 hour emergency contacts.	May list internal and external contacts and should be kept up to date.
(5) Arrangements for assisting emergency services.	<p>These arrangements should include details of access and escort, transport, equipment and personnel. The roles of various staff and the emergency services should also be identified, considering the matters outlined in Appendix F – NSW Emergency Management Framework.</p> <p>This should also include the potential for the mine to assist the emergency services in the area near the mine (refer to Chapter 2 Context and Chapter 3, 3.5 Consultation for external liaising and Appendix F NSW Emergency Management Framework). Even where the emergency plan would not be triggered in relation to an event, the plan may include arrangements to assist emergency services who are in control of an event at or near the mine e.g. bushfire.</p>
<p>3 Notifications</p> <p>(1) In the event of the occurrence of a notifiable incident or an event that could reasonably be expected to lead to a notifiable incident, procedures for notifying:</p> <p>(a) any person whose health or safety may be affected, even if:</p> <p>(i) the person is located underground, or</p> <p>(ii) there is no electrical power that can be used for the notification, and</p> <p>(b) the emergency services in circumstances where emergency services are required.</p>	<p>(a) Plan may include the procedures for the provision and use of communications systems for how people are to be notified of actual or imminent notifiable incidents (including underground and after a loss of power).</p> <p>Note: see References section for guidance on notifiable incidents.</p> <p>See also section 3(4) of the Schedule in table below for further details.</p> <p>(b) may include details of triggers (circumstances) in which to contact the appropriate emergency services. Refer to chapter 2 Establishing the context for emergency planning for related information. This is to be read in conjunction with WHS Regulation clause 43(1)(iii) and conducted at the earliest opportunity.</p>

WHS (Mines) Regulations (unless referenced as WHS Regulations provisions)	Considerations on what may be included in the plan content to satisfy the legislation
(2) On-site and off-site warning systems.	Details of systems, which may include a defined radio call signal or broadcast over speakers and horns. It may also have details of any off-site warning systems, such as alarms going direct to security companies or emergency services. The alarms may be linked to defined actions in response.
(3) Contact details for emergency services and other support services that can assist in providing resources and implementing evacuation plans in an emergency.	May include contact details of services such as emergency services, consultants, neighbouring mines and government agencies e.g. ambulance service.
(4) On-site communication systems.	May include details of telephone, two-way radio, paging systems and so on. The on-site communications systems should include the means for communicating off-site if necessary to move away from the emergency hazards. For example, the plan should include details of redundant or back-up systems, such as a satellite phone for use if the mobile or landline system is inoperable (clause 97(3) requires the provision of back-up systems in underground mines – see Chapter 11 Underground Mines below for further details). See clause 3(1) in the schedule above for back-up systems being available for notifiable incidents.
4 Resources and equipment (1) On-site emergency resources, including: (a) first aid equipment, facilities, services and personnel, and	List the items to be used in the plan. This may also serve as an audit tool to check that the items are available for an emergency response. (a) first aid equipment needs should be risk-assessed to determine the appropriate resources. See also clause 42 of the WHS Regulations in relation to the factors that must be considered in determining adequate first aid equipment, facilities and training. For general guidance, refer to the <i>NSW Code of Practice: First Aid in the Workplace</i> . As this code does not address the high risk nature of mining workplaces, the guidance provided as to minimum requirements may not adequately address first aid requirements at a mine. See also 4.5 in this code for further advice on first aid at mines.

WHS (Mines) Regulations (unless referenced as WHS Regulations provisions)	Considerations on what may be included in the plan content to satisfy the legislation
<p>(b) emergency equipment and personnel, including adequate and compatible fire-fighting equipment such as foam generators, and</p> <p>(c) gas detectors, wind velocity detectors, sand, lime, neutralising agents, absorbents, spill bins and decontamination equipment, where applicable.</p>	<p>b) compatible fire-fighting equipment means consideration should be given to the types of equipment used by external emergency services and where the mine equipment is not compatible, adaptors should be maintained at the mine.</p> <p>c) refer to 7.7 Resources and equipment for further guidance</p>
<p>(2) Off-site emergency resources, including arrangements for obtaining additional external resources (specific to the likely incidents), including mines rescue services, as necessary.</p>	<p>Details of any items that are planned to be obtained externally from the mine, such as rescue teams, breathing apparatuses, vehicle extraction equipment and plant for working at heights. The identification of these resources before an emergency will assist in determining response times and help define appropriate response requirements from internal resources. This may also include external emergency services.</p>
<p>(3) Arrangements for mines rescue that state the following:</p> <p>(a) the minimum mines rescue training to be provided,</p>	<p>Details of the internal and/or external training to be provided, including standards. For training by external providers (such as Registered Training Organisations) reference to their courses is sufficient.</p>
<p>(b) any arrangements for the mine operator and mine operators of mines in the vicinity to assist each other in an emergency,</p>	<p>Include details of what the assistance involves (equipment, people etc.) and may include notifying each other if they are unable at any stage to provide the agreed assistance. Mine operators should consult emergency services so arrangements comply with emergency legislation and the role of other agencies (see Chapter 2 Context for details)</p>
<p>(c) how inertisation equipment is to be used,</p>	<p>The procedures for inertisation should be documented or referenced. Where the equipment being used is supplied by an external provider, consideration should be given in the plan to address the suppliers' requirements for power, water, parking areas and any other facilities.</p>
<p>(d) the procedures to be followed in carrying out mines rescue.</p>	<p>Where the mines rescue is being conducted by an external provider, then reference to their procedures and protocols is sufficient. For on site response arrangements, the mine should prepare a procedure(s) that may include minimum standards and protocols.</p>

WHS (Mines) Regulations (unless referenced as WHS Regulations provisions)	Considerations on what may be included in the plan content to satisfy the legislation
	<p>The mine operator should consult on the procedures for rescue to be adopted as part of their consultation with emergency services.</p> <p>This may include considering the role of external agencies, particularly the NSW Police Force in coordinating rescue operations (refer also to the State Emergency and Rescue Management Act section 50).</p>
<p>(4) For an underground mine, a means of communication between the surface of the mine and any underground area of the mine where persons are located, that is effective, so far as is reasonably practicable, even if there is no electrical connection between the surface and the relevant underground area.</p>	<p>Provide details of redundant (back-up) systems and systems that reach people where they are working underground, such as through the earth radio. For example, personal emergency devices (PED) and wireless communication.</p>
<p>5 Procedures</p>	
<p>(1) Procedures for the safe evacuation of, and accounting for, all persons at the mine.</p>	<p>Include procedures for a system for readily locating all persons at the mine, the triggers for evacuation, the method of evacuation, the location of the emergency assembly area and the equipment required for a safe evacuation.</p>
<p>(2) Procedures and control points for utilities, including gas, water and electricity.</p>	<p>Document and include the areas that can be isolated by each control point. The procedures should include provisions for isolation and alternative supplies, if required, during the emergency.</p>
<p>(3) Procedures in the event of the ventilation system at the mine failing in all or part of the mine for more than 30 minutes.</p>	<p>Include or reference procedures that should give consideration to the hazards that may occur during a ventilation failure and the potential loss of power. Where diesel transport is utilised, a risk assessment of its suitability during a ventilation failure should be undertaken to inform these procedures.</p>
<p>(4) Procedures for fighting fires at the mine and details of the persons having the competency to fight fires and to train others in fire-fighting.</p>	<p>Procedures may consider internal resourcing and external agencies as necessary for the nature of the emergency.</p> <p>Competency standards may be established internally or to reference external sources or statutory positions e.g. fire officer specified for an underground coal mine.</p>
<p>(5) Procedures for sealing an underground coal mine from a safe place (including from a place out of the direct line of any potential blast).</p>	<p>See also guidance above for clause 4(3)(c), Schedule 7, WHS (Mines) Regulations for Resources and Equipment, and section 11.10 of the code.</p>
<p>(6) Procedures for safely inserting inertisation equipment.</p>	<p>See section 11.10 for more guidance.</p>

6 Emergency procedures

6.1 General

The mine operator must develop written procedures as determined by risk assessments to manage the different types of emergencies that could arise and to meet the requirements in the WHS legislation.

Procedures should be developed for both:

- the management of an emergency, and
- the action by all people at the mine if an emergency occurs.

Emergency procedures related to the legislative requirements may include, but are not limited to, the following:

- management structure for emergency control
- response to a fire
- transport of injured people
- evacuation or withdrawal procedures, including emergency assembly areas
- notification of emergency services
- medical treatment and assistance
- communication protocols
- bushfire procedures
- vehicle rescue procedures
- emergency training procedures
- specific procedures for underground mines.

These procedures should be subject to a risk assessment to determine if they are suitable for activation and to understand their limitations. This process should also be useful in identifying the training, resources and equipment needed to implement the procedures. The procedures must be documented in the plan.

The mine operator, or EPG on their behalf, must provide a statement of potential triggers (or thresholds) for the activation of the emergency plans required under clause 88(2)(b).

In documenting the triggers, consideration should be given to allocating the responsibility for:

- monitoring triggers (often the trigger is a phone call from the area where the incident has occurred)
- acting on the trigger
- implementing the required emergency procedures.

One way of managing emergency triggers and documenting them is through a trigger action response plan (TARP). Examples are included in Appendices B and C.

Large mines should consider using duty cards when an emergency occurs. They are particularly useful for operations working 24 hours, seven days a week. Each duty card should contain:

- the preferred person or position to be allocated the card
- specific duties for the person allocated the card
- equipment required for the duties
- any reporting requirements associated with the duties.

The duty cards may be specific to a type of emergency or general for use in all emergencies. Examples of duty cards that have been developed are in Appendix A.

6.2 Notifying people at the mine and emergency services

The emergency plan must address the WHS (Mines) Regulations requirements for notifications (see also 7.6 below for more legislative requirements):

WHS (Mines) Regulations

97 Safe escape and refuge (cl 672 model WHS Regs)

- (1) The mine operator of an underground mine must provide adequate means of communicating with all affected persons when the emergency plan for the mine is implemented.

(details of penalty omitted)

Example: An alarm system.

...

Schedule 7 Matters to be included in emergency plan for a mine (Clause 88) (Sch 22 model WHS Regs)

(see 5.3 above for details and guidance)

...

As outlined in Chapter 5, the plan must include the provision of communications systems for how people are to be notified of an emergency (including those underground and after a loss of power – refer to Chapter 11 below for underground mines). This may include audible and visual alarms, and public address systems. Back-up communication systems are required in underground mines, between the surface and any underground area where people are.

Where arrangements are in place with emergency services (or aid agreements with other mines), the mine operator should:

- ensure emergency services are familiar with the route and access to the site, or that there is appropriate signage
- establish a protocol for contacting the organisations
- identify triggers (circumstances) in which to contact the appropriate emergency services
- have an understanding of the role of the external agencies in an emergency situation.

6.3 Evacuation procedures general requirements

Evacuation is an orderly and controlled movement of people at the mine from the emergency situation to a place of safety (as opposed to escape).

Procedures must be developed by the mine operator or EPG to ensure any evacuation or withdrawal is carried out safely. Specific requirements for safe escape and refuge in relation to underground mines are outlined in Chapter 11.

6.3.1 Decision to evacuate

The decision to escape, evacuate or take shelter or refuge may be:

- a) on a person's initiative, or
- b) in response to a command from someone in authority in the command structure, or an external authorised emergency service empowered under NSW specific emergency legislation, or
- c) in accordance with a procedure.

6.3.2 Evacuation procedures - considerations

Evacuation and withdrawal procedures should be developed after considering:

- a) triggers that initiate evacuation or withdrawal procedures in an emergency, and this should be documented in the emergency plan (refer to 6.1 above for triggers)

- b) all people at the mine should be trained and tested in the procedures, and be aware of the triggers that initiated the actions
- c) copies of evacuation procedures may be strategically placed in and around the mine for easy reference by everyone at the mine
- d) the evacuation route should be specified and lead to a designated emergency assembly area.

