

TARGETED ASSESSMENT PROGRAM

Consolidated report – Coal dust explosion suppression in underground coal mines

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Executive summary

The targeted assessment program (TAP) commenced in March 2016 providing a planned, intelligence-driven and proactive approach to assessing how effectively mine operators are managing the principal hazards defined in the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014 (WHS (M&PS) Regulation).

This report summarises the findings of assessments undertaken in relation to the risk of coal dust explosion in underground coal mines. These assessments commenced in October 2016, and to date have been completed at 16 mines.

The targeted assessment is an in-depth look at the control measures for coal dust explosion and their implementation. The assessments are undertaken by a multi-disciplined team of Mine Safety inspectors using both desktop and on-site assessment.

The findings of the assessments are grouped into those that are specific to the hazard of coal dust explosion, and those that could be generally applied to all aspects of critical control measure implementation.

General findings highlight that there is a need for statutory officials to undertake refresher training on:

- the requirements of clause 50 and 65 of the WHS (M&PS) Regulation
- the manufacturer's guidelines for explosion barriers
- the procedure for the installation of explosion barriers, stone dusting standards, defect management, and inspection and maintenance of explosion barriers is recommended.

Specific findings identified:

- There is a need for an appropriate solution to the placement of bat bags above monorails to ensure an effective barrier in the event of an explosion.
- Some mine operators were not maintaining required incombustible limits behind auxiliary fans.
- Stone dusting standards were not consistent throughout the outbye sections of the mine.
- Mine operators were not maintaining required incombustible limits behind auxiliary fans.
- Inconsistency of stone dusting standards to non-combustible limits.

Targeted assessments are seen as a valuable process and a powerful analytical tool capable of identifying critical risk control issues not previously uncovered by conventional inspection regimes. This approach also highlights the benefits of using a multi-disciplined inspection team to identify issues across a range of areas through one activity.

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 WHS (M&PS) 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

Involving a multidisciplinary team of inspectors, the scope of the targeted assessment included two elements:

- a desktop assessment of:
 - compliance against legislation with respect to the management of risks to health and safety associated with an explosion caused by coal dust at the mine.
 - controls the mine utilises to prevent and mitigate the risks to health and safety associated with coal dust explosion.
 - means the mine utilise to monitor the effectiveness of those controls.
- a workplace assessment of the implementation of those controls.

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.

Coal dust explosion suppression

A person conducting a business or undertaking at a mine must manage risks to health and safety associated with mining operations at the mine in accordance with Part 3.1 of the WHS Regulations - clause 9 WHS (M&PS) Regulation. In complying with clause 9, the mine operator of an underground mine must manage risks to health and safety associated with an explosion associated with dust at the mine. In accordance with clause 50 of the WHS (M&PS) Regulation 2014, in managing risks to health and safety associated with dust at the mine, the mine operator must implement control measures that, so far as is reasonably practicable:

- a. minimise the generation of potentially explosive dusts, and
- b. suppress, collect and remove potentially explosive airborne dusts, and
- c. suppress any dust explosion, and
- d. restrict the propagation of any dust explosion so that other areas are not affected.

Clause 65 of the WHS (M&PS) Regulation sets out the specific requirements for the management of coal dust at an underground coal mine.

Assessment findings

The targeted assessments of the risk of coal dust explosion in underground coal mines highlighted some issues with the implementation of critical controls to manage the hazard, and more generally with the process of developing, reviewing and implementing controls. While the highlighted issues were not relevant at all of the sites assessed, the findings provide some valuable information which should be considered when developing critical controls.

The assessment process highlighted that:

- Heavy machinery and cable systems suspended from monorails prevent the correct placement of bat bags in roadways.
- Training of statutory officials with respect to the provisions of clauses 50 and 65 of the WHS (M&PS) Regulation and the manufacturer's guidelines for explosion barriers needs refreshing.
- There is inconsistent use and monitoring of trickle dusters behind auxiliary fans.

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 hazard.

General findings

Training of statutory officials

Issue	Response
Explosion barriers above the longwall conveyor were not compliant with the manufacturer's guidelines.	It is recommended that statutory officials undertake refresher training with respect to clauses 50 and 65 of the WHS (M&PS) Regulation and the manufacturer's guidelines for explosion barriers.
Explosion barriers were not compliant with the manufacturer's guidelines yet the barriers were signed as compliant by the statutory official.	Refresher training for statutory officials on the procedure for the installation of explosion barriers, stone dusting standards, defect management, and inspection and maintenance of explosion barriers is recommended.
Coal fines were observed near the rollers of conveyor belts and transfer points.	As above.
The use and monitoring of trickle dusters behind auxiliary fans, in particular the use of 1.2 tonne bulk bags of stone dust with spears.	Increase the monitoring of trickle dusters and include this in the mandatory refresher training for statutory officials.

