FACT SHEET

Airborne contaminants

October 2016

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

Exposure standards

In NSW mines no person is to be exposed to airborne dust that exceeds in total[1]:

- 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.

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.

Health risks

In underground 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 those 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 disabling and often fatal lung diseases[2].

Your obligations

Under the *Work Health and Safety Act 2011* (WHS Act), a person conducting a business or undertaking has the primary duty to ensure, so far as is reasonably practicable, workers and other people are not exposed to health and safety risks arising from the business or undertaking.

This duty includes eliminating exposure to airborne dusts, so far as is reasonably practicable, for example by using alternative mining processes. If it is not reasonably practicable to do so, then risks must be minimised so far as is reasonably practicable.

The Work Health and Safety Regulation 2011 prescribes exposure standards[3] for substances which must not be exceeded in respect of a person at any workplace (clause 49).

In addition, the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014 requires a mine operator to manage risks and implement a range of control measures including:

- implementing a principal hazard management plan for air quality or dust or other airborne contaminants (clauses 23-25)
- ensuring the exposure standards for respirable and inhalable dust is not exceeded (clause 39)
- implementing a ventilation control plan to ensure effective ventilation (clause 62)
- implementing air quality, monitoring and ventilation arrangements (clauses 38-42, 54-64 and 71).

Also, operators of underground coal mines must:

- undertake certain actions if air quality or safety standards are not met, such as withdrawing workers from a place of risk and preventing re-entry (clause 76)
- ensure sampling and analysis of airborne dust is carried out under, and in accordance with, a licence, and at the locations and frequency as prescribed (clause 86, schedule 6 and part 9).

Additionally, Order 42 under the *Coal Industry Act 2001* provides for Coal Services Pty Ltd to conduct dust monitoring at coal mines consistent with the provisions for sampling and analysis under the *Work*

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

[2] The National Institute of Occupational Safety and Health (NIOSH) Respirable dust. www.cdc.gov/niosh/mining/topics/RespirableDust.html

[3] *Workplace Exposure Standards for Airborne Contaminants* published by Safe Work Australia on its website with a date of effect of 18 April 2013 as in force or remade from time to time

Health and Safety (Mines and Petroleum Sites) Regulation 2014.

Elimination and control

To reduce worker exposure to appropriate levels, more than one control measure may be required.

Control measures fall into three categories, which are minimising:

1. dust generation at the source
2. dust generation throughout the work environment
3. exposure to individuals at risk.

Whatever strategy is adopted, it should be under-pinned by utilising the hierarchy of controls, so that occupational exposure to dust can be controlled.

The process used to extract coal is an important consideration in minimising the dust generated.

The design, implementation and operation of ventilation systems also play a critical role in minimising the risk posed by airborne contaminants.

Dust suppression and separation/positioning of people by distance or barriers from the airborne contaminants generated may also prevent or minimise exposure (for example, use of remote controlled mining equipment).

The above methods to control workplace exposures to airborne contaminants are now readily available, as are commonly employed atmospheric monitoring and health surveillance strategies.

Targeted assessment program

Mine Safety will be conducting targeted assessments to ensure that workplaces with elevated exposure risks such as underground mines are employing a range of these measures to control the exposure risks of workers.

The management of airborne contaminants at mines will be the subject of targeted assessments by Mine Safety.

The assessments will focus on how the mine prevents worker exposure to harmful airborne dust in respirable fraction, specifically coal and crystalline silica.

Key categories assessed are:

1. identification, assessment and risk controls for airborne contaminant hazards
2. preventative controls (controlling dusts at the source)
3. mitigating controls (controlling exposure to airborne contaminants)
4. monitoring (worker exposure)
5. verifying the effectiveness of controls.

For more information see Mine Safety's *Targeted assessment program fact sheet*.

What you should do

Review your strategy and capacity to manage respirable coal and crystalline silica airborne contaminants immediately to ensure it complies with the legislation. Sites should ensure their approach to the management of this hazard is in line with the available guidance material and reflects accepted, effective control practice.

More information

For more information and guidance on managing mining hazards and risks associated with exposure to airborne contaminants view the following resources:

- Focus on: Atmospheric contaminants causing respiratory illness (NSW Mine Safety)
- Guidance about dust and other airborne contaminants (WA Department of Mines and Petroleum)
- Position Paper: Dusts not otherwise specified (dust NOS) and occupational health issues (Australian Institute of Occupational Hygienists)
- Guidance on the Interpretation of Workplace Exposure Standards for Airborne Contaminants (Safe Work Australia)
- Mining topic: respirable dust (National Institute of Occupational Safety and Health)
- Workplace atmosphere - method for sampling and gravimetric determination of respirable dust (Australian Standard AS 2985-2009, infostore.saiglobal.com)
- Workplace atmosphere - method for sampling and gravimetric determination of inhalable dust (Australian Standard AS 3640-2009, infostore.saiglobal.com)
- Mine Safety Bulletin 151 – Preventing dust related lung disease (Queensland Department of Natural Resources and Mines)
- Mine Safety Bulletin 19: Place change - maintaining adequate ventilation (Queensland Department of Natural Resources and Mines)
- Position paper: respirable crystalline silica and occupational health issues, 2009 (Australian Institute of Occupational Hygienists)

PUB16/500