Assembly areas or places of safety should be identified by the mine operator in consultation with all the key stakeholders, including mine workers and other PCBUs. When deciding on the location of assembly areas or places of safety, consideration should be given to it being:

- within a reasonable distance and outside or away from the affected area,
- a place that has sufficient facilities to provide for the short term needs of evacuees,
- suitable for the maximum expected number of people
- suitable for the temporary management of people with disabilities
- accessible to transport should people need assistance or transport to a secondary location.

The mine operator, or its EPG, should also consider whether the movement of large numbers of people evacuated or withdrawn to a place of safety, may result in a crowded environment that could lead to panic. Consideration should be given to minimising this risk.

6.3.3 Communication during evacuation

The emergency plan should address the communication systems and procedures so it provides:

- a) consistent, timely and clear directions and/or information to control any panic and facilitate an effective, coordinated and orderly evacuation or withdrawal.
- b) mines with more complex operations and higher risks may find it necessary to develop communication procedures that ensure information is passed between different people in the command structure. For example, a person identified in the command structure, such as an incident/emergency controller, giving directives.
- c) ways to positively check that the information has been received, understood and acknowledged by all the people who are affected. For example, the ability to check that all affected people have moved to a safe place or assembly area. The checks should be communicated between people in the command structure to confirm who has been withdrawn or evacuated.

6.4 Withdrawal

Withdrawal is a precautionary measure to move people from an area of the mine to a place of safety before the situation becomes an emergency. This occurs at a level before an emergency occurs. Withdrawal may be included or referenced in the emergency plan so that its inter-relationship is clear and effective.

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:

...

- (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,

...

The mine should consider developing procedures for withdrawal that take into account:

- loss of major controls for a hazard e.g. loss of ventilation where there is a likelihood of gas build-up. Note: clause 62 also requires the ventilation control plan to cover this situation if the main ventilation system fails
- loss of response capability e.g. loss of fire-fighting water or communications
- trends indicating potential loss of control e.g. dams filling rapidly, which may lead to water entering the working area.

Triggers should be set for each identified change that would lead to a withdrawal (refer to 6.1 above for further details). As part of the process, it would be appropriate to consider the triggers to re-enter the workplace after a withdrawal.

6.5 Re-entry to any part of a mine – during or after an emergency

The mine operator should develop procedures for workers to safely re-enter the mine, or parts of it, after an emergency has occurred or contained (for example during a rescue). In developing re-entry procedures, the following should be addressed:

- checking for any prohibition notices issued by the regulator
- adequate consultation with everyone involved
- obtaining sufficient information on all the hazards and conditions surrounding the emergency situation. This includes the mine and environmental conditions that may have changed as a result of the emergency, thereby introducing new hazards and increased risks (for underground coal mines, see WHS (Mines) Regulations clause 77 Post incident monitoring and clause 85(9) Inspection plan for more details)
- a risk-assessment of all hazards and conditions, which considers:
 - a) is there safe access?
 - b) is there a need to isolate some affected areas?
 - c) is there sufficient monitoring of hazards that have developed as a result of the emergency?
 - d) is it possible that people are re-entering in response to a temporary dip below withdrawal or evacuation trigger levels?
 - e) have inspections or remote monitoring been considered before re-entry (for underground coal mines, see WHS (Mines) Regulations references listed above for the dot point in this section of the code)?
 - f) people have correct training and competence to carry out re-entry procedures?
 - g) have clear instructions been given?
 - h) will there be adequate supervision?
 - i) is there adequate back-up systems? e.g. communication
 - j) is there an adequate escape strategy?
 - k) is there sufficient equipment available?
 - l) is there adequate communication between key persons and the control centre?
 - m) are triggers set to abandon the re-entry if necessary?
 - n) is there a planned review after the re-entry?.

Note: aided rescue is not part of this code, as specialist rescue protocols, procedures and training are required. Mines wanting to include rescue protocols and procedures should seek specialist advice and refer to the references in this code.

7 Emergency response

7.1 Introduction

The emergency plan must be used as the primary means of response. This response is based on being prepared and being able to respond in order to reinstate safe operations for people working in the mine.

7.2 Preparedness

Considerations for determining whether a mine is prepared for an emergency may include:

- plan is prepared and readily accessible
- training and general emergency response awareness throughout the mine site
- procedures and duty cards established and issued so command structure is established (see 7.4 below)
- guidelines developed that consider potential risks to security
- emergency plan assessments completed, as well as training and test exercises carried out
- communication system(s) established and regularly tested
- evacuation plans in place and tested
- warning systems in place and tested
- resources in place and checked and audited regularly e.g. first aid, including any special facilities and equipment such as air bags to release people
- mutual aid agreements in place with emergency services or other emergency support, such as other mines and mines rescue organisations.

Effective communication between everyone involved in managing and responding to an emergency is critical. This communication must be planned for and be well-established before an emergency occurs. See 7.6 below.

7.3 Response capability

Considerations for determining whether a mine is capable of responding effectively to an emergency should include:

- activating exercises to test the emergency plan and procedures (see Chapter 9 below for more details)
- duty cards ready to be issued and people trained in them and their overall role in activating the emergency control room or control centre
- mobilising internal and external resources in a timely, efficient and coordinated manner
- providing medical assistance with first aid and the ability to provide further medical assistance
- providing immediate relief, search and rescue
- notifying public authorities
- monitoring the location of people at all times.

The WHS (Mines) Regulations require the emergency plan to address locating people in a mine:

WHS (Mines) Regulations

88 Duty to prepare emergency plan (cl 664 model WHS Regs)

...

- (2) In addition to the matters required by clause 43 (1) of the WHS Regulations, the emergency plan must:

-
- (a) address all aspects of emergency response, including by ensuring:
 - (i) the establishment of a system that enables all persons at the mine to be promptly located, and
 - (ii) that a record of all persons who are underground at a mine (other than an opal mine) at any given time and each person's likely location is accurately maintained and is readily available in an emergency, and
 - ...

The mine operator must establish the system in the plan to record and locate all persons in the mine (with the exception of opal mines). The system may include paper sign-in forms through to electronic tracking devices.

7.4 Emergency command structure

Schedule 7 of the WHS (Mines) Regulations requires certain matters to be included in the emergency plan for command structure:

WHS (Mines) Regulations

Schedule 7 Matters to be included in emergency plan for a mine (Clause 88)

(Sch 22 model WHS Regs)

2 Command structure and site personnel

- (1) The command philosophy and structure to be activated in an emergency, so that it is clear what actions will be taken, who will take these actions and how, when and where they will be taken.
- (2) Details of the person who can clarify the content of the emergency response control plan if necessary.
- (3) The contact details of, and the way to contact, the persons at the mine responsible for liaising with emergency services.
- (4) A list of 24 hour emergency contacts.
- (5) Arrangements for assisting emergency services.

For mines with less complex operations and risks, the operational command structure for mining operations may be adopted for the emergency command structure. The plan is to set out who carries out which action in an emergency. These people must be trained and maintain an appropriate level of competence to be able to effectively complete the role in an emergency.

In mines with more complex operations and risks, a specific emergency response command structure may be developed. This structure must detail all functions and responsibilities to be assumed during an emergency. Duty cards may be issued to each of these people with a summary of their responsibilities and a summary of the command structure on the back of each card.

Matters to consider when developing an emergency command structure include:

- specific competencies required for the various tasks to be carried out
- what to do if the person nominated on a particular shift cannot be contacted
- who will be in charge where the supervisors on shift are of equal status
- at what point does a nominated person relinquish the function to a more senior person
- where emergency procedures and other system documents will be kept
- communication capability and location
- transportation capabilities on site
- first aid and medical assistance

-
- who will be the first contact person to receive emergency calls
 - who will contact emergency services so they are involved in a timely manner
 - who will be part of any incident control team and control the area
 - who speaks to family, friends, work colleagues, media and so on
 - who will account for people during and after the initial response
 - what debrief is needed after an emergency e.g. may include providing for and encouraging people to attend critical incident stress and trauma counselling
 - how to maintain emergency response coverage 24 hours a day/seven days a week, including relief for key people where it is foreseeable that there will a prolonged emergency at the mine)
 - management of fatigue for all people involved.

The mine operator should model its command structure on the Australasian Interservice Incident Management System (AIIMS) framework, on which many of the emergency services base their command structures (see Chapter 2). Comments and recommendations made within both the Pike River Royal Commission report and the Hazelwood Mine Fire Inquiry acknowledge the need for standardised incident management structures (such as AIIMS) and specific training in those roles within the structure.

In addressing the arrangements for assisting emergency services, the mine operator should accommodate those external agencies roles in the command structure. In particular, for events where an external agency takes control of an incident and appoint an incident controller. This may conflict with the principle of 'unity of command' and other underpinning concepts within the AIIMS approach, when external agency roles have not been recognised and integrated effectively into the system. The risk of conflict or confusion over who is in command should be avoided by prior consultation and making arrangements in the command structure.

7.5 Control room or dedicated person

The control room used in an emergency should have access to all of the necessary communications and resources needed to manage an emergency. The establishment and maintenance of this room should be a specific responsibility in the duties of nominated workers within the emergency plan.

Not every mine has a dedicated control room. However, the emergency management capabilities of a control room should be made available at a mine. This could be the responsibility of a nominated person to ensure that a room is set up to function as a control room if an emergency occurs and be able to take initial emergency calls. This nominated person should be trained in this function and be aware of their responsibilities within the emergency plan. The control room operator should:

- have as their core function, the ability to initiate a required response to information received
- maintain a log of any information received and transmitted
- be able to access and use established procedures
- be trained in handling all types of emergency response calls.

In the case of underground mines, the control room operator for each shift where workers are underground should be the person assigned to be one of the competent persons at the surface under clause 102 of the WHS (Mines) Regulations. Refer to Chapter 11 Underground mines (11.3) for further guidance.

7.6 Establishing communication

The mine operator must provide and maintain means to notify any person whose health or safety may be affected by a notifiable incident or an event that could reasonably be expected to lead to a notifiable incident, including in the case of underground mines, for communicating with all those affected when the emergency plan is implemented:

WHS (Mines) Regulations

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

The mine operator of a mine must ensure that:

...

(c) 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)

97 Safe escape and refuge (cl 672 model WHS Regs)

(1) The mine operator of an underground mine must provide adequate means of communicating with all affected persons when the emergency plan for the mine is implemented.

(details of penalty omitted)

...

Schedule 7 Matters to be included in an emergency plan for a mine (clause 88) (Sch 22 model WHS Regs)

...

3 Notifications

(1) In the event of the occurrence of a notifiable incident or an event that could reasonably be expected to lead to a notifiable incident, procedures for notifying:

(a) any person whose health or safety may be affected, even if:

(i) the person is located underground, or

(ii) there is no electrical power that can be used for the notification, and

...

When establishing communication systems and procedures the mine operator should consider the following:

- every person in or about the mine should be able to be notified if an emergency occurs
- every person (or work group) should be able to communicate with the control room (or control centre) and/or the nominated person if an emergency occurs
- when information is received in an emergency the control room operator or nominated person should seek enough detail to know where all people are, as well as relay to the person(s) the appropriate action to be taken.

Examples of communication systems for surface mines include:

- two-way radio systems
- emergency evacuation sirens
- mobile telephones
- mobile satellite phones for more isolated areas.

In some cases with large mines it may be appropriate to have a communication system that is connected to external emergency services to provide immediate notification in certain emergencies.

Guidance on further legislative requirements for communication in underground mines is contained in 11.3.