Risk assessment

Issue	Response
The risk assessment and safe work procedures for floor brushing processes did not specifically consider the hazard of coal dust explosion.	Mine operators must ensure that the hazard of coal dust explosion is considered in the risk assessment and safe work procedures for floor brushing processes.
Mine operators did not adequately consult with workers or give them a	The mine operator is required to give workers a reasonable opportunity to express their views and contribute to the decision making process.

reasonable opportunity to express their views and contribute to the decision-making process in relation to the risk assessment process.

(Section 48 WHS Act). Mine operators should ensure that a cross-section of the workforce is included in the risk assessment process.

Specific findings

Explosion barriers above monorails

Issue	Response
Heavy machinery and cable systems suspended from monorails are a standard part of longwall development installation but prevent the correct placement of bat bags in the roadway.	It is recommended that mine operators contact the manufacturer for an appropriate solution to the placement of bat bags above monorails to ensure an effective barrier in the event of an explosion.

Stone dusting standards

Issue	Response
The practice of hosing down drive heads, transfer points and loop take ups affects stone dusting standards.	Mine operators must ensure that stone dusting standards are maintained in accordance with clause 65 of the WHS (M&PS) Regulation.
Stone dusting standards were not consistent throughout the outbye sections of the mine.	Mine operators should implement a system so that the outbye stone dusting standards are consistent throughout the mine. Review of the stone dusting procedure should be undertaken to ensure that stone dusting standards are consistent and in compliance with legislative requirements and the manufacturer's guidelines.

Use of trickle dusters behind auxiliary fans

Issue	Response
Mine operators were not maintaining required incombustible limits behind auxiliary fans.	Mine operators must ensure that trickle dusters are in operation at all times behind auxiliary fans while mining operations are taking place.

Stone dusting standards in main return roadways

Issue	Response
Inconsistency of stone dusting standards to non-combustible limits.	The mine operator must ensure that stone dusting standards in main return airways remain compliant and look for proactive ways to improve standards in these roadways.

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 WHS (M&PS) Act, and improvement notices, under section 191 of the WHS Act.

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

Notice	In relation to
Improvement notices, s 191	<ul style="list-style-type: none"> • Non-compliant concentrated explosion barrier at longwall belt conveyor inbye of loop take up. • Training, education and assessment of stone dusting standards, concentrated barriers for preventing the propagation of coal dust explosions, defect management, inspection and maintenance. • Review management plans and safe work procedures (including the barrier work order system) for adequacy of compliance/verification checks. • Review risk assessment and safe work procedures for floor brushing processes to ensure critical dust explosion control measures are maintained.

Notices of concern, s 23

- The mine operator to contact the manufacturer and supplier of bat bags to consider a solution for placement of bat bags above monorail to ensure an effective barrier in the event of a dust explosion.
- Bat bags placed outside the manufacturer's specifications.
- Concerns that combustible roadway dust concentrations were at the maximum allowable limits in the face zone.
- Excessive coal fines build up in conveyor loop take-up.
- The mines explosion suppression management plan was not compliant with the manufacturers guidelines.
- There were inconsistent applications of stone dust in the face zone in some areas

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 to manage the risk of coal dust explosion. 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.

The requirement for principal hazard management plans to comply with legislative requirements, reduce risk to as low as reasonably practicable and give appropriate consideration to the implementation and management of critical controls apply at all types of mining operations.

Issued by

Dave McLean
Chief Inspector of Mines
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's Mine Safety branch. You can find the relevant contact details below.

Type	Contact details
Email	mine.safety@industry.nsw.gov.au
Phone	02 4931 6666
Incident reporting	To report an incident or injury call 1300 814 609
Website	resourcesandenergy.nsw.gov.au/safety
Address	Resources Regulator, Mine Safety 516 High Street Maitland NSW 2320

Appendix A: Legislative requirements relating to the management of dust explosion

The appendix provides a list of certain legislative requirements for the management of coal dust explosion referred to in this report as provided by the *Work Health and Safety Act 2011*, *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014*.

Legislation, section/clause	Legislative requirements
WHS (M&PS) Regulation, clause 9	Management of risks to health and safety
WHS (M&PS) Regulation, clause 50	Dust explosion
WHS (M&PS) Regulation, clause 65	Coal dust explosion
WHS (M&PS) Regulation, clause 107	Review of information, training and instruction
WHS Act, section 48	Nature of consultation