Department of Industry
Resources Regulator
Mine Safety

MAJOR INVESTIGATIONS AND EMERGENCY RESPONSE UNIT

INFORMATION RELEASE

Serious illness

Incident date Between 1985 and 2015

Event Exposure to harmful dust resulting in serious illness

Location Various open cut mines in the Hunter Valley, NSW

Overview

As announced by the Resources Regulator and widely reported on 3 February 2017, an open cut mine worker has been diagnosed with complicated mixed dust pneumoconiosis, the first case reported in NSW since the 1970s.

The investigation into this isolated case by the NSW Resources Regulator's Major Investigations and Emergency Response Unit and Mine Safety Branch is ongoing. No further information on this case is currently available other than what was published in February.

In accordance with usual practice, the Resources Regulator has issued the following information release to draw attention to the investigation and provide safety information about complicated mixed dust pneumoconiosis to the mining industry.

Photograph 1: P2 dust masks are a form of personal protective equipment (PPE) available to workers to protect against dust exposure. Source: australiansafetysigns.net.au

Coal workers' pneumoconiosis

Coal workers' pneumoconiosis (CWP) is the term generally applied to a disease of the lungs resulting from chronic exposure to coal dust, its inhalation and deposition, and the lung tissue immune response to its presence.[1] The disease typically has a very long latency period (usually 10-20 years or more), which means that workers exposed to chronic levels of coal dust may not show symptoms of the disease for a very long time. In many cases this can be well after leaving the industry or in retirement, which makes it essential that coal mine workers continue to undergo regular lung health checks.

Evidence suggests that this disease mainly affects underground coal workers, due to historical mining techniques and historical controls being less than adequate. Over recent decades CWP was thought to have been eradicated in the NSW mining industry because of increased monitoring and contemporary controls. This case, the first reported since the 1970s, has been diagnosed as mixed dust pneumoconiosis, which is different from coal workers' pneumoconiosis.

Mixed dust pneumoconiosis

As the name suggests, mixed dust pneumoconiosis is a disease of the lungs resulting from chronic exposure to more than one type of mineral dust. For coal miners this dust mixture is generally coal dust and silica dust. There is evidence to suggest the toxicity of mixed dust is greater than coal dust alone. This is especially because rapid progression and progressive massive fibrosis are more likely with silicosis—pneumoconiosis that is caused by chronic exposure to silica alone—than with CWP.[2]

Progressive massive fibrosis

Progressive massive fibrosis (PMF) is the debilitating end-stage of mixed dust pneumoconiosis and CWP. Irreversible lung damage from silica and coal dust causes an inflammatory response within the lung tissue. This inflammatory response creates congestion and activates a range of immunological pathways. The inflammatory response is followed by a reparative phase, where growth factors stimulate tissue regeneration. During the regeneration phase, abnormal or uncontrolled regeneration of tissue can occur. This results in fibrotic nodules forming on the lungs.[3] The characteristics of these fibrotic nodules are characteristic of the mineral that initially caused the damage. Specialist radiologists that are trained in the appropriate techniques are able to distinguish between CWP and mixed dust pneumoconiosis.[4]

Symptoms of pneumoconiosis

Symptoms of pneumoconiosis are very similar to many other known lung diseases. A strong persistent cough, a noticeable wheeze and shortness of breath can all be symptoms of pneumoconiosis. Unexplained weight loss and increased breathlessness during mild or moderate exertion can be signs of a potential issue.[5] Notably, during latency periods (10-20 years or more) no symptoms may be present, which means that workers should not rely on waiting until symptoms develop before they seek medical assistance.

