

TARGETED ASSESSMENT PROGRAM

# Consolidated report – Emergency management in NSW underground mines

**June 2018**

## Document control

Published by NSW Department of Planning and Environment, NSW Resources Regulator

Title: Consolidated report – Emergency management in underground mines

First published: June 2018

Authorised by: Chief Inspector

CM9 reference: 18/280908

Amendment schedule		
Date	Version	Amendment

© State of New South Wales through the NSW Department of Planning and Environment 2018.

This publication is copyright. You may download, display, print and reproduce this material in an unaltered form only (retaining this notice) for your personal use or for non-commercial use within your organisation. To copy, adapt, publish, distribute or commercialise any of this publication you will need to seek permission from the NSW Department of Planning and Environment.

Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (July 2018). 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 Planning and Environment or the user's independent advisor.

## Contents

Executive summary .....	3
Background .....	4
Scope .....	4
The process .....	5
Emergency management .....	5
Assessment findings.....	6
Areas of good practice .....	6
General findings.....	7
Risk assessments .....	7
Consultation .....	8
Specific findings.....	9
Training .....	9
Testing of the emergency plan .....	9
First aid .....	10
Emergency exits and lifeline standards .....	10
Firefighting PPE .....	11
Hazardous chemicals .....	11
Where to now .....	13
Further information .....	15
Appendix A: Legislative requirements relating to emergency management .....	16

## Executive summary

This report summarises the findings of assessments undertaken in relation to mine operators' implementation of the emergency plan. These assessments were undertaken in 2017 and early 2018, and to date have been completed at 11 underground mines - six coal and five metalliferous mines.

General findings highlight a need for mine operators to adequately assess risks, in the emergency response context, to determine effective controls that should to be implemented. This is an essential part of the process in determining both adequacy and effectiveness of the emergency response arrangements. Mine operators are required to conduct consultation under clause 89 of the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014. Some mine operators have not completed this adequately. This is an essential part of developing an effective and integrated emergency response capability.

Specific findings identified that key personnel with roles and responsibilities under the emergency plan lacked knowledge and understanding of the roles and responsibilities of the emergency service organisations in the emergency management framework. Control room operators were unclear on the types of incidents to be notified to emergency service organisations.

Some emergency response arrangements had not been established and maintained as required within the mine's emergency response management plan, including critical elements such as escape signs and lifelines and testing of the emergency response arrangements.

The management of hazardous chemicals at mining operations is generally inadequate. The assessments found that regulator notifications, site manifests, safety data sheets and emergency response arrangements, including adequate personal protective equipment, need attention.

## Background

The targeted assessment program (TAP) provides a planned, intelligence-driven and proactive approach to assessing how effective an operation is when it comes to controlling critical risk. The TAPs apply the following principles:

- a focus on managing prescribed 'principal hazards' from the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014 (WHS (MPS) Regulation)
- evaluation of the effectiveness of control measures implemented through an organisation's safety management system
- consideration of the operation's risk profile and the targeting of operations deemed to be highest risk.

The objective of the risk profiling is to identify the inherent hazards and the hazard burdens that exist at individual operations in each mining sector in NSW. The information is then used to develop the operational assessment and inspection plans that inform the program.

Each TAP is undertaken by a team of inspectors from various disciplines, such as electrical and mechanical engineering, who work together with the operation's management team to undertake a thorough assessment of the control measures associated with the relevant hazard and their implementation.

## Scope

The scope of the targeted assessment on emergency management included two elements:

- a desktop assessment of:
  - the process used by the mine to determine the likely emergency scenarios
  - how the mine has established and maintained an adequate emergency response capability to these emergency scenarios, including incident management arrangements and facilities
  - the review, testing and governance processes related to this emergency response capability
  - the notification and integration of external emergency services and supporting organisations, including consultation requirements.
- a workplace assessment of the emergency plan and adequacy of the emergency response capability.

**Note:** the focus of the first six targeted assessments was on the underground self-escape and rescue elements of the emergency plan, with the mine operator required to demonstrate how the risks have been assessed and the controls put in place to mitigate those risks in the emergency response context. The final five targeted assessments focused on testing of the emergency plan and the interaction of the mines' emergency response capabilities with the emergency service organisations.

## The process

The process for undertaking a TAP generally involves the following stages:

1. Preliminary team meetings and the preparation of documents.
2. Information and assessment requirements are discussed and supplied to the relevant mine.
3. Execution of an on-site assessment involving:
  - a site desktop assessment of all relevant plans and processes
  - a discussion with the mine management team on the legislative compliance of the relevant plans
  - the inspection of relevant site operations.
4. Discussion and feedback to the mine management team on the findings and actions that need to be taken by the operators in response.

