NSW Resources Regulator

TARGETED ASSESSMENT PROGRAM

Dust and other airborne contaminants in open cut coal mines

August 2018

NSW GOVERNMENT

Document control

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

Title: Consolidated report – Dust and other airborne contaminants in open cut coal mines

First published: August 2018

Authorised by: Director of Strategy and Engagement

CM9 reference: DOC18/497364

Amendment schedule		
Date	Version	Amendment

Contents

Executive summary

This report summarises the findings of assessments undertaken in relation to the hazard of dust and other airborne contaminants (hereafter referred to as dust) in open cut coal mines. These assessments began in November 2017 and were completed at seven mines.

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

General findings highlight there is a lack of awareness among workers of the risks to their health from exposure to dust at open cut coal mines. The assessment team found that drillers and shotfirers were particularly vulnerable to dust due to the nature of their work, yet no additional information, training or instruction was provided to these workers to increase their awareness of the risks to their health from exposure to dust. In particular the induction process lacked information, training and instruction to workers on the risks to their health from exposure to dust.

The risk assessments for dust in several cases did not include a cross-section of the workforce and did not include those workers or similar exposure groups (SEGs) at increased risk due to the nature of the work they performed e.g. drillers and shotfirers.

Specific findings identified that the procedure for personal protective equipment (PPE) did not state the mandatory respiratory protective equipment (RPE) required for tasks and areas of the mine where workers are at increased risk due to exposure to dust.

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 risk profiling is to identify inherent hazards and the hazard burden that exist at individual mines. The information is then used to develop the operational assessment and inspection plans that inform the program.

Scope

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

- → a desktop assessment of:
  - o compliance against legislation with respect to the management of risks to health and safety associated with dust at the mine.

- controls the mine uses to prevent and mitigate the risks to health and safety associated with dust.
- means the mine uses 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.

Airborne contaminants in open cut coal mines

Airborne contaminants are generated during coal mining activities such as extraction, drilling, crushing, hauling and stockpiling of coal and rocks containing minerals. Workers in coal mines may be exposed to both coal dust and crystalline silica dust.

In open cut coal mining, coal and crystalline silica dust occur at both an inhalable and respirable fraction. Normally dust of the larger inhalable fraction is considered an irritant as it is deposited in the upper respiratory tract. At the smaller respirable fraction, these dust contaminants represent a serious health risk to people who are exposed.

The smaller-sized particles can penetrate into the lower regions of the lung where gas exchange takes place. As such, coal and silica dusts at the respirable fraction can cause pneumoconiosis (in the case of coal) or silicosis (in the case of crystalline silica). Both conditions are debilitating and often fatal lung diseases.[1]

In NSW mines no person is to be exposed to airborne dust that exceeds in total[2]:

- → 3 mg/m^3 (or 2.5 mg/m^3 in the case of a coal mine) for respirable dust
- → 10 mg/m^3 for inhalable dust.

[1] CDC - Mining Topic - Respirable Dust - NIOSH

[2] Measured in accordance with Australian Standard, AS 2985-2009

Exposure standards for individual substances also must be satisfied within these overall limits. For example, the exposure standard for crystalline silica is 0.1 mg/m^3.

For further information, including obligations under work health and safety legislation, refer to the fact sheet on Airborne contaminants at open cut coal mines.

Assessment findings

The assessment program has identified issues with the implementation of critical controls that manage the hazard, and more generally with the process of developing, reviewing and implementing controls. While the highlighted issues were not relevant at all the sites assessed, the findings provide some valuable information that should be considered when developing critical controls.

The assessment process highlighted:

- → the critical controls used by open cut coal mines to manage the risk of worker exposure to dust were common e.g. sealed, air conditioned and/or air filtered pressurised cabins of mobile plant to isolate workers from exposure to dust.
- → the induction process for workers lacked information, training and instruction on the risks to their health from exposure to dust.
- → the procedure for personal protective equipment (PPE) did not state the mandatory RPE required for tasks and areas of the mine where workers were at increased risk due to exposure to dust.
- → the documented procedures for workers engaged in 'on ground' activities are often silent on actions required to be implemented to mitigate against exposure to non-compliant levels of airborne contaminants.

Areas of good practice

- ✓ Relocation of haul truck routes in response to dust generation associated with wind direction and speed.
- ✓ Allocation of a dedicated small water cart to the shotfirers' crew to ensure the bench was sufficiently watered down.
- ✓ Introduction and trialling of body cameras with real time monitoring to determine what activities were causing exceedances.
- ✓ Shotfirers had dust masks available in the light vehicles for easy access when required.
- ✓ Trialling the use of real time dust monitoring on the shot bench.
- ✓ Progressive rehabilitation of mined out areas of the pit to reduce the amount of dust potentially liberated into the atmosphere.

