AIRBORNE DUST IN COAL MINES
RESPIRABLE DUST & QUARTZ
INHALABLE DUST

Coal Services Pty Limited
2008
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INHALABLE DUST

The Coal Mine Health & Safety Act Regulation 2006 defines airborne dust to include both respirable dust and inhalable dust, it is also known as “airborne particulate matter” or “airborne particulates”.

Coal Services Pty Limited’s Standing Committee on Dust Research and Control (SDC) has produced this booklet to promote a better understanding of the health effects and control of airborne dust.

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Definitions:

**What do we mean by Respirable Dust (invisible dust)?**

Respirable dust & quartz particles (which are only a fraction of the width of a human hair) are too small to be seen with the naked eye. When air containing dust is breathed, the larger particles are either stopped by the nose or mouth, or if they go deeper, are removed naturally by the special defences of the lungs. However, a small fraction of the dust cloud, the very small particles, can be retained in the lungs. Therefore a lack of visible dust does not mean that respirable dust is not present.

**What do we mean by Inhalable Dust (visible dust)?**

Inhalable dust particles are visible, which also includes respirable dust particles. Inhalable dust (visible dust size below 100 microns) is dust that enters the body but is trapped in the nose, throat and upper respiratory tract.
What is Quartz?

“Quartz”, “Crystalline Silica” and “Free Silica” are common names for a naturally occurring mineral compound in the earth’s crust. “Respirable Quartz” means the quartz present in respirable dust. “Quartz-Containing Dust” means respirable dust which contains five percent (5%) or more by mass of respirable quartz.

Health Effects:

Why is the subject of dust so important?

Long term exposure to many dusts, including coal dust and rock dust, can cause disabling lung diseases.
Is rock dust harmful?

The kinds of rock dust which contain a lot of quartz, a form of crystalline silica, are more likely to be harmful to your health than coal dust. One kind of rock dust, limestone dust (often called "Stone Dust"), is used in mines but is not permitted to contain more than 3% quartz. This "Stone Dust" quartz level is controlled by regulation so as to protect the health of mineworkers.

What is pneumoconiosis (dusted) and how is it caused?

The word "pneumoconiosis" means "lung dust disease", commonly referred to as being "dusted" or "black lung". It is caused by very fine coal dust particles which have reached the depths of your lungs and become lodged on the lung wall. Your body reacts to such particles by forming layers of covering scar tissue over the affected area. These dust collections and scaring may later show up as "small round shadows" on your regular chest X-ray.
1. The alveoli, or air sacs, are responsible for exchanging gases with the blood. They are located at the ends of each bronchiole.

2. Macrophages, a type of blood cell, collect foreign particles and carry them to where they can be coughed out or swallowed.

3. If too much dust is inhaled over an extended period of time, some particles and dust-laden macrophages collect permanently in the lungs.
What are the symptoms of pneumoconiosis (dusted)?

The lesser degrees of pneumoconiosis do not usually cause any symptoms or disability. A chest X-ray may show fine dust shadows ("nodules") however the individual may have little or no breathing problems. With more advanced pneumoconiosis there is shortness of breath and increasing overall lung disability.

If a person is breathless on exertion, does it mean that they have pneumoconiosis (dusted)?

Not necessarily. Bronchitis and other chest diseases, which may not be directly due to dust, can cause breathlessness. The single biggest cause of chest and related disease and disability is smoking.
Is pneumoconiosis (dusted) ever a serious disease?

As stated above, pneumoconiosis can range from undetectable to grossly disabling and often complicated by other lung diseases especially those due to smoking.

The aim of preventative measures in NSW coal mines is to stop pneumoconiosis occurring or at worst stop any progression beyond the very early stages of the disease. Symptoms may remain undetected for years, therefore regular medical checkups are recommended.

What action should you take if you think you are dusted?

You should request to see a Coal Services Health doctor, who works in an organisation that has a special interest in the diagnosis of dust related diseases in coal miners, or you can consult your own local doctor. Coal Services Health will always be willing to communicate findings to your doctor at your request. If it is considered that you have any disability which may have resulted from your work, a certificate to this effect should be obtained. With this certificate your Employer or Union can advise you how best to proceed.
Is pneumoconiosis (dusted) a problem for open-cut mine workers?

Pneumoconiosis should not be a problem because of the nature of the mining method and also the high degree of mechanisation. Exposure to coal and other dusts is minimal as most workers are located in enclosed, air conditioned cabins. Remembering this does assume proper cabin sealing is maintained and appropriate work procedures are in place. Anybody exposed to coal dust could get dusted.

What is silicosis and who can get this chest disease?

Silicosis is a quartz dust-caused chest disease very similar to coal workers pneumoconiosis. Open cut workers during drilling and shot firing operations in the stone overburden are possibly at risk if not protected by proper procedures or cabin sealing. Underground workers when mining or drilling stone roof, floor or igneous intrusion are also at risk.
How does quartz affect you?