7.6.1 Communication – from incident location to control room

The control room operator or nominated person may use a card or annotated logbook system to record important information including:

- a) name of the person notifying of the emergency
- b) the location of the emergency
- c) brief details of what has happened
- d) who is involved
- e) the extent of injuries/damage
- f) what action people have taken so far
- g) what actions are planned to be taken
- h) what help and resources are needed
- i) whether a person is available to stay at the phone to relay further information, and
- j) any other relevant information.

The above information may be critical in the early stages of an emergency and may help the effectiveness of the response.

All people at a mine site should be trained to know the dedicated emergency number and who to contact and what information to provide. This initial information is important to the success of the emergency response.

7.6.2 Communication to those who may be affected

To ensure a timely first response, communications and other notifications in and around the mine must take place so that all affected persons are informed of the emergency:

WHS (Mines) Regulations

Schedule 7 Matters to be included in emergency plan for a mine (Clause 88)

(Sch 22 model WHS Regs)

...

3 Notifications

...

- (2) On-site and off-site warning systems.

...

- (4) On-site communication systems.

Some larger mines may have emergency systems that are automatically programmed to warn/alarm and commence electronic communications to affected people.

In mines with more complex operations and risks, the mine operator should consider developing an emergency telephone number and a protocol for communication across two-way radios, telephones or other communication systems. It should even consider non-verbal communication when appropriate, such as the use of cap lamp signals or use of stench gas initiated at various locations in underground mines to signal evacuation.

7.6.3 Immediate and ongoing command structure

The emergency plan should address when and how the command structure may change to best manage a prolonged or ongoing emergency. In developing the immediate and ongoing command structure, consideration should be given to the following issues, among others:

- monitoring evacuation
- incident scene control

- overall incident control, including whether a senior mine person being directly involved in the emergency
- for ongoing incidents in larger mines, the formation of an incident management team
- roster arrangements for prolonged emergency response
- ceasing work in unaffected areas to minimise potential conflict with the emergency response.

The plan should also consider how emergency services people may become part of the command structure for emergencies where this is necessary (see Chapter 2 Context, 2.1.2; Chapter 3, 3.5 Consultation with emergency services and 7.4 above).

7.7 Planning for resources and equipment

The mine operator must ensure the emergency plan identifies resources and equipment to be used in emergencies as required:

WHS (Mines) Regulations

88 Duty to prepare emergency plan (cl 664 model WHS Regs)

- (2) In addition to the matters required by clause 43 (1) of the WHS Regulations, the emergency plan must:
- (a) address all aspects of emergency response, including by ensuring:
 - ...
 - (iii) the provision of adequate rescue equipment, and
 - ...
 - (v) the provision of adequate patient transport if a person is working at a mine, and
 - (vi) the provision of appropriate transportation for persons (or suitable means of exit by walking) for persons at risk in the case of an emergency to a place of safety including during an emergency evacuation, and
 - ...
 - (c) include all matters specified in Schedule 7, and
 - ...

Schedule 7 Matters to be included in emergency plan for a mine (Clause 88)

(Sch 22 model WHS Regs)

4 Resources and equipment

- (1) On-site emergency resources, including:
- (a) first aid equipment, facilities, services and personnel, and
 - (b) emergency equipment and personnel, including adequate and compatible fire-fighting equipment such as foam generators, and
 - (c) gas detectors, wind velocity detectors, sand, lime, neutralising agents, absorbents, spill bins and decontamination equipment, where applicable.
- (2) Off-site emergency resources, including arrangements for obtaining additional external resources (specific to the likely incidents), including mines rescue services, as necessary.
- ...

The WHS (Mines) Regulations also require certain resources to be provided for underground mines (see Chapter 11). The amount of equipment required for each situation depends on the nature and complexity of the mine and the associated risks.

The mine operator should provide equipment as identified by the risk-assessment process. As the risk of fire and medical emergency are present at all mines, the plan must make provision for equipment so that the mine can respond to those emergencies, including those requiring patient transport. For example, air bags for releasing trapped people and vertical or water rescue equipment.

The mine operator must ensure the mine has first aid capabilities. Consult clause 42 of the WHS Regulations and for general guidance the *NSW Code of Practice: First aid in the workplace for these requirements*.

7.8 Providing and maintaining resources

Resources, including rescue equipment, should be provided in an appropriate area and maintained:

WHS (Mines) Regulations

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

The mine operator of a mine must ensure that:

- (a) all resources, including rescue equipment, specified in the emergency plan for the mine are provided in accordance with the plan, and
- (b) all resources required for the effective implementation of the emergency plan are provided, and
- (c) 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)

Equipment identified by the mine operator may be provided by:

- on-site emergency response equipment
- external emergency service support and/or
- mutual aid arrangements with other mines or if present, Mines Rescue Stations.

Mines should be as self-sufficient as reasonably practicable in the basic equipment requirements to provide rapid response to an emergency. This may also help prevent the emergency escalating.

8 Information, training and instruction

8.1 General

Under the WHS Regulations all PCBUs must provide information, training and instruction in relation to implementing the emergency plan. Mine operators have further specific duties under the WHS (Mines) Regulations.

WHS Regulations

39 Provision of information, training and instruction

- (1) This clause applies for the purposes of section 19 of the Act to a person conducting a business or undertaking.
- (2) The person must ensure that information, training and instruction provided to a worker is suitable and adequate having regard to:
 - (a) the nature of the work carried out by the worker, and
 - (b) the nature of the risks associated with the work at the time the information, training or instruction is provided, and

(c) the control measures implemented.

(details of penalty omitted)

- (3) The person must ensure, so far as is reasonably practicable, that the information, training and instruction provided under this clause is provided in a way that is readily understandable by any person to whom it is provided.

(details of penalty omitted)

43 Duty to prepare, maintain and implement emergency plan

- (1) A person conducting a business or undertaking at a workplace must ensure that an emergency plan is prepared for the workplace, that provides for the following:

...

- (b) information, training and instruction to relevant workers in relation to implementing the emergency procedures.

(details of penalty omitted)

...

- (3) For the purposes of subclauses (1) and (2), the person conducting the business or undertaking must consider all relevant matters, including the following:

(a) the nature of the work being carried out at the workplace,

(b) the nature of the hazards at the workplace,

(c) the size and location of the workplace,

(d) the number and composition of the workers and other persons at the workplace.

...

WHS (Mines) Regulations

95 Training of workers

The mine operator of a mine is to ensure that workers at the mine are trained in relation to the emergency plan:

(a) before commencing work at the mine, and

(b) as soon as is reasonably practicable after any significant revision to the plan.

(details of penalty omitted)

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 Regulations.

- (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:

...

(d) the emergency plan for the mine,

...

(details of penalty omitted)

106 Information for visitors (cl 675C model WHS Regs)

The mine operator of a mine must ensure that a visitor who enters the mine with the authority of the mining operator is, as soon as is reasonably practicable:

...

- (c) instructed in the actions the visitor should take if the emergency plan for the mine is implemented while the visitor is at the mine.

(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)

The duty to inform, train and instruct should result in mine workers being competent to carry out their role that is stated within the emergency plan.

As part of the risk-management processes, the mine operator should have identified the emergency response training needs under the emergency plan for each of the hazards involved in the emergencies. Training should occur for the following:

- people who have specific roles under the considered withdrawal (before an emergency) or during evacuation conditions of an emergency, including incident management team members, control room officers, supervisors
- for any controls that may be set out in the TARPs that require persons to be competent to carry out their role during an emergency.

The WHS Regulations also requires all PCBUs at the mine to ensure that an adequate number of workers are trained to administer first aid. See clause 42 of the WHS Regulations and for general guidance, the *NSW Code of Practice: First Aid in the Workplace*.

To prepare for its emergency training needs, a mine operator may refer to a number of references provided at the end of this code. One possible source includes the national units of competency under the National Recognised Training Packages for Resources and Infrastructure (RII). Another source may be reference material provided by the regulators for mine safety, as well as special rescue organisations for mining.

Events or activities that may identify that further training is required may include:

- emergency plan testing required under clause 43 of the WHS Regulations and clause 93 of the WHS (Mines) Regulations
- review and subsequent amendment of the plan under clause 94 of the WHS (Mines) Regulations (see Chapter 10 of code)
- if an emergency occurs and as a result the mine operator identifies that people were not yet competent to carry out their roles as stated in the emergency plan
- audits of the SMS (as required under clause 15 of the WHS (Mines) Regulation) have identified deficiencies or opportunities for improvement
- routine time-based training to ensure people remain competent.

8.2 Rescue equipment training

The WHS Regulations require people to be trained in specific areas, such as rescue, as determined by the risk-assessments and emergency plan:

WHS(Mines) Regulations

88 Duty to prepare emergency plan (cl 664 model WHS Regs)

...

(2) In addition to the matters required by clause 43 (1) of the WHS Regulations, the emergency plan must:

(a) address all aspects of emergency response, including by ensuring:

...

(iv) that an adequate number of persons trained in the use of rescue equipment are available to respond effectively to the emergency if a person is working at the mine, and

...

The mine operator should consider from the risk assessments, the types of rescue equipment that persons may need to be trained in. These may include, but not be limited to, the following:

- breathing apparatus
- fire-fighting equipment
- vehicle rescue and access equipment
- vertical access equipment
- first aid equipment including resuscitators, defibrillators, pain relief
- strata fall entrapment equipment
- water rescue equipment
- air bags
- confined space rescue equipment.

The mine operator should also determine the number of people who need to be trained. In determining an adequate number of workers who should be trained in the emergency plan and specifically in first aid, see clauses 42-43 of the WHS Regulations (part extracts in 4.8 and 5.2) and section 4.5 above. Relevant factors to consider may include:

- the number and types of rescue equipment
- number of workers at the mine who are available to operate the equipment
- the number of people required to carry out rescue activities (e.g. team size, need for a standby team)
- availability of other suitably trained people from mutual agreements with other mines or organisations such as a mines rescue organisation
- hours of operation, such as whether it is a 24 hour continuous operation requiring people to be trained on each shift.

For underground mines, all workers must be trained in relation to self-rescuers (see clause 100 of the WHS (Mines) Regulations and Chapter 11 of this code).

9 Testing

9.1 General

The objectives of testing the emergency plan for the mine operator may be to:

- safely test the emergency facilities and strategies in place at the mine that are designed to manage emergencies in all circumstances
- test the competency of people in using those facilities and implementing the strategies

- enhance the confidence and ability of people to respond in an emergency
- identify opportunities for improvement
- improve coordination and sharing of resources with involved emergency service organisations and other mines
- if possible, share the learning outcomes with others in the mining industry.

For certain exercises, the mine operator may consult with external organisations to see if they may participate, especially in the case where procedures include their involvement.

9.2 Frequency and nature of testing

The mine operator must test the emergency plan:

WHS (Mines) Regulations

93 Testing of emergency plan (cl 669 model WHS Regs)

The mine operator of a mine must test the emergency plan for the mine at intervals of no more than 12 months and as soon as is reasonably practicable after there has been a significant revision to the plan. Any such test is to have regard to the recommendations made by the emergency service organisations consulted under clause 89 in preparing the plan.

(details of penalty omitted)

Note: More frequent testing may be required—see clause 43 of the WHS Regulations.

This means that the emergency plan must be tested at least within 12 months of the last test or after a significant revision to the plan eg. changes in emergency equipment or warning systems, evacuation procedures and arrangements for command structure and site personnel in emergency response. See Chapter 10 in relation to when a revision may be required.

As stated in the legislation above, the mine operator must have regard to recommendations from any emergency service organisations consulted under clause 89 as to the frequency and nature of emergency plan testing (see section 3.5 of this code in relation to consultation).

The frequency and scale of the testing should be dependent on the nature and complexity of the mining operation, and the associated risks if an emergency occurred (see section 5.2 above). It should also be determined with the purpose of ensuring the plan remains current and achieves the objectives listed in 9.1. In practice this may mean the purpose of the test will help determine the type of test or exercise conducted e.g. desktop exercises for incident management staff versus actual testing such a full site evacuation drills.