## Emergency management

Operators of mine or petroleum sites have a duty to prepare an emergency plan that addresses all aspects of the emergency response under the WHS (MPS) Regulation. From 1 February 2017, operators have had to comply with the emergency management provisions of the regulation.

Under the Work Health and Safety Regulation 2017 (WHS Regulation), a person conducting a business or undertaking at a workplace must prepare, maintain and implement an emergency plan for the workplace.

Operators of a mine or petroleum site are required to:

- prepare an emergency plan that addresses all aspects of the emergency response<sup>1</sup>
- provide an appropriate means of escape from an underground mine in the case of an emergency evacuation<sup>2</sup>
- ensure that an adequate number of people, trained in the use of rescue equipment, are available to respond effectively to an emergency.<sup>3</sup>

Importantly, when developing the emergency plan, the WHS (MPS) Regulation requires the operator of a coal mine or an underground mine to consult with the primary emergency services responsible for the area in which the mine is located, and the local authority in relation to principal hazards that may adversely affect the health and safety of people in the area surrounding the mine. In the case of a coal mine, operators need to consult with all emergency service organisations (including NSW Mines Rescue Brigade established under the *Coal Industry Act 2001*) that may be required to participate in

---

<sup>1</sup> Clause 43 Work Health and Safety Regulation 2017

<sup>2</sup> Clause 97(5) Work Health and Safety (Mines and Petroleum Sites) Regulation 2014

<sup>3</sup> Clause 88(2)(iv) Work Health and Safety (Mines and Petroleum Sites) Regulation 2014

implementing the emergency plan. There are requirements for mine operators to consider aspects of recommendations made during the consultation process with emergency service organisations.

Additional emergency planning requirements exist for mine sites with hazardous chemicals that exceed the manifest quantities set out in Schedule 11 of the WHS Regulation.

It is recommended that operators refer to the [NSW Code of Practice - Emergency planning for mines](#) for guidance in relation to achieving legislative compliance of the emergency plan. The code refers to the required risk assessments and legislation and provides practical guidance in relation to achieving compliance including the requirements around consultation and testing of the emergency plan.

Operators should also refer to the [Mine sub plan](#), which is a sub plan of the NSW state emergency management plan. This plan clarifies how and when the state's emergency management arrangements apply in respect to emergencies at mines.

Finally, operators must ensure that their emergency plan addresses all requirements of Schedule 7 of the WHS (MPS) Regulation.

## Assessment findings

The targeted assessment of emergency management risks highlighted some issues with the implementation of critical controls to manage the hazard, and more generally with the process of developing emergency management capabilities and reviewing controls. While the highlighted issues were not relevant at all of the sites assessed, the findings provide some valuable information that should be considered when developing critical controls.

The assessment process highlighted that:

- the risk assessment process for emergency management was generally inadequate for identifying, analysing and assessing the rescue, medical and firefighting capability required by the mine
- consultation with emergency service organisations was generally inadequate due to the lack of active engagement directly with the emergency service organisation or the Local Emergency Management Committee (LEMC)
- control room operators were unclear on the types of incidents to be notified to emergency service organisations.

## Areas of good practice

- Workers were aware of escape routes in underground mines and associated self-rescue equipment.
- The emergency response equipment installed in mines such as firefighting and first aid equipment was generally well maintained.

The findings of this assessment are grouped into two categories:

- **General findings** that can be used to inform all aspects of an operation's safety management and provide valuable information and insight across all sectors and operation types.
- **Specific findings** should be used to inform and improve safety management systems to address this principal control plan.

## General findings

### Risk assessments

Issue	Response
The risk assessment for the emergency plan had not identified all the hazards associated with the mine e.g. the various types of fires that could occur.	<p>Mine operators have a duty under clause 34 of the WHS Regulation to identify reasonably foreseeable hazards that could give rise to risks to health and safety and a duty under clause 9 of the WHS (MPS) Regulation to conduct a risk assessment for each identified hazard.</p> <p>Mine operators must keep a record of each risk assessment and the control measures implemented to eliminate or minimise any risk that was identified through the risk assessment.</p>
The risk assessment did not adequately identify the controls to eliminate or minimise the risks to health and safety related to emergency scenarios at the mine site eg the provision of adequate rescue equipment; adequate number of workers trained in the use of emergency equipment who are able to respond effectively to an emergency.	As above. In addition, the provision of rescue equipment for use in emergencies may require specific training for both the general use of the equipment and the use of the equipment for emergency related tasks (ie general tools). This is particularly important where items such as airbags and other lifting equipment are installed.
Mine operator had not undertaken a risk assessment to determine if self-contained self-rescuers should be provided to persons who go underground at the mine.	Mine operators must conduct a risk assessment to determine whether self-contained self-rescuers should be provided to any person who is to go underground at the mine in accordance with clause 100(6) of the WHS (MPS) Regulation.