If you are, or have been, a worker in a coal mine in NSW you should contact Coal Services or your General Practitioner (GP) for regular check-ups and openly discuss the potential for diseases

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[1] Wallaert, B. and Leroy, S. (2008) *Clinical Respiratory Medicine (Third Edition) Chapter 64 – Silicosis and Coal Workers Pneumoconiosis*, Mosby p 809.
[2] Laney, A. S., Petonsk, E. L., Attfield, M. D. (2010) *Pneumoconiosis among underground bituminous coal miners in the United States: is silicosis becoming more frequent*. Occup Environ Med p 652.
[3] Wallaert, B. and Leroy, S. (2008) *Clinical Respiratory Medicine (Third Edition) Chapter 64 – Silicosis and Coal Workers Pneumoconiosis*, Mosby p 809.
[4] *Guidelines for the use of the ILO international classification of radiographs of pneumoconiosis* (revised edition 2011) International Labour Office, Geneva.
[5] Medical Journal of Australia, *Coal workers' pneumoconiosis: an Australian perspective* (2016) <https://www.mja.com.au/journal/2016/204/11/coal-workers-pneumoconiosis-australian-perspective>.

caused by dust exposure with your GP. You should also seek medical assistance if you are concerned you may be showing symptoms of the disease.

Open cut mining and harmful dust

Workers at open cut coal mines can be exposed to silica during excavation of non-coal material, such as sandstone, clay or granite. The level of exposure to respirable and inhalable dust is thought to be less in surface mines than in underground mines. But this does not mean that the risk does not exist in open cut mines. A 2012 study by the Centres for Disease Control and Prevention (a US government agency) demonstrated that pneumoconiosis was a risk for open cut workers. In their study of 2,328 open cut coal miners they identified 37 workers who had never worked underground and had contracted mixed dust pneumoconiosis. Of those workers with the disease, 12 had developed PMF.

The study recommended:

> "Surface coal mine operators should monitor worker exposures closely to ensure that both respirable dust and silica are below recommended levels to prevent CWP. Clinicians should be aware of the risk for advanced pneumoconiosis among surface coal miners, in addition to underground coal miners, to facilitate prompt disease identification and intervention." [6]

Prescribed exposure levels

Exposure levels are defined in clause 39 of the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014 for respirable coal dust and inhalable dust. Clause 39 also ensures compliance to the Workplace Exposure Standards for Airborne Contaminants published by Safe Work Australia.

In NSW coal mines, the specified dust exposure limits are (eight hour-time-weighted exposures):

- respirable dust 2.5 milligrams per cubic metre of air (mg/m^3)
- inhalable dust 10 mg/m^3
- respirable quartz[7] (silica dust) 0.10 mg/m^3.

Minimising exposure levels

Mine operators are reminded of the requirement to assess the source of dust generated at a mine site from production areas, transportation roads, conveyors, coal processing and handling equipment. The hierarchy of controls should be applied to ensure exposure levels are minimised and that a combination of controls may be required to ensure the risk is appropriately minimised or eliminated.

Operators may consider the following when attempting to minimise dust exposure:

- remove workers from dusty environments and consider reduced exposure times
- control the dust through adequate ventilation, suppression or mining techniques
- engineer appropriate workplaces that employ adequate air conditioning, such as sealed cabins in open cut mobile and fixed plant
- apply appropriate housekeeping
- apply appropriate administrative controls, such as policies and procedures

[6] Laney, A. S., Wolfe, A. L. and Petsonk, E. L. (2012) *Pneumoconiosis and Advanced Occupational Lung Disease Among Surface Coal Miners – 16 States, 2010-2011* Morbidity and Mortality Weekly Report, Centres for Disease Control and Prevention Vol. 61/ No.23 pp 431-433.
[7] Safe Work Australia, *Workplace Exposure Standards for Airborne Contaminants* (2013).

- use specific personal protective equipment (PPE) such as P2 or P3 respirators.