9.3 Initial testing of emergency plan

It may be beneficial to do initial testing of the emergency plan for each emergency scenario and the proposed strategies and procedures to control hazards, by walking through each scenario at an appropriate location at the mine. This could identify opportunities for initial improvement of strategies and if procedures are practical.

9.4 Emergency exercises

One way the mine operator may test the plan is through a scheduled exercise (a drill or simulation of an emergency) to ensure it is effective and maintained ready for any emergency situation.

The mine operator should consider the following when organising exercises for the mine:

- the benefits of doing exercises for part of or all of the mine
- the objectives (based on the list in 9.1) for each exercise and design the exercise to deliver the outcomes
- briefing everyone involved before the exercises on:

- their roles
- strategies planned and goals to achieve in controlling likely hazards during an emergency
- having the attitude that it is a real emergency situation.

For less complex mines with few employees, the exercise may consist of simple walk throughs of potential emergency scenarios with at least one other person discussing the appropriate actions to take, checking the emergency equipment and reviewing the emergency procedures (refer to first four objectives of the list in 9.1 above).

For more complex mines, the scale of the exercises may be different. Generally they may involve either mine-wide exercises or area/crew based exercises that should include the use of escape equipment and emergency evacuation. For these mines, consideration should be given to include any incident management team and control room operators (workers assigned as first contact people) or similar referred to in the emergency plan, in the exercise or in stand-alone exercises.

Mine operators may refer to the *Australian Emergency Management Institute Managing Exercises – Handbook 3* for further guidance on methods to conduct exercises.

9.5 Conducting exercises and reviewing

To identify opportunities to improve exercises, mine workers should be assigned to monitor them. They should keep a record of how the exercises were completed, noting if strategies were effective and if procedures were followed. A debrief should be held after each exercise with everyone involved to discuss the observations, and possibly agree on improvements. A report should be prepared for review by the mine operator, or the mine's EPG.

In response to reports on exercises, the mine operator may:

- make changes to the emergency plan
- take corrective actions, such as refresher training and organising additional resources and/or upgrading existing ones

10 Maintenance and review of the emergency plan

Once the emergency plan has been implemented and initial testing completed, the mine operator needs to maintain and review the plan.

10.1 Records

Mine operator must create and keep records relating to the emergency plan as set out in the WHS (Mines) Regulations:

WHS (Mines) Regulations

91 Copies to be kept and provided (cl 667 model WHS Regs)

- (1) The mine operator of a mine must keep a copy of the emergency plan for the mine at the mine.
(details of penalty omitted)
- (2) The mine operator must ensure that a copy of the emergency plan is available on request to any emergency service organisation consulted under clause 89.
(details of penalty omitted)

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

- ...
- (4) The mine operator must ensure that the following are readily accessible to all workers at the mine:
...

(b) the emergency plan for the mine(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)

Further to the requirement to make the emergency plan available to workers, a mine operator should document key elements and display it throughout the mine. Pictures and symbols may help make the plan easier to understand. The detail of the documentation depends on the size, nature, complexity and risks associated with operating the mine. Regardless of how detailed the plan is, it must be easy to understand.

The mine operator should, and sometimes must, also keep other risk-management documents relating to the emergency plan, which describe:

- a) the hazards identified, the types of incidents that may occur and the consequences of such incidents
- b) the risk assessments that underlie the emergency plan and the relationship of the emergency plan to any principal hazard management plans for the mine
- c) records of how, to what standard and when workers were trained in the requirements of the emergency plan, including those who are required to manage the emergency
- d) records developed during an emergency
- e) records relating to the review of the emergency plan.

Note: that some documents must be retained for a minimum period as part of the mine record, in accordance with the WHS (Mines) Regulations, such as risk assessments, training records and records of incidents notified to the regulator. The mine operator should retain other documents related to the emergency plan as long as they remain relevant to the current version. These documents should be easily locatable so they may be consulted to check on decisions made regarding past arrangements. However, all risk-assessment documents should be kept for the life of the mine when those documents relate to risks that are categorised as high-level risks (or higher category). They provide an important record if those risks reoccur at the mine. Documents that relate to lesser level risks should be kept for as long as those risks exist at the mine. There may be NSW-specific emergency legislation regarding record-keeping that the mine operator should check and comply with, in addition to the above (refer to 2.3 and 8.1 for further details of records requirements).

10.2 Monitoring

Monitoring of the emergency plan may take place through:

- procedures to implement and maintain the plan (see Chapter 6 Procedures – 6.1 and Chapter 11 Underground – 11.1), including the possible use of TARPs
- the mine operator, and if relevant their EPG, ensuring the plan is prepared and implemented so an appropriate emergency response can be delivered (see Chapter 7 Emergency response)
- testing of the emergency response, including exercises (see Chapter 9).

10.3 Review

The mine operator must ensure there is a review of the safety management system under clause 17 of the WHS (Mines) Regulations, and specifically a review of the emergency plan in the specified circumstances:

WHS (Mines) Regulations (cl 670 model 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).

...

94 Review (cl 670 model WHS Regs)

- (1) The mine operator of a mine must ensure that the emergency plan for the mine is reviewed and as necessary revised:
 - (a) at intervals of no more than 12 months, and
 - (b) as soon as is reasonably practicable after there has been a significant change to the mining operations at the mine, and

(details of penalty omitted)

- (1) A review under subclause (1) must include a review of the training of workers under clause 95 and a review of the testing of the plan.
- (2) If a risk control measure is revised under clause 38 of the WHS Regulations or clause 10 of this Regulation, the mine operator of the mine must ensure that the emergency plan is reviewed and as necessary revised in relation to all aspects of risk control addressed by the revised control measure.

(details of penalty omitted)

The purpose of the review is to check the continuing suitability, adequacy and effectiveness of the emergency plan in managing emergencies and how it can be improved. See the *NSW Code of Practice: Safety management systems in mines* for further details on reviewing.

Initially the regular review should consider the underpinning risk assessments to confirm that they are still appropriate to the possible emergencies at the mine.

In undertaking the review, the mine operator must consult with workers and, as far as is reasonably practicable, their health and safety representatives. If an EPG was formed at the mine, they should be included in the review process (refer to code section 3.3 for EPGs). Consideration should also be given to consulting the emergency services organisations that were part of developing the plan.

During consultation, the questions that should be considered include:

- are the emergency risks adequately managed?
- are the control measures working effectively in both their design and operation?
- how effective is the risk-assessment process? Are all hazards being identified?
- have new work methods or new equipment been introduced to make the job safer? What is their impact on existing hazards, risks and control measures for emergencies? Are emergency procedures being followed?
- has instruction and training provided to workers been successful?

- if new legislation or new information becomes available, does it warrant a review of current controls?
- what has been the industry experience with respect to emergencies since the last review?
- what is the current industry best practice for the management of emergencies?
- have there been technological advances made that may be of assistance in managing emergencies?
- have there been any industry publications or technical reports published that may assist in the managing of emergencies?
- have there been changes that affect the involvement of external services?

If problems are found, go back to any point in the emergency management process, review the information and make further decisions about risk control.

For reviews in response to risk control changes, the mine operator should adopt a similar approach to that of the regular review above.

Advice on significant changes to mining operations that may require a mine operator to review their emergency plan and test it is contained in section 9.1 above.

10.4 Audit

The mine operator must carry out audits of the emergency plan, as part of the mine safety management system:

WHS (Mines) 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.

The mine operator must set performance standards and audit against them, such as whether procedures specified are in place and being followed, performance outcomes set are being achieved, and actions are being taken e.g. corrective actions from an incident investigation. Further details on auditing are contained the in *NSW code of practice: Safety management systems in mines*.

The audit measures for the effectiveness of the emergency plan may specifically include, but not be limited to auditing whether:

- mine workers understand their responsibilities and carry them out
- training and testing has been carried out in accordance with the emergency plan
- equipment required is available and maintained, including monitoring equipment
- inspections specified have been carried out
- appropriate emergency responses have occurred in response to any triggers in a TARP
- required reports have been completed.

Information from the audit should enable the emergency plan to be improved and should ensure it remains effective in an emergency.

The audit system must include the frequency, audit methodology and results, and may include:

- scope of the audit
- name(s) and competency of the auditor(s)
- person responsible for ensuring the audit is conducted
- reporting protocol for the audit
- person(s) responsible for acting on the audit report.

A mine operator may decide to carry out internal audits with people working at the mine that have the appropriate auditing competence and technical expertise. Alternatively, it may be decided to have an independent audit undertaken by an external person so as to be potentially more objective and gain external expertise and insights.

11 Underground mines

11.1 Introduction

Underground mines have considerations for emergency planning that are different from other mines, including:

- hazards that are not present in surface mines
- additional risks with transport both for injured persons and for evacuation
- potential for contaminated air to pose additional risks.

This chapter provides additional guidance in relation to underground mines, and builds on the guidance material contained in Chapters 1-10 that applies to all mines.

Many underground mines have used trigger action response plans (TARPs) to provide a simple and effective summary of actions and responses to take when certain triggers occur. More details regarding TARPs may be read in Chapter 6 Emergency procedures within 6.1 General. For an example of a TARP used in an underground mine, see Appendix E.

11.2 Emergency exits

Underground mines must meet requirements for exits to escape from mine workings.

WHS (Mines) Regulations

96 Emergency exits (cl 671 model WHS Regs)

- (1) The mine operator of an underground mine must ensure that the mine has at least 2 exits to the surface that are trafficable by persons and that comply with subclauses (2) and (3).
(details of penalty omitted)
 - (2) Each exit must:
 - (a) be accessible from each level in the mine in which coal extraction or stopping operations are being carried out, and
 - (b) allow for the passage of rescue persons and rescue equipment, and
 - (c) be marked or signposted so that it can be readily located in an emergency, and
 - (d) be maintained so that it remains effective.
- ...

The legislation stated above requires exits to be marked or signposted so they can be readily located in an emergency, such as in reduced visibility. Consideration should be given to:

- segregated fresh air exits, where a contamination of the air in one exit does not contaminate the air in the other exit
- installing a lifeline in each exit (this is generally a continuous line with direction indicators for persons to use in extremely low visibility)
- making each exit trafficable by persons or transports, as specified in the emergency plan
- minimising any ladder way in the exit
- emergency egress hoists to be used in exits with long distances to climb, instead of or in conjunction with ladder ways
- setting minimum standards for the exits.

In underground coal mines, exits must also be located so that, as far as reasonably practicable, the blocking of one does not prevent the others from being used:

WHS (Mines) Regulations

96 Emergency exits (cl 671 model WHS Regs)

...

(3) In the case of an underground coal mine:

- (a) the exits must be located so as to ensure, so far as is reasonably practicable, that an incident or event that occurs in relation to one exit, that prevents the exit from being used for the purpose of escape from the mine, does not prevent persons from using the other exit to escape.
- (b) at least one of the exits must:
 - (i) be an intake airway or a combination of adjacent intake airways, and
 - (ii) be designated as the primary exit, and
 - (iii) be suitable for use by a vehicle.

...

The most likely scenario where an event in one egress will affect the ability of persons to escape using the other egress is a fire, where the smoke may travel from an intake egress to a return egress. This needs to be considered in the design of the egresses. Other events, such as flooding of egresses or broad strata ground failure, should also be considered in the design.

The mine operator may be exempt from having two trafficable exits in the following situations:

WHS (Mines) Regulations

96 Emergency exits (cl 671 model WHS Regs)

...