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

Risk assessment

Issue	Response
The risk assessment for dust did not include a cross-section of the workforce and did not include workers or similar exposure groups (SEGs) at increased risk due to the nature of the work they perform e.g. shotfirers	The operator of a mine or petroleum site must consult with workers at the mine or petroleum site in relation to conducting risk assessments for principal hazard management plans. (Clause 121 WHS (MPS) Regulation)

Training workers

Issue	Response
The induction process lacked sufficient information, training and instruction to workers on the risks to health of dust and other airborne contaminants.	The operator of a mine or petroleum site must ensure that each worker at the mine or petroleum site is provided with suitable and adequate information, training and instruction related to the hazards associated with the work being carried out and the implementation of control measures relating to the work being carried out by the worker. (Clause 104(2-3) WHS (MPS) Regulation)

Specific findings

Personal protective equipment

Issue	Response
The procedure for personal protective equipment (PPE) did not state the mandatory respiratory protection equipment (RPE) required for tasks and areas of the mine where workers are at increased risk due to	Mine operators must ensure the documented PPE procedure clearly identifies the circumstances when wearing RPE is mandatory. The RPE must suit the nature of the work and any hazard associated with the work. (Clause 44(3)(a)(i) WHS Regulation)

exposure to dust or other airborne contaminants e.g. maintenance electricians working on high voltage cabinets in trucks.	
Workers did not always carry or wear appropriate PPE when working in areas of the mine where respirable dust was present.	Mine operators must ensure that workers are provided with appropriate PPE[3] and are provided with information, training and instruction in the proper use of the equipment.[4] The worker must, as far as the worker is reasonably able, use or wear the PPE in accordance with the information, training or instruction provided.

Pre-start inspections of mobile equipment

Issue	Response
The pre-start inspection report checklist did not include specific inspections of the cabin cleanliness, the cabin sealing arrangements and the operation of the air conditioner and filtered pressurised systems.	Inspection requirements should include confirmation of housekeeping standards and absence of threats related to dust and other contaminants. When developing a control measure to manage the risks to health and safety associated with dust and other airborne contaminants (e.g. cabin cleanliness and cabin sealing arrangements), inspection and testing of mobile plant must be taken into account.[5]
The documented pre-start inspection report system was not being correctly and consistently implemented, resulting in defects not being identified and/or defects not being rectified in a timely manner.	When developing a control measure to manage the risks to health and safety associated with dust and other airborne contaminants (e.g. air conditioning, filtered pressurised systems), the identification, assessment, management and rectification of defects that affect the safety of mobile plant must be taken into account.[6]

[3] Clause 36, WHS Regulation

[4] Clause 44, WHS Regulation

[5] Schedule 2(3)(e) WHS (M&PS) Regulation

[6] Schedule 2(3)(f) WHS (M&PS) Regulation

Communication of personal monitoring results to workers

Issue	Response
Workers were only notified of their personal monitoring results when there was an exceedance. Workers were interested in the results of their personal monitoring, whether or not there was an exceedance.	Mine operators should notify workers of their personal monitoring results, whether or not there is an exceedance. Sampling results for the similar exposure groups (SEGs) should be made available to workers.

Where to now

Targeted assessments provide an account of the issues observed at particular sites at a point in time. Some of the findings resulted in notices being issued, including notices of concern, under section 23 of the WHS (MPS) Act, and improvement notices, under section 191 of the WHS Act.

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, s 191	→ workers require ready access to respiratory protection equipment → document communication arrangements between shifts → training for all workers on air quality, dust other airborne contaminates principle hazard management plan
Notices of concern, s 23	→ pre-start inspection records (no monitoring of inspections completed) → information (dust results, notices) not on the workshop notice board → dusty haul roads → non-compliance with closed window policy → documented pre-operational inspection report system not being correctly implemented → mandatory wearing of respiratory protection for particular tasks and areas of the mine had not been identified and documented

All mine operators involved in this targeted assessment have responded 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 hazard of dust. 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 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

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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	cau@planning.nsw.gov.au
Phone	1300 814 609
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 and other airborne contaminants

The appendix provides a list of certain legislative requirements for the management of dust and other airborne contaminants 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 and Work Health and Safety Regulation 2017.

Legislation, section/clause	Legislative requirements
WHS Act, section 19	Primary duty of care
WHS (MPS) Regulation, clause 104	Duty to provide information, training and instruction
WHS (MPS) Regulation, clause 121	Duty to consult with workers
WHS (MPS) Regulation, Schedule 2	Principal control plans - matters to be addressed
WHS Regulation, clause 36	Hierarchy of control measures
WHS Regulation, clause 39	Provision of information, training and instruction
WHS Regulation clause 44	Provision to workers and use of personal protective equipment