It is worth noting that in NSW there are a number of statutory duties that outline controls[8] that must be considered, specifically:

- the duty to prepare a risk assessment that involves a comprehensive and systematic investigation and analysis of all aspects of risk to health and safety associated with hazardous dust; and
- the operator of a mine or petroleum site must prepare a principal hazard management plan for air quality or dust or other airborne contaminants (the contents of which are defined in the legislation).[9]

Monitoring dust levels

Work health and safety legislation requires the operator of a mine or petroleum site to carry out air monitoring to minimise the exposure of people at the workplace to harmful dust. It also requires that they determine if there is a risk to health.[10]

Onsite dust monitoring must be carried out by an appropriately licenced dust sampler who has the requisite quality endorsements by the National Association of Testing Authorities, Australia.

Dust monitoring results are reviewed by:

- the mine where the samples were taken
- NSW Department of Industry (Resources Regulator)
- Coal Services
- CFMEU Mining and Energy Division
- Standing Committee on Dust Research and Control (Standing Dust Committee).

All statutory dust results are held in a single database by an independent monitoring authority.

The investigation

The investigation into this case of pneumoconiosis will examine:

- the employment history of the worker
- the environmental factors at each workplace
- locations and activities at the mine where harmful dust exposure may occur
- the likely exposure levels at each workplace
- contributing factors
- the historical and current regulatory framework for dust monitoring and control
- legal compliance under relevant work health and safety legislation.

The investigation will be undertaken by the NSW Resources Regulator's Major Investigations and Emergency Response Unit and Mine Safety Branch. Occupational hygienists and medical specialists will be engaged to assist with the investigation.

[8] *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014* (NSW) cl 23.
[9] Ibid cl 24.
[10] *Work Health and Safety Regulation 2011* (NSW) cl 50.

Safety observations

The risks to health and safety regarding coal dust and silica are well-known to the NSW mining industry.

Mine operators are reminded of their duty to identify hazards and manage risks to health and safety in accordance with the provisions of the *Work Health and Safety Act 2011* and *Work Health and Safety (Mines and Petroleum Sites) Act 2013* (NSW) and Regulations.

Specifically, all mine operators are reminded of their specific duty under the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014 to conduct a risk assessment and prepare a principal hazard management plan for air quality or dust or other airborne contaminants for their specific workplace.

Further information

- Resources Regulator's website
  - resourcesandenergy.nsw.gov.au/miners-and-explorers/safety-and-health
- Coal Services' brochure 'Prevention of pneumoconiosis in NSW: information for workers'
  - coalservices.com.au/MessageForceWebsite/Sites/340/Files/Prevention-of-Pneumoconiosis-in-NSW-information-for-workers-February-.pdf
- Australian Institute of Occupational Hygiene, for a list of occupational hygienists that may help your operation
  - aioh.org.au/find-a-coh
- Senate Select Committee on Health Fifth Interim Report: 'Black Lung: "It has buggered my life"'
  - aph.gov.au/Parliamentary_Business/Committees/Senate/Health/Health/Fifth_Interim_Report
- CFMEU Mining & Energy Division for their campaign 'Make Black Lung History'
  - cfmeu.com.au/campaigns/national/make-black-lung-history

About this information release

The Resources Regulator has issued this information to draw attention to the occurrence of a reported case of pneumoconiosis in the mining industry. Investigations are ongoing and further information may be published as it becomes available.

The information contained in this publication is based on knowledge and understanding at the time of writing. However, because of advances in knowledge, users are reminded of the need to ensure that the information upon which they rely is up to date and to check the currency of the information with the appropriate officer of the Department of Industry, Skills and Regional Development or the user's independent adviser. Information about the Major Investigations and Emergency Response Unit and its publications can be found at: www.resourcesandenergy.nsw.gov.au/miners-and-explorers/safety-and-health/major-investigations

For information about health and safety regulation for mine sites contact a mines inspector at one of our local offices www.resourcesandenergy.nsw.gov.au/miners-and-explorers/safety-and-health/mine-safety-offices

Issued by:

Steve Orr
Manager Regulatory Audit and Investigation
Major Investigations and Emergency Response Unit
NSW Resources Regulator