- (4) The mine operator of a mine is not required to comply with subclause (1) in either of the following circumstances if the mine operator ensures that the mine has at least 1 trafficable exit to the surface that complies with subclause (2):
 - (a) a single entry drive or shaft is being developed,
 - (b) the most distant area of the mine is no more than 250 metres from the mine entrance or a second exit.
- (5) The mine operator of an underground mine must ensure that:
 - (a) the risk associated with fire affecting an exit is managed so far as is reasonably practicable, and

- (b) fire-fighting equipment is located on, or near, any equipment installed in the primary exit and is appropriate for its proposed use, and
 - (c) workers who may need to use exits are provided with sufficient training and instruction so as to be made familiar with those exits, and
 - (d) the marking of exit paths is such that persons can, so far as is reasonably practicable, safely travel on them in an emergency including through conditions of reduced visibility or irrespirable or unsafe atmospheres.
- (details of penalty omitted)

Clause 96(4)(a) relates to when a mine operator is driving the first shaft to develop the underground workings and so cannot have a second trafficable exit until it is possible to be completed.

Small underground mines, such as opal mines, may not have workings that are more than 250 metres from the underground entrance and are not required to have second trafficable exit under clause 96(5)(b). However, the mine operator should consider having second exit if it is reasonably practicable as a control to manage hazards and risks at the mine such as fire (see section 11.8).

11.3 Communications

The mine operator must provide for adequate means of communication to all affected people when the emergency plan is triggered:

WHS (Mines) Regulations

97 Safe escape and refuge (cl 672 model WHS Regulations)

- (1) The mine operator of an underground mine must provide adequate means of communicating with all affected persons when the emergency plan for the mine is implemented.

(details of penalty omitted)

Example: An alarm system.

- (2) The mine operator of an underground mine must ensure, so far as is reasonably practicable, that the communication systems for the underground mine enables communication to be established:
 - (a) between persons underground in different parts of the mine, and
 - (b) between persons underground and persons at the surface in the case of an emergency, and
 - (c) across strategic locations at the mine, being places critical for communicating with persons in an emergency, (such as refuge chambers, caches, refill stations, change-over stations, escape routes and mobile plant), and
 - (d) from places unaffected by hazards associated with an emergency to those that are affected.

(details of penalty omitted)

...

The communication system should be designed and implemented so it is located where workers may be in an emergency, for example refuge chambers, caches, escape routes and mobile plant. Consideration should also be given to putting the system in a place that is not affected by hazards associated with an emergency.

There are several different communication methods available for underground mines. They include:

- two-way radios (leaky feeder systems)
- telephones at specific locations
- personal emergency device system (sending messages via cap lamps)
- Wi-Fi systems (using cap lamps or radios)
- wireless with VOIP system
- stench gas.

There is ongoing technical research to improve communication systems for underground mines. This is often combined with people-tracking systems. During development or review of the emergency plan, it would be appropriate to consider those technical advances and their applicability to the mine. Consideration should be given to back up systems and to the physical integrity of the system during an emergency (see 5.3 above for more details of plan content).

The communications systems for emergencies must have back-ups and in the case of certain areas of underground coal mines, be suitable for the presence of 2% methane:

WHS (Mines) Regulation

97 Safe escape and refuge (cl 672 model WHS Regs)

...

- (3) The mine operator of an underground mine must ensure that any power operated communication equipment used as part of a communication system for the mine (including the power supplied to that equipment) incorporates a failsafe or back up power supply for the critical parts of the system.

(details of penalty omitted)

- (4) The mine operator of an underground coal mine must ensure that any power operated communication equipment used as part of a communication system that is installed underground (unless installed in a drift or shaft being driven from the surface in material other than coal) must be suitable for use in a place where the concentration of methane in the general body of the air is greater than 2% by volume.

(details of penalty omitted)

...

Schedule 7 Matters to be included in emergency plan for a mine (Clause 88)

(Sch 22 model WHS Regs)

4 Resources and equipment

...

- (4) For an underground mine, a means of communication between the surface of the mine and any underground area of the mine where persons are located, that is effective, so far as is reasonably practicable, even if there is no electrical connection between the surface and the relevant underground area.

There is also a requirement to have surface contacts for any persons underground to contact:

WHS (Mines) Regulation

102 Competent person at surface

The mine operator of an underground mine must ensure that at any time that persons are underground:

- at least one person at the surface (the surface contact) is readily available to be contacted by those persons underground, and
- at least one of the surface contacts has the authority, the competence and is readily available

- to activate the emergency plan as necessary, and
- (c) at least one of the surface contacts has the competence and is readily available to answer alarms as necessary, and
 - (d) at least one of the surface contacts has the competence and is readily available to switch off and switch on the supply of power to the underground parts of the mine as necessary.
- (details of penalty omitted)

This clause specifically requires that any time people are underground, that there are surface contacts who are able to respond and carry out one of the specified tasks required in any emergency:

- activate the emergency plan
- answer alarms
- switch off or on the supply of power to underground parts of the mine.

11.4 Escape strategies

Underground metalliferous mines and underground coal mines have different legislative requirements and generally have different strategies for use of self-rescuers and evacuation/escape strategies:

WHS (Mines) Regulations

97 Safe escape and refuge (cl 672 model WHS Regs)

...

- (5) The mine operator of an underground mine must provide adequate means of escape that:
 - (a) in the case of an underground coal mine – enable persons to safely reach an exit, or
 - (b) in the case of other underground mines - enable persons to safely reach an exit or a refuge chamber, including through conditions of reduced visibility or irrespirable or unsafe atmospheres.
- (details of penalty omitted)

Coal mines generally have a procedure that calls for escape to the surface. This is because in the event of a fire, a coal mine has a virtually inexhaustible supply of fuel and if that fuel is being consumed explosive gases may be generated. Specific requirements for the mine operator to take into account for an emergency escape to the surface strategy are:

WHS (Mines) Regulations

97 Safe escape and refuge (cl 672 model WHS Regs)

...

- (6) The mine operator of an underground coal mine must, in conjunction with providing an adequate means of escape, ensure that an overall emergency escape to the surface strategy is developed for the mine that takes into account the following:
 - (a) the distance persons will need to travel in order to reach the surface, and
 - (b) the rate at which persons will need to travel in order to reach the surface safely, and
 - (c) the location and size of each refill station, cache or change-over station, and
 - (d) the provision of water and communications at refill stations and change-over stations, and
 - (e) procedures, so far as is reasonably practicable, for rehydration and communication in an

irrespirable atmosphere, and

- (f) provisions for monitoring the respirable air both within and outside a change-over station, and
- (g) the escape apparatus and cache or refill station capacity that is required to allow the safe escape of all persons from the mine.

(details of penalty omitted)

...

Due to the distances that are required to be travelled to reach the surface, a single self-rescuer may be insufficient to allow for safe escape from the mine. Most coal mines have a strategy that either uses compressed air breathing apparatus (CABA) with associated refill stations or oxygen generating self-contained self-rescuers with additional caches of self-rescuers.

For other (non-coal) underground mines, different requirements for the escape to surface strategy exist:

WHS (Mines) Regulations

97 Safe escape and refuge (cl 672 model WHS Regs)

...

- (7) The mine operator of an underground mine other than an underground coal mine must, in conjunction with providing an adequate means of escape, ensure that an overall emergency escape to the surface or refuge strategy is developed for the mine that takes into account:
 - (a) the distance persons will need to travel in order to reach a refuge chamber or the surface, and
 - (b) the rate at which persons will need to travel in order to reach a refuge chamber or the surface safely, and
 - (c) the location, number, duration and capacity of refuge chambers including arrangements in relation to the provision of food, water, sanitation, communications and the potential for the generation of excess heat in the chamber, and
 - (d) arrangements for the monitoring of the air both within and outside the refuge chamber, and
 - (e) arrangements for locating refuge chambers by persons who may need to use them in circumstances of reduced visibility, and
 - (f) limiting the number of persons in an area to the refuge chamber capacity, and
 - (g) procedures to recover all persons who may need to use the refuge chamber as soon as possible in a safe manner.

(details of penalty omitted)

Metalliferous mines generally use the self-rescuer to reach a refuge chamber or fresh air base where people wait for rescue or for instructions from the mine control centre. This has proven to be effective in many cases, both in Australia and overseas. In addition to the considerations for the refuge approach required in the legislation above, other considerations should include:

- perform risk assessments with various emergency scenarios that could occur to determine if the strategies for refuge and escape are effectively controlling the risks involved with each emergency, and if further training or resources are required
- planning well before crews are to work in areas to ensure there is sufficient capacity in the refuge chambers and this needs to take into account any additional persons, such as supervisors, management and visitors
- planning to use a temporary and smaller capacity refuge chambers e.g. when only a development crew is working in a more isolated location
- location of signage for refuge chambers (see section 11.5 below) and escape routes

-
- a person to have the responsibility for limiting the number of workers in an area to the refuge chamber(s) capacity.

11.5 Self-rescuers and refuge chambers

All persons underground must be provided with an appropriate self-contained self-rescuer if there is a risk of an irrespirable atmosphere:

WHS (Mines) Regulations

100 Self-rescuers (cl 674 model WHS Regs)

- (1) The mine operator of an underground mine (other than an opal mine) must ensure that a person who is to go underground is provided with an appropriate self-contained self-rescuer if there is a risk of an irrespirable atmosphere in the underground mine (including during an emergency).
(details of penalty omitted)
...
- (2) The mine operator must ensure that the person is trained in the use of, and is able to use, the self rescuer provided.
(details of penalty omitted)
- (3) In the case of a worker at the mine, any such training must involve training the worker, in a simulated work environment, in the donning and change-over of each type of self-rescuer that the worker may be required to use:
 - (a) before the worker initially commences work at the mine, and
 - (b) every 6 months after that.
- (4) In the case of a worker at an underground coal mine, any such training must also involve training the worker to operate any oxygen-generating self-contained self rescuers that the worker may be required to use whilst undertaking physical effort similar to an evacuation situation:
 - (a) before the worker initially commences work at the mine, and
 - (b) every three years after that

The self-rescuer must form part of an escape strategy to enable a person to get to a place of safety through any irrespirable atmosphere.

Mine operators should risk-assess whether an irrespirable atmosphere may pose a risk at the mine, such as when a fire occurs or low oxygen levels.

In all underground mines procedures should be developed to make clear when self-rescuers or other respiratory protection apparatus are to be used and what actions to take in an emergency or any potential emergency.

Workers must be trained in the donning of self-rescuers and changeover to any subsequent rescuer (e.g. SCSR or CABA) at induction and every six months. This may be carried out using training versions of the units in accordance with clause 100 above. Preference should be given to carrying this out in the underground environment.

Workers must be trained on a 'live' trainer at induction and every three years for oxygen generating SCSRs. The 'live' trainer is normally a short duration version of the SCSR with reusable parts. This training must include physical activity of sufficient intensity to demonstrate to the user how the rescuer will operate under a high demand, and may be carried out on the surface of the mine.

To ensure that people are able to continue using the self-rescuer, the mine operator should:

- determine a schedule for refresher training, which may be based on advice from the supplier of the self-rescuers (and be additional to the minimum requirements set out above). The refresher training may include:
 - donning and wearing
 - changeover (for chemical self-rescuers)
 - refilling (for compressed air breathing apparatus)
 - pre-use checks
 - self-rescuer locations
 - risks and suitable controls associated with using a self-rescuer (such as the effect of heavy work and side breathing).
- establish the frequency of additional retraining such that all persons are familiar with the use and location of self-rescuers at all times they are working underground

Mine operators of all underground mines should consider the installation of refuge chambers at the mine. If refuge chambers or cache, refill and changeover stations are used, then there are requirements for signage:

WHS (Mines) Regulations

98 Signage for emergency refuge (cl 673 model WHS Regs)

The mine operator of an underground mine that includes a refuge chamber must ensure that signs are prominently displayed at the mine showing the location of, and direction to, each refuge chamber.