## Consultation

Issue	Response
<p>Mine operators had not consulted with the primary emergency services in the area.</p>	<p>When preparing the emergency plan, a mine operator must, so far as is reasonably practicable, consult with the primary emergency services with responsibility for the area in which the mine is located, in accordance with clause 89(1) of the WHS (MPS) Regulation.</p>
<p>Mine operators had not included the recommendations made by the emergency service organisations in the emergency plan.</p>	<p>In accordance with clause 89(2) of the WHS (MPS) Regulation, operators must ensure that the emergency plan addresses any recommendation made by the emergency service organisations consulted in relation to:</p> <ul style="list-style-type: none"> <li>→ 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</li> <li>→ what incidents or events at the mine should be reported to the emergency service organisations.</li> </ul>
<p>Consultation with emergency services did not involve active engagement with the emergency service organisations.</p>	<p>Mine operators should engage with the Local Emergency Management Committee (LEMC). This is a proactive way to commence the consultation process with the emergency service organisations. Mine operators should refer to the fact sheet on <a href="#">Mine emergency planning consultation</a> for guidance on the consultation process.</p> <p>The consultation process must be comprehensive to be effective. Consultation needs to be more than an overview presentation or just supplying a copy of an emergency plan. It must involve active discussion and feedback between those involved, and directly address the matters outlined in this fact sheet and other relevant matters in the mine's emergency plan.</p> <p>To assist consolidating relevant information for use during the consultation process, we recommend that mine operators use the <a href="#">Mine emergency plan summary</a> template and provide it to the agencies consulted.</p>

## Specific findings

### Training

Issue	Response
The control room operators were unclear on the types of incidents to be notified to emergency service organisations.	<p>Mine operators must provide training and instruction to all workers, including control room operators, on the emergency plan for the mine in accordance with clause 104(2)(d) of the WHS (MPS) Regulation.</p> <p>The emergency plan must address any recommendation made by the emergency service organisations in relation to what incidents or events at the mine should be notified to the emergency service organisations.<sup>4</sup></p>
Key personnel with roles and responsibilities under the emergency plan, lacked knowledge and understanding of the roles and responsibilities of the emergency service organisations in the emergency management framework.	<p>It is recommended that control room operators, staff with incident management roles, or those likely to have roles involving contact with emergency services undergo specific training on the integration of NSW emergency and rescue management arrangements within the mine emergency plan, including training on the roles and responsibilities of the individual emergency service organisations consulted in accordance with clause 89 of the WHS (MPS) Regulation. This will ensure consistency and interoperability across the range of potential events that may occur at the mine.</p> <p>It is recommended that the mine operator provide trained liaison officers to interact with the emergency service organisations during activation of the mine's emergency plan.</p>

### Testing of the emergency plan

Issue	Response
The emergency plan was not being tested every 12 months.	The emergency plan must be tested 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 in accordance with clause 93 of the WHS (MPS) Regulation. Testing of the plan should be comprehensive, and ensure all staff with key roles are given the opportunity to practice those skills on a regular basis.

<sup>4</sup> Clause 89(2)(b) Work Health and Safety (Mines and Petroleum Sites) Regulation 2014

Emergency exit training and familiarisation	Conducting emergency exit training and familiarisation is a separate and additional requirement under clause 96(5)(c) of the WHS (MPS) Regulation.
NSW Mine Sub Plan exercising requirements	The NSW Mine Sub Plan Section 6.3 outlines that at least one exercise every three years should be designed to test the arrangements in the sub plan. It also indicates the relevant Local Emergency Management Committee and the Resources Regulator should be advised when the exercise is going to be conducted and given the opportunity to attend that exercise.

## First aid

Issue	Response
The level of training of first aid personnel underground was insufficient to take into account the distance and travel times for paramedic level care to reach the face area.	Mine operators should ensure that the level of training of first aid personnel underground is sufficient to respond effectively to an underground severe injury or physical entrapment scenario given the distance and travel times for the Ambulance Service of NSW to reach the injured underground. The number of first aiders and the level of training required must consider the types of events that may happen, the remoteness of the workplace, and the clinical level of response required for those types of events and timeframes likely to be encountered for the arrival of external specialist medical response teams.