(details of penalty omitted)

99 Signage for caches, refill stations and change-over stations

The mine operator of an underground mine that includes a cache, refill station or change-over station must ensure that signs are prominently displayed at the mine showing the location of each such cache, refill station or change-over station.

(details of penalty omitted)

11.6 Personal protective equipment for first aid and rescue

The mine operator must ensure that people entering the mine as part of first aid and rescue procedures have the appropriate personal protective equipment (PPE):

WHS (Mines) Regulations

101 Personal protective equipment in emergencies (cl 675 model WHS Regs)

- (1) This clause applies in relation to a worker who is to enter an underground mine in an emergency in order to carry out first aid or rescue procedures.
- (2) The mine operator of the underground mine must ensure that oxygen or air supplied respiratory equipment is available for use by, and is provided to, the worker in an emergency in which:
 - (a) the concentration of oxygen falls below a safe oxygen level, or
 - (b) the atmosphere in the underground mine has a harmful concentration of an airborne contaminant, or
 - (c) there is a serious risk of the atmosphere in the underground mine becoming affected in the way referred to in paragraph (a) or (b) while the worker is in the underground mine.

(details of penalty omitted)
- (3) The mine operator must ensure that suitable personal protective equipment is available for use by, and is provided to, the worker in an emergency in which:

-
- (a) there has been an inundation or inrush of any substance in the underground mine, or
 - (b) there is a serious risk of an inundation or inrush of any substance occurring while the worker is in the underground mine.
(details of penalty omitted)
- (4) The mine operator must ensure, so far as is reasonably practicable, that a worker uses the personal protective equipment provided under subclause (2) or (3).
(details of penalty omitted)

Considerations for ensuring capacity to provide PPE include:

- potential or actual atmospheric contaminants
- potential or actual inundation or inrush
- availability of the appropriate equipment
- availability of persons trained in the equipment
- specific protocols for use of the equipment
- procedures for any specialist emergency response team who may enter the mine.

11.7 Air monitoring and warning systems

Due to the risk from underground emergencies that result in contamination of the air, the mine operator should consider having a monitoring system that provides an early warning system of contamination. This monitoring system may be complementary or additional to the monitoring systems required as a risk control measures under Divisions 4 and 5, Part 2, the WHS (Mines) Regulations, and the requirements for monitoring air both within and outside of respirable air change over stations and refuge chambers in clauses 97(6) and (7).

When developing a monitoring system that will trigger evacuation, the mine operator should consider:

- a monitoring system that is adequately designed, maintained and calibrated
- detection points positioned and alarms initiated in appropriate locations
- graduated alarm settings with escalating actions for a deteriorating situation
- early warning systems and associated decision-making protocols and procedures
- contingencies in the event of failure of any part of the monitoring system
- availability of competent people to operate systems and analyse results.

Consideration should be given to redundant monitoring systems and to the physical integrity of the system during an emergency.

Early warning trigger levels should:

- recognise normal or background conditions
- be able to measure or observe levels in both absolute and relative terms, for example, in appropriate units and as a percentage comparison to normal or back ground conditions
- be current
- be consistent with statutory requirements
- be relevant to the risk being considered
- be directly linked to a specific response action.

11.8 Fire

There are requirements for the mine operator of an underground mine to ensure the risk of fire is controlled in emergency exits so one remains available for use:

WHS(Mines) Regulations

96 Emergency exits (cl 671 model WHS Regs)

(3) In the case of an underground coal mine:

- (a) the exits must be located so as to ensure, so far as is reasonably practicable, that an incident or event that occurs in relation to one exit, that prevents the exit from being used for the purpose of escape from the mine, does not prevent persons from using the other exit to escape, and
- (b) at least one of the exits must:
 - (i) be an intake airway or a combination of adjacent intake airways, and
 - (ii) be designated as the primary exit, and
 - (iii) be suitable for use by a vehicle.

...

(5) The mine operator of an underground mine must ensure that:

- (a) the risk associated with fire affecting an exit is managed so far as is reasonably practicable, and
- (b) fire fighting equipment is located on, or near, any equipment installed in the primary exit and is appropriate for its proposed use, and
- (c) workers who may need to use exits are provided with sufficient training and instruction so as to be made familiar with those exits, and
- (d) the marking of exit paths is such that persons can, so far as is reasonably practicable, safely travel on them in an emergency including through conditions of reduced visibility or irrespirable or unsafe atmospheres.

(details of penalty omitted)

Schedule 7 Matters to be included in emergency plan for a mine (Clause 88)

(Sch 22 model WHS Regs)

5 Procedures

...

- (4) Procedures for fighting fires at the mine and details of the persons having the competency to fight fires and to train others in fire-fighting.

...

When developing procedures for fighting fires in underground mines, relevant factors the mine operator should consider include:

- the extent of the mine workings and its connections to the surface or other workings in other coal seams or other mines
- the type and concentration of contaminants coming from the fire and the potential for the fire to cause recirculation of air over the fire
- water reticulation lines in the mine together with hydrant and valve sites
- fire stations and depots, ventilation control devices and direction of the ventilating air currents
- gas drainage ranges and drainage bore holes in coal mines
- location of stored pressure vessels.

11.9 Re-entry after an emergency

In addition to the considerations in 6.5, the mine operator should consider ventilation issues, which may include the following points when re-entering an underground mine to enhance the chances of a safe outcome:

- composition of atmosphere
- re-ventilation method
- possible progressive re-entry
- condition of ventilation devices
- monitoring trends of mine gases
- confidence level in the monitoring results regarding:
 - sampling locations,
 - potential dilution or contamination from other sources
 - whether the sample is truly representative
- dilution of gases
- means of collecting representative samples of atmosphere
- control of atmosphere.

Any re-entry to an underground mine after an emergency should be subject to a specific risk assessment.

11.10 Sealing and inertisation

Due to the nature of underground coal mines and certain other mines, the virtually limitless supply of fuel, there are special considerations in treating an uncontrollable fire when it is not safe to fight it directly. One of these considerations is inertisation, the creation of an inert atmosphere to extinguish combustion.

Regardless of the source of the fire (eg. spontaneous combustion, post explosion, electrical or mechanical) inertisation may be used as a control measure.

Schedule 7 requires the mine operator to include procedures for safely inserting inertisation equipment as part of the plan:

WHS (Mines) Regulations

Schedule 7 Matters to be included in emergency plan for a mine (Clause 88)

(Sch 22 model WHS Regs)

5 Procedures

...

- (6) Procedures for safely inserting inertisation equipment.

The main forms of inertisation are:

- The GAG engine operated by Queensland Mines Rescue Service. This is a de-thrusted jet engine which exhausts a low oxygen gaseous mixture. The gases include toxic amounts of carbon monoxide. The GAG generates very little pressure and requires the mine ventilation to be running to draw the exhaust gases around the mine. The GAG also requires a docking station to allow ease of connection to the mine.
- Mine Shield operated by Mines Rescue Service of NSW. This takes liquid nitrogen and heats it into a gaseous form. The gas is piped to a borehole for injection into the mine or piped directly to a release point in the mine. The mine is generally sealed before injection and the nitrogen produced is at a pressure that allows for piping over several kilometres and into a

sealed mine. Supplies of liquid nitrogen may be difficult to procure for a prolonged event. The Mine Shield requires a large footprint for operation.

- Self-inertisation is when a mine is sealed and the seam gases being released in the mine (generally methane or carbon dioxide) create an inert atmosphere.
- Small inertisation plants (such as Tomlinson Boilers or membrane technology nitrogen plants) create low flows of inert gases. These are often used as a preventive measure in mines subject to spontaneous combustion. They are suitable only for small-scale inertisation.

The mine operator of an underground mine has requirements for sealing the mine in the event of an emergency:

WHS (Mines) Regulations

68 Sealing

- (1) In complying with clause 9, the mine operator of an underground coal mine must manage risks to health and safety associated with sealing at the mine.
- (2) Without limiting subclause (1), the mine operator must ensure:
 - (a) that consideration is given to the conditions at the place in which the seal is to be installed, including:
 - (i) the presence of flammable gas, and
 - (ii) the potential of ignition sources, and
 - (iii) the possibility of pressure piling behind the seal, and
 - (iv) how long the seal can be expected to remain in the condition in which it installed, and
 - (b) that when the mine, or part of the mine, requires sealing in emergency conditions:
 - (i) the sealing is carried out in accordance with the ventilation control plan and the emergency plan for the mine, and
 - (ii) the risks to health and safety associated with the emergency sealing activities at the mine are managed, and
 - (iii) notification regarding the emergency sealing is provided as soon as is reasonably practicable to the regulator in the manner and form required by the regulator, and
 - (c) that the operation of each airlock installed at an entrance to the mine is tested at least once every 12 months (or more if necessary) to ensure its effectiveness (any such testing does not need to include pressure testing), and
 - (d) that the connection point for using inertisation equipment and each airlock and seal required to be used with that equipment at the mine are tested at appropriate intervals to ensure that they are fit for use in the event of an emergency and that necessary facilities including water and cleared areas are available for use with that equipment, and
 - (e) modelling is conducted at least once every 12 months to ensure that the inertisation locations to be used at the mine are located effectively.

88 Duty to prepare emergency plan (cl 664 model WHS Regs)

...

- (2) In addition to the matters required by clause 43 (1) of the WHS Regulations, the emergency plan must:
 - (a) address all aspects of emergency response, including by ensuring:
 - ...
 - (vii) arrangements are in place for emergency sealing of all or part of an underground coal mine, and
 - ...

The mine operator of an underground coal mine should make provisions so that each entrance from the surface to the underground coal mine is capable of being sealed at the following locations:

- the surface portals without requiring people to travel in front of the entrance to seal it
- at vertical shafts, immediately above or in a roadway at the bottom of the shaft
- consideration given to making provision at each district's entrance so that they are capable of being sealed in an emergency.

References

Codes of practice

NSW Code of Practice: First Aid in the Workplace

www.safeworkaustralia.gov.au/sites/swa/about/publications/pages/first-aid-in-the-workplace

NSW Code of Practice: Managing the work environment and facilities

www.workcover.nsw.gov.au/formspublications/publications/Documents/managing-work-environment-facilities-code-of-practice-3567.pdf

NSW Code of Practice: Safety Management Systems in Mines

www.resourcesandenergy.nsw.gov.au/miners-and-explorers/safety-and-health

NSW Code of Practice: Work health and safety consultation, coordination and cooperation

www.workcover.nsw.gov.au/formspublications/publications/Documents/whs-consultation-cooperation-coordination-code-of-practice-3568.pdf

Documents that form part of this code

The following Australian Standard for its information relevant to the structure of the code in 1.2:

AS/NZS 4360 *Risk Management*, Standards Australia (as amended from time to time)

infostore.saiglobal.com/store/details.aspx?productid=381579

Documents that do not form part of this code

Below is a list of some published documents that may be useful in developing, maintaining, reviewing and implementing the emergency plan 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 emergency planning in mining and compliance with any one or more of the following documents does not guarantee compliance with WHS legislation.

This guide provides details of useful information that persons may refer to support their compliance with WHS legislation in relation to emergency plans at mines.