## Emergency exits and lifeline standards

Issue	Response
Emergency exits were not adequately marked or signposted so that they could be readily located in an emergency.	Mine operators must ensure that each emergency exit is marked or signposted so that it can be readily located in an emergency, and be maintained so that it remains effective (clause 96(2) WHS (MPS) Regulation). Mine operators must ensure that the marking of exit paths is such that workers 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 (clause 96(5)(d) WHS (MPS) Regulation).
Lifelines installed in the mine were not maintained to be compliant with the	Mine operators should ensure that all lifelines are compliant with the operator's established standards, which are effective and appropriate for their particular site.

operator's documented lifeline standards.

## Firefighting PPE

Issue	Response
Adequate consideration of appropriate protective clothing for workers required to perform firefighting activities, particularly tasks beyond an initial response.	Mine operators must ensure that adequate personal protective equipment is provided to workers in accordance with the work carried out (clause 44 WHS Regulation). Firefighting strategies and activities must be assessed to determine not only the equipment and skills required, but the potential risks to workers and standard of personal protective equipment required for the task.

## Hazardous chemicals

Issue	Response
Mine operators did not have an accurate manifest of hazardous chemicals and consequently had exceeded the manifest quantities specified in Schedule 11 WHS Regulation hazardous chemicals.	<p>In accordance with clause 347 of the WHS Regulation, mine operators must prepare a manifest of Schedule 11 hazardous chemicals, and amend the manifest as soon as practicable if:</p> <ul style="list-style-type: none"> <li>→ the type or quantity of those hazardous chemicals or group of hazardous chemicals changes</li> <li>→ or there is a significant change in the information required to be recorded in the manifest.</li> </ul> <p>The manifest must be kept at a place determined in agreement with the primary emergency service organisation, and be readily accessible to emergency services.</p>
Mine operators had not notified the regulator of Schedule 11 hazardous chemicals exceeding the manifest quantities, or a significant change in the risk of storing the hazardous chemicals.	Mine operators must ensure that the regulator is given written notice if a quantity of a Schedule 11 hazardous chemical or group of Schedule 11 hazardous chemicals exceeds the manifest quantity and is or is to be used, handled or stored at the mine (clause 348 WHS Regulation). The notice must be given immediately after the operator knows that there will be a significant change in the risk of using, handling or storing the Schedule 11 hazardous chemical or group of Schedule 11 hazardous chemicals at the mine or at least 14 days before that change (whichever is earlier).

Notifications and updates should be made via the SafeWork NSW Hazardous Chemicals notification portal on the website. This information is supplied by Safework NSW to the Resources Regulator.

Operators had not provided a copy of the emergency plan to primary emergency service organisations with regard to the Schedule 11 hazardous chemicals exceeding the manifest quantities for that hazardous chemical.

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, the operator must give a copy of the emergency plan for the mine to the primary emergency service organisation in accordance with clause 361 of the WHS Regulation. If the primary emergency service organisation gives the operator a written recommendation about the content or effectiveness of the emergency plan, the operator must revise the plan in accordance with the recommendation.

The primary emergency service organisation for this provision is Fire and Rescue NSW.

Fire protection and firefighting equipment – specific requirements relating to hazardous chemicals

In addition to the general comments about identifying emergency risks at the workplace, mine and petroleum site operators are required to establish fire protection and firefighting equipment designed and built for the types of hazardous chemicals at the workplace, and in the quantities that are used, handled, generated or stored at the workplace.<sup>5</sup>

Mine operators had not made a clear link between environmental management plans (pollution response plans) and emergency response plans

When identifying risks, mine operators should be aware of risks to health and safety created by environmental hazards. Pollution response arrangements outlined in the environmental management plan should be linked or identified in the mine emergency response plan.

<sup>5</sup> Clause 359 of Work Health and Safety Regulation 2017

## Where to now

Targeted assessments provide an account of the issues observed at particular sites at a particular time. Some of the findings resulted in notices being issued, including notices of concern, under section 23 of the *Work Health and Safety (Mines and Petroleum Sites) Act 2013*, and improvement notices, under section 191 of the *Work Health and Safety Act 2011*.