Electronic citations (as viewed 27 October 2014)

Australian and International Standards

AS 3745 *Planning for Emergencies in Facilities*, Standards Australia

infostore.saiglobal.com/store2/Details.aspx?ProductID=1439257

International Standard *ISO 31000 Risk Management - Principles and Guidelines*, International Organisation for Standardisation, Geneva

www.iso.org/iso/catalogue_detail?csnumber=43170

Government and statutory authority publications

Emergency Preparedness and Mines Rescue Guidelines, Mines Rescue Pty Ltd, 2011

www.minesrescueservices.com/Downloads.aspx

Emergency Management in the Minerals Resources Sector, Developed jointly by Victoria Police, CFA, WorkSafe Victoria and the Minerals Council of Australia, August 2008

www.worksafe.vic.gov.au/wps/wcm/connect/79e05b804071f2478836dee1fb554c40/Emergency_Management_In_The_Minerals_Recources_Sector_Brochure_web.pdf?MOD=AJPERES

Guidance and Information on the role and design of safe havens in arrangements for escape from mines, Health and Safety Executive (UK), Mine 08, published 09/07

www.hse.gov.uk/pubns/mines08.pdf

Hazelwood Mine Fire Inquiry Report and Recommendations

report.hazelwoodinquiry.vic.gov.au/

MDG 1020 *Guidelines for underground emergency escape systems and the provision of self rescuers,*

MDG 1022 *Guidelines for determining withdrawal conditions from underground coal mines, Guidelines for in-seam response using CABA for events when life is at risk.*

Produced by the Mines Rescue Working Group and Mine Safety Operations Division of Industry and Investment NSW, October 2010

MDG 1029 *Guideline for agency co-ordination during emergencies and body recovery at NSW mines,* NSW Trade and Investment, October 2011

Notification of incident and injury: guide, NSW Trade & Investment, January 2015

www.resourcesandenergy.nsw.gov.au/miners-and-explorers/safety-and-health/publications/

National Recognised Units of Competency from Resources and Infrastructure (RII09) Training Package:

RIIERR203A - *Escape from hazardous situation unaided*

training.gov.au/Training/Details/RIIERR203A

RIIERR204A - *Provide aided rescue to endangered personnel*

training.gov.au/Training/Details/RIIERR204A

RIIERR302A - *Respond to local emergencies and incidents*

training.gov.au/Training/Details/RIIERR302A

NZ Royal Commission on the Pike River Coal Mine Tragedy Final Report,

pikeriver.royalcommission.govt.nz/Final-Report

Prevention of fires in underground mines – Resources Safety, Western Australian Department of Mines and Petroleum, 2013

www.dmp.wa.gov.au/documents/Factsheets/GL_PreventionFiresUGMines.pdf

Refuge Chambers in Underground Mines — guideline (2nd edition): Resources Safety, Western Australian Department of Mines and Petroleum, 2008.

www.dmp.wa.gov.au/documents/Factsheets/MSH_G_RefugeChambersUGmines.pdf

Requirements for Design Registration of Refuge Chambers used in Underground Mines at a Coal Workplace, NSW Department of Trade & Investment Gazettal Notice 1 July 2011

www.resourcesandenergy.nsw.gov.au/__data/assets/pdf_file/0016/430117/Refuge-chambers-used-in-underground-mines-at-a-coal-workplace.pdf

The State Emergency Management Plan (EMPLAN), NSW Government Ministry for Police & Emergency Services

www.emergency.nsw.gov.au/content.php/476.html

Other publications

Incident Command and Control System (ICCS) Guide, Mines Rescue Pty Ltd, 24 March 2014

www.minesrescueservices.com/Downloads.aspx

Protocol for Crush Injury Management (2014), Coal Services Mines Rescue

www.minesrescueservices.com/

The Australian Inter-service Incident Management System, Australasian Fire & Emergency Services Authorities (2013)

www.afac.com.au/ProductCatalog/Product?ID=155

Books

Galvin, J.M. (2008). *Geotechnical Engineering in Underground Coal Mining: Principles, Practices and Risk Management. Manual, Workshop 1: Fundamental Principles and Pillar Systems*, ACARP Project No. C14014.

Websites:

Extensive useful information and templates are available on the following websites:

1. Australian Emergency Management, Australian Government Attorney-General's Department, www.em.gov.au

Particular publications on this website that are particularly useful to mines, with templates and samples, are:

Emergency Risk Management Applications Guide

www.em.gov.au/Documents/Manual%2005-ApplicationsGuide.pdf (available on CD)

Managing Exercises – Handbook 3,

ema.infoservices.com.au/items/HB3-2ND (free EBook can be downloaded)

Note: the publications refer to communities. However, this should not be interpreted narrowly as the local community outside of the mine. The term 'community' is defined in the *Australian Emergency Manuals Series Part 1 Manual 3 Australian Emergency Management Glossary* as:

'A group with a commonality of association and generally defined by location, shared experience, or function.'

Workers and PCBUs at a mine would qualify as a community under this definition so publications should be read and applied in this way.

2. NSW Government Ministry for Police & Emergency Services

www.emergency.nsw.gov.au/home.html

3. Fire & Rescue NSW

www.fire.nsw.gov.au/

4. NSW Trade & Investment, Miners & Explorers – Safety & Health for a range of publications (some are listed in the documents list section above):

www.resourcesandenergy.nsw.gov.au/miners-and-explorers/safety-and-health

5. Mines Rescue Pty Ltd

In addition to the above referenced documents, see downloads such as presentations on topics like crush injury management

www.minesrescueservices.com/default.aspx

Appendices

Appendix A – Examples of duty cards

(1) Metalliferous Mine

Duty Card 1	Incident controller
Role description	<ul style="list-style-type: none">• most senior person on site at time of incident until relieved by a more senior/experienced person• assumes command and control of incident management• must be fully trained in the contents of the emergency plan
Assessments	<ul style="list-style-type: none">• obtain briefing from call receiver and relieve that person of command• confirm area evacuations, audible/visual alarms, radio/telephone broadcasts• consider further evacuations• continuous assessment and reassessment of incident management team personnel (ie physical and psychological fatigue)• request other managers, including any contractor manager to attend incident control centre• external service requirements including mutually arranged organisations (mines rescue service, emergency services or other mines rescue)
Appointments	<ul style="list-style-type: none">• incident management team members depending on type and extent of incident
Communications and notifications	<ul style="list-style-type: none">• use dedicated radio channel (for emergencies)• declare specific roles to certain mine personnel in role and use of radio communication• establish and maintain alternative effective communication as a back up• notify regulator• notify mine owners• perform next-of-kin notifications
Incident management	<ul style="list-style-type: none">• establish incident management team• brief and assess according to type and scope of incident• consult with emergency response commander on response strategy and management• ensure resources are available throughout response until site control is re-established• monitor performance of incident management team and relieve as required• debrief all involved in incident and response• keep secure all records of the incident and response

Explanation of terms used in the above table

Incident controller: most senior appropriate person available who takes immediate control and co-ordinates the emergency response.

Emergency response commander: site appointed emergency response superintendent or a person appointed by that person. This person is responsible for coordination of all aspects of emergency response, including fire, medical and rescue. This person appoints emergency response team leaders who supervise and take a leadership role with an emergency response

Incident management team: team members that assist the incident controller. They include emergency response superintendent, superintendent of area of incident, mine manager of area of incident, senior site executive, projects general manager, contractor manager, WHS superintendent, external emergency service officers.

(2) Medium sized open cut mine

MINE PERSONNEL

**Crisis / Emergency Response
Duty Card**

1. Contact Emergency Services (000)
2. Notify a supervisor or manager immediately
3. Make sure your site is safe
4. Arrange first aid or basic life support
5. Minimise environmental pollution where possible
6. Prepare for emergency response
7. If approached by the media (with proper conduct)
"If you provide your name, number and interest, I
will have my manager contact you".

AREA / OPERATIONAL MANAGERS

Duty Card

1. Notify regional general manager (RGM) & risk manager immediately
2. Attend site as soon as possible
3. Ensure site secured
4. Mobilise staff as required
5. Be prepared to make brief non-committal comments to the media.
(e.g.) We regret the incident occurring, however we are not sure exactly what happened at this stage. A full investigation is occurring and as soon as details are available we will be in contact
6. Check with RGM & risk manager re
notification of relevant authorities,
staff counselling, solicitor,
investigator etc.
7. Perform activities as directed by
RGM / crisis coordinator.
8. Maintain log of events

Appendix B - Example of a medium sized surface mine TARP

Severe weather event

Level 1 No Severe Weather Event	
SUPERVISORS	Perform inspections of operational areas
WORKERS	Continue operations as per normal
Level 2 Severe Weather Event approaching within 30 – 60 km	
FOREMAN/SUPERVISORS	monitor the severe weather lightning activity using a Lightning/Storm Detector communicate with all Workers and monitor the distance of the lightning strikes recorded on the lightning detector. assess the direction that the storm is heading – refer to Bureau of Meteorology website if necessary www.bom.gov.au
WORKERS	continue operations as normal
Level 3 Severe Weather Event approaching within 15 – 30 km	
FOREMAN/SUPERVISORS	monitor the severe weather lightning activity using a lightning/storm detector instruct all workers to remain in the cabins of the equipment they are operating or to remain indoors stop all high-risk work, including confined space, working at heights, high voltage switching, work on dragline booms and all mobile crane work. evacuate all mobile crib huts
WORKERS	continue operations as normal all mine workers are to remain in the cabins of the equipment they are operating
Level 4 Severe Weather Event approaching within 5 – 15 km	
FOREMAN/SUPERVISORS	monitor the severe weather lightning activity using a lightning/storm detector instruct workers to park the equipment they are operating safely, gather at the main administration building and to remain indoors inform all mine workers when it is safe to continue operations (lightning activity at a distance greater than 15 km).
WORKERS	When instructed to do so by the foreman or area supervisor, all workers are to: park and shutdown the equipment they are operating in a safe manner isolate the equipment using the main isolation point remain in the cabin of the equipment they are operating until collected gather at the main administration building, remain indoors and await further instruction or until informed by the foreman / supervisor that the severe weather event has passed

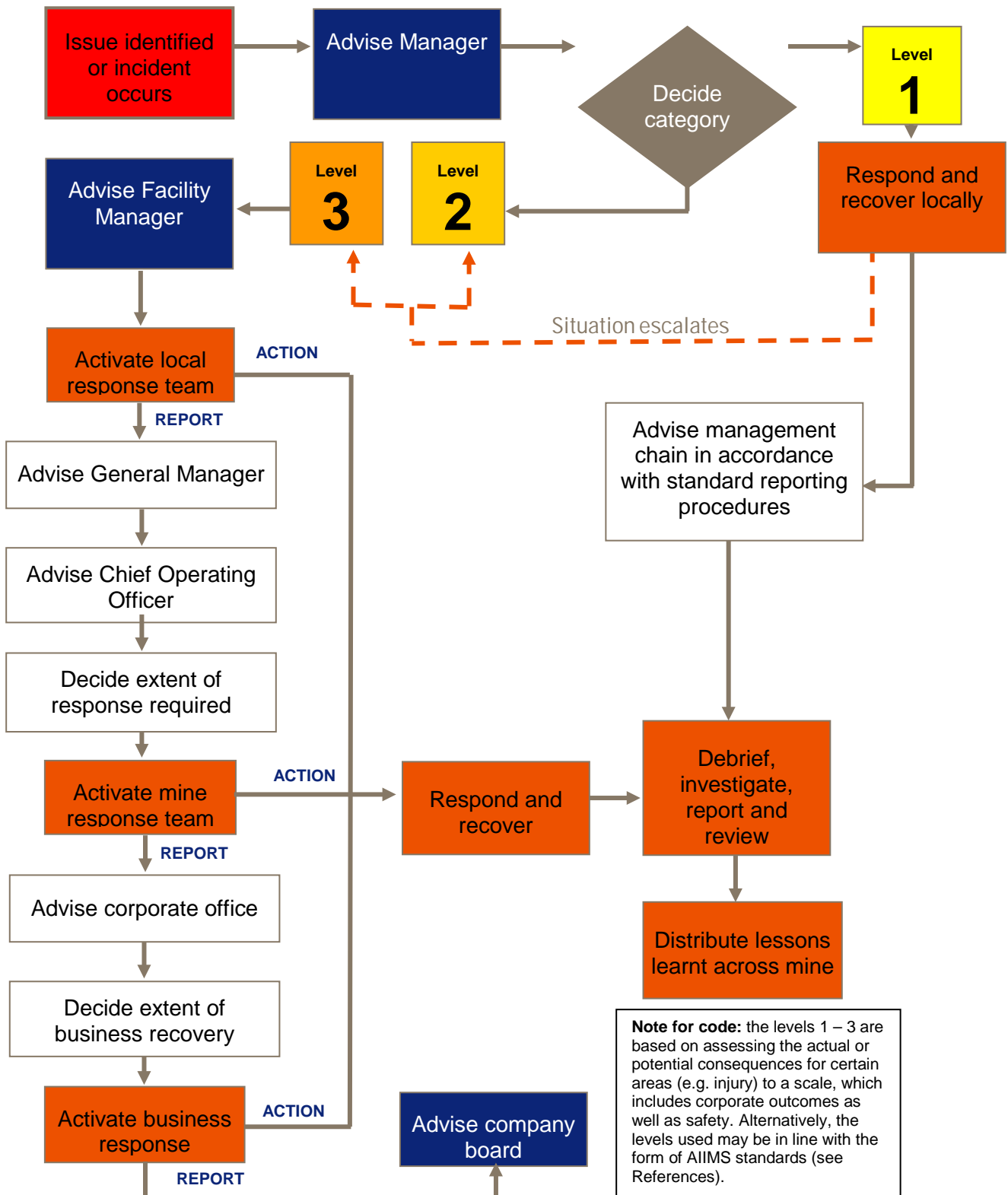
Appendix C - Example of TARP (part only) for a quarry/extractive industries mine