The matters addressed by the notices reflect the findings of the Resources Regulator inspectors. In summary, these findings are:

Notice	In relation to
Improvement notices, s191	<ul style="list-style-type: none"> <li>→ the emergency plan to include recommendations made by emergency service organisations in relation to testing of the plan, frequency of testing of the plan and what incidents should be notified to the emergency service organisations.</li> <li>→ incident management team (IMT) members to receive formal training in relation to the mine incident control system</li> <li>→ provision of a copy of the emergency plan to primary emergency service organisation</li> <li>→ emergency exits and self-rescuers</li> <li>→ provision of adequate rescue equipment and training of persons in the use of rescue equipment</li> <li>→ hazardous chemicals exceeding manifest quantity and failure to notify regulator and Fire Rescue NSW</li> <li>→ maintaining hazardous chemicals registers, manifests and safety data sheets (SDS).</li> <li>→ risk assessment to identify the appropriate self-rescue unit</li> <li>→ consultation with primary emergency service organisations</li> <li>→ testing of the emergency plan</li> <li>→ risk assessment and supply of adequate PPE for firefighting</li> <li>→ risk assessment and establishing effective firefighting capabilities and strategies for sites with hazardous chemicals</li> <li>→ risk assessment and supply of adequate PPE for hazardous chemical incidents</li> <li>→ assessment and determination of adequate first aid provisions</li> <li>→ rehydration provisions for workers during self escape</li> </ul>
Notices of concern, s23	<ul style="list-style-type: none"> <li>→ training of key personnel on roles and responsibilities in the command philosophy established within the emergency plan</li> </ul>

- consultation with emergency service organisations on the types of incidents or events of which they should be notified
  - forward planning of emergency exercises
  - risk assessment for the development of the emergency plan
  - use of semi-rigid (stiff neck) cervical collars (see ANZCOR Guideline 9.1.6)
  - risk assessment to determine the adequacy of rescue equipment
  - risk assessment to identify all hazards, including various types of fires
  - location of firefighting equipment
  - accessibility of fire hydrants
  - signs for waste oil storage
  - number of occupational first aid trained staff underground
- 

All mine operators involved in this targeted assessment have indicated that they would respond to the notices and other issues identified through the inspections. Where significant issues were identified, these will be followed up with the individual mines.

The TAP process identified many common issues around the approach taken by the sites regarding emergency response and emergency management. It also highlighted broader issues that are common across mine sites associated with the process of developing, implementing and reviewing the risk assessments, management plans and procedures.

The regulator expects that all underground mines will review their procedures and practices in consideration of the findings of this summary.

### **Issued by**

Garvin Burns  
Chief Inspector  
NSW Resources Regulator  
NSW Department of Planning and Environment

## Further information

For more information on targeted assessment programs, the findings outlined in this report, or other mine safety information, please contact the Resources Regulator. You can find the relevant contact details below.

Type	Contact details
Email	<a href="mailto:cau@planning.nsw.gov.au">cau@planning.nsw.gov.au</a>
Phone	1300 814 609
Incident reporting	To report an incident or injury call <b>1300 814 609</b>
Website	<a href="http://resourcesandenergy.nsw.gov.au/safety">resourcesandenergy.nsw.gov.au/safety</a>
Address	Resources Regulator, Mine Safety 516 High Street Maitland NSW 2320

## Appendix A: Legislative requirements relating to emergency management

The appendix provides a list of certain legislative requirements for the management of emergency management referred to in this report as provided by the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014 and Work Health and Safety Regulation 2017.

Legislation, section/clause	Legislative requirements
WHS (MPS) Regulation, clause 9	<a href="#">Management of risks to health and safety</a>
WHS (MPS) Regulation, clause 88	<a href="#">Duty to prepare emergency plan</a>
WHS (MPS) Regulation, clause 89	<a href="#">Consultation in preparation of emergency plan</a>
WHS (MPS) Regulation, clause 93	<a href="#">Testing of emergency plan</a>
WHS (MPS) Regulation, clause 96	<a href="#">Emergency exits</a>
WHS (MPS) Regulation, clause 97	<a href="#">Self escape and refuge</a>
WHS (MPS) Regulation, clause 100	<a href="#">Self-rescuers</a>
WHS (MPS) Regulation, Clause 104(2)(d)	<a href="#">Duty to provide information, training and instruction on emergency plan</a>
WHS Regulation, clause 34	<a href="#">Duty to identify hazards</a>
WHS Regulation, clause 43	<a href="#">Duty to prepare, maintain and implement emergency plan</a>
WHS Regulation,	<a href="#">Fire protection and firefighting equipment</a>

clause 359

---

WHS Regulation,  
clause 347

[Manifest of hazardous chemicals](#)

---

WHS Regulation,  
clause 348

[Regulator must be notified if manifest quantities to be exceeded](#)

---

WHS Regulation,  
clause 361

[Emergency plans](#)

---