Fire event

Trigger	Action	Risk Level	Response	Resources
Emergency call or information received	Record all details	Low to high	Contact <ul style="list-style-type: none"> • emergency services (if appropriate) • First aiders • Mine manager • All site personnel 	<ul style="list-style-type: none"> • Telephone, mobile phone or satellite phone • Emergency/Incident log book • Nominated persons to take certain responsibilities • Training (taking emergency calls and logging report, contacting emergency services, evacuation procedures)
Fire	Consider the size of fire and extra danger near fire such as: fuel, explosives, tyres of vehicles, electricity, chemicals	Low to high	<ul style="list-style-type: none"> • Assess scene • Consider: put out fire or not, depending on size of fire and extra danger. • Evacuate area and ensure all personnel are at assembly area and accounted for. • Consider stand off distance due to any extra danger – up to 500m (e.g. truck tyres could explode if truck on fire) • Consider wind direction and location of personnel. • Tape off incident scene and prevent access to the incident area. • Provide escort and clear access for emergency services 	<ul style="list-style-type: none"> • Fire extinguishers (appropriate for fire) • Fire hoses (only used if appropriate and there is no extra danger) • Bushfire kit • Training <ul style="list-style-type: none"> - Emergency training (evacuation procedures) - First aid - Basic fire-fighting (fire extinguisher and fire hose use)

Note: in this example emergency call and fire are the triggers. This scenario could be broken up into low risk, medium risk and high risk fire scenarios depending on the consideration outcomes in the Action column, and then the Responses will differ accordingly. In the Resource column there is identified requirements for equipment and training. This would vary according to each scenario as it is expanded. These should be the essential resources to effectively respond to the emergency scenario.

Appendix D - Example of a response and recovery flowchart for a large mine



Appendix E - Example of an underground emergency TARP for a large metalliferous mine (in part)

		DEATH/INJURY/ILLNESS	FIRE/EXPLOSION	Environmental	GEOPHYSICAL	HAZARDOUS MATERIAL	ESSENTIAL SERVICES	ENTRAPMENT
Trigger		<ul style="list-style-type: none"> ■ On-site accident ■ Missing person ■ Vehicle accident ■ Industrial accident ■ Equipment failure ■ Death by unknown cause ■ Irrespirable air 	<ul style="list-style-type: none"> ■ Electrical ■ Chemical ■ Gas ■ Fuel/oil ■ Vehicle ■ Smoke 	<ul style="list-style-type: none"> ■ Gas explosion ■ Pressure vessel explosion ■ Tyre explosion 	<ul style="list-style-type: none"> ■ Flooding ■ Seismic event ■ Major ground failure 	<ul style="list-style-type: none"> ■ Chemical spill ■ Gas leak ■ Fuel/oil spill ■ Ammonia gas 	<ul style="list-style-type: none"> ■ Power outage ■ Electrical incident ■ Communications failure ■ Ventilation problem/failure 	<ul style="list-style-type: none"> ■ Entrapment/rockfall/inrush of water ■ Caught in machinery ■ Person suspended ■ Injured at height ■ Trapped in conveyances
All On-site Workers Actions	Immediate Actions	<ul style="list-style-type: none"> ■ Assess the situation ■ Render first aid 	<ul style="list-style-type: none"> ■ Assess the situation ■ Attempt to extinguish fire using portable extinguishers or fixed fire fighting systems ■ Evacuate personnel to nearest emergency/refuge bay 	<ul style="list-style-type: none"> ■ Assess the situation ■ Render first aid ■ Evacuate personnel to nearest emergency/refuge bay 	<ul style="list-style-type: none"> ■ Assess the situation ■ Evacuate personnel to nearest emergency/refuge bay 	<ul style="list-style-type: none"> ■ Assess the situation ■ Evacuate personnel to nearest emergency/refuge bay 	<ul style="list-style-type: none"> ■ Assess the situation ■ Evacuate personnel to nearest emergency/refuge bay 	<ul style="list-style-type: none"> ■ Assess the situation ■ Isolate equipment causing entrapment ■ Evacuate personnel to nearest emergency/ refuge bay
	Notification	<ul style="list-style-type: none"> ■ Call #2222 ■ Advise your immediate supervisor 						
	Continued Response	<ul style="list-style-type: none"> ■ Assess the situation ■ Render first aid to anyone injured ■ Seek assistance from other on-site workers ■ Prevent personnel and vehicles entering the affected area 	<ul style="list-style-type: none"> ■ Isolate cause of injury (turn off machine, handbrake on, turn off power etc.) ■ Determine nature of injury/death ■ Assess extent of injury/death ■ Continue first aid 	<ul style="list-style-type: none"> ■ Attempt to identify cause and inform supervisor ■ Attempt to extinguish fire being mindful of electrical isolation requirements 	<ul style="list-style-type: none"> ■ Try to determine if workers are trapped 	<ul style="list-style-type: none"> ■ Determine type, source and extent of spill/leak and inform supervisor ■ Prevent ignition/explosion of materials by removing heat sources/sparks 	<ul style="list-style-type: none"> ■ Secure any equipment running at time of outage to prevent injuries when power restored. ■ Inform supervisor of actions 	<ul style="list-style-type: none"> ■ Attempt to identify cause of accident and inform supervisor ■ Reassure trapped worker(s) while waiting for MRS
Supervisor Actions	Responses common to all incidents	<ul style="list-style-type: none"> ■ Confirm nature of incident ■ Obtain all available details on the issue/incident ■ Account for all personnel ■ Move to scene of incident or nearest safe location ■ Conduct initial assessment of the issue/incident and alert the response coordinator ■ Assess incident level rating using Response Assessment Matrix and the level of On-scene Commander/SRRT response required ■ Notify Area Superintendent ■ Be prepared to assume the role of On-scene Commander 						
	Specific responses		<ul style="list-style-type: none"> ■ Arrange isolation of electrical equipment 				<ul style="list-style-type: none"> ■ Notify Electrical Supervisor (if electrical fault) 	
Emergency Duty Officer/ Superintendent Actions		<ul style="list-style-type: none"> ■ Note that if these tasks may be performed by the Superintendent or the EDO ■ Confirm incident/issue level using Response Assessment Matrix ■ If SRRT activation is not required, monitor and review situation and be prepared to activate SRRT if situation escalates ■ If SRRT activation is required, initiate call-out and notify GM ■ Deploy to the SRR ■ Assume assigned role within the SRRT 						
General Manager		<ul style="list-style-type: none"> ■ Decide on composition of SRRT ■ Assume role of SRRT Manager ■ Inform COO 						

Appendix F – NSW emergency management framework and mines

In the State Emergency Management Plan ('NSW State EMPLAN'), the NSW Government acknowledges the potential for emergencies and the social, economic and environmental consequences. Accordingly, it recognises the need for a coordinated response by all agencies having roles or responsibilities in such emergencies, including NSW Trade & Investment and mine operators.

Emergency service organisations

Emergency service organisations operate under their own legislation that can be linked to roles and responsibilities outlined within the NSW State EMPLAN and related plans (refer to Chapter 2). These requirements apply during routine incidents and also emergencies under the SERM Act. For example, the *Fire Brigades Act 1989* outlines the duties of Fire & Rescue NSW to attend hazardous materials incidents and its powers of entry to land and buildings, along with general powers at the site. Fire & Rescue NSW is also assigned as the responsible agency for this function in the NSW State EMPLAN during emergencies. This is one example where an incident of this type could occur on a mine site and may attract a response from a government agency that is empowered to exercise powers of entry, control of incident site and investigation. Other types of incidents include, but are not limited to:

- fires
- floods
- rescues
- fatalities
- pollution events
- hazardous materials incidents
- criminal activity
- medical care.

Trigger thresholds and notification

In considering the related state emergency management plans and the general role of emergency service organisations, the mine operator should consider the threshold for when an emergency at the mine triggers a response that requires emergency service organisations to be contacted. An initial incident triggering the emergency plan at a mine may be low level, such as a small fire. However, in this example, if the fire cannot be quickly contained by the resources of the mine and the emergency plan, or there is a risk of it spreading to adjoining properties, then the plan may trigger for the NSW Rural Fire Service or Fire & Rescue NSW to be contacted. These arrangements may also vary during depending upon conditions, such as high fire danger periods, where it would be appropriate that any instance of fire be immediately reported.

It is preferable for the emergency services to be contacted early in the event (in some cases it is required under legislation) so that they can prepare a response, rather than responding when the incident has further deteriorated. The emergency plan must have procedures for notifying emergency service organisations at the earliest opportunity (refer to WHS Regulations clause 43(1)(a)(iii) and guidance in Chapter 5).

Where possible (or as required under clause 89), the mine operator should hold discussions with the relevant emergency services during the development of the emergency plan to establish the notification requirements. The discussions may establish that the relevant local emergency services want to be advised of most incidents and make the determination on a case by case basis about their response.

Seamless integration between mines and emergency services/agencies

As outlined in the New Zealand Royal Commission on the Pike River Coal Mine Tragedy Report findings (refer to References above), mine emergency plans should be capable of seamless integration with emergency agencies, and not be developed in isolation of the requirements

outlined above. It is strongly recommended that all mine operators and managers make themselves fully aware of the current NSW arrangements for emergency management and work co-operatively with local emergency management agencies in developing their emergency plans.

The flowchart below illustrates typical incident responses to NSW mines and other associated considerations. This may assist mines to identify and establish responses with the relevant organisations for their potential mine emergencies.

Australasian Inter-service Incident Management System (AIIMS)

All emergency services organisations in NSW use an incident command and control system in line with the principles outlined by the Australasian Fire & Emergency Services Authorities Council in the Australasian Inter-service Incident Management System (AIIMS) – refer to References section at end of code for more details. The system enables multiple agencies to come together to resolve large incidents and emergencies with an integrated and effective response. Mine emergency plans should use common terminology and similar formatting used by emergency service organisations.

The Hazelwood Mine Fire Inquiry made recommendations that future incidents be managed with integrated incident management teams (Rec No 2) and that persons nominated by the mine as Emergency Commanders be accredited and proficient in the use of AIIMS (Rec No 13) (report.hazelwoodinquiry.vic.gov.au/recommendations).

Example of typical incident responses to NSW mines and associated considerations