Quartz dust can cause fibrous or scar tissue formations in the lungs (silica-induced pneumoconiosis) which reduce the lung’s ability to extract oxygen from the air. Breathing in extremely small dust particles containing quartz can result in a disease of the lungs called silicosis. There is no cure for silicosis, thus prevention is the only answer.

There is evidence to suggest that quartz exposure may increase the risk of lung cancer in persons already suffering from a lung disorder such as pneumoconiosis. The biological pathway for this health effect however is not clear.

What are the symptoms of silicosis?

There are several stages of silicosis and early stages may go unnoticed. Continued exposure may result in shortness of breath when exercising and possible fever. Silicosis makes a person more susceptible to infectious diseases of the lungs and is thought to play a role in the onset of lung cancer. Progression of the disease leads to fatigue, extreme shortness of breath, loss of appetite and pain in the chest, all of which may lead eventually to death.
<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic Silicosis</td>
<td>this is the most common form and occurs 10-30 years after inhalation of high levels of dust</td>
</tr>
<tr>
<td>Accelerated Silicosis</td>
<td>occurs after inhalation of very high concentrations of dust over a relatively short period (5-10 years)</td>
</tr>
<tr>
<td>Acute Silicosis</td>
<td>results from inhalation of exceptionally high concentrations of dust over a very short period (1-5 years).</td>
</tr>
</tbody>
</table>

**How does the body reduce the amount of dust inhaled?**

The human body has three lines of defence of the lung against foreign particles:

(i) Particles being deposited in the upper airways by impaction, sedimentation and diffusion

(ii) Receptors can initiate sneezing, coughing to expel particles

(iii) Receptors can initiate constriction of bronchial smooth muscle as a response to chemical or mechanical irritation.
What are the adverse health effects of inhalable dust?

There is reduced visibility in the work place; it can cause irritation of the eyes & nose; it affects pre-existing conditions such as asthma; and it can cause bronchitis. At this stage there is not enough research to indicate that inhalable dust is a contributor to Chronic Obstructive Pulmonary Disease (COPD) and insufficient evidence to classify coal dust as a carcinogen.

Is any research being carried out on dust related diseases?

Research is continually being undertaken and Coal Services Pty Limited (formerly the Joint Coal Board) through the Standing Dust Committee (SDC) has made important contributions to world scientific literature on the subject. It is only by the co-operation of the mineworker in their medical examinations and dust measurements that any possible adverse affect on health can be detected at an early stage and appropriate action recommended.
**Sampling:**

*What method is used to determine the respirable dust concentration of air in working places?*

The approved sampling method adopted in the New South Wales coal industry is personal gravimetric sampling. In this method, respirable dust is collected from the breathing air very close to the nose and mouth of a mine worker and the amount of dust is then measured by weighing. The weight of fine dust drawn into the lungs gives the most accurate prediction of the likelihood of developing pneumoconiosis (being dusted). The samples are taken by means of a small battery-powered pump worn by the mine worker. The pump is connected with a piece of plastic hosing to a sampling unit (or cyclone) that is clipped to the individual’s shirt. A steady stream of air is drawn through the sampling unit where the coarse dust is first removed and only the very fine respirable dust is collected on a filter and weighed.
What are the purposes of dust sampling?

A comprehensive monitoring programme is continually being carried out to determine whether dust levels at every coal mine are kept below the approved limits and to protect the long term health of mine workers.
**What working places are sampled for respirable dust?**

As per the *NSW Coal Mine Health & Safety Regulation 2006*, mine workers are sampled regularly. For longwall faces, sampling is carried out at intervals not exceeding 6 months on each producing shift. For continuous miner panels, sampling is carried out at intervals not exceeding 12 months on each producing shift. Other underground working places, open cuts, coal preparation plants, crusher and loading stations are all sampled at intervals not exceeding 12 months on only one production shift.

**What is done with the dust results?**

Copies of all results are sent to the Mine Operator, Inspector of Coal Mines and Industry Check Inspector. Following a failed result, the Mine Manager informs the person who was sampled and there is an obligation under the *Coal Mine Health & Safety Act Regulation 2006* to take action to correct the situation. Coal Services through the Standing Dust Committee (SDC) also maintains an overview of the results of the dust sampling programme in mines and where necessary advises the mine management on how to improve the situation. This SDC recommends the display of all results on the mine notice boards.
Should the exposure limits be less for extended shifts?

The current exposure limits for dust and quartz are based on a 40 hour week (8 hour shifts 5 days a week) over a 40 year working life.

For working weeks greater than 40 hours therefore the exposure limit needs to be lower. As a general rule the exposure limit can be adjusted by a factor calculated from the ratio of weekly exposure in a normal work cycle to the average weekly exposure in the extended cycle.

For more detailed information on this matter please refer to the Coal Services Health & Safety Trust research project on “Extended Shift Exposure Limit Adjustment Factors for Coal Mine Dusts”. Website [www.coalservices.hstrust.com.au/](http://www.coalservices.hstrust.com.au/) or contact Coal Services Health & Safety Trust by Email trust@coalservices.com.au
What happens to the results if the person sampled is exposed to one very dusty task for a short time and no dust for the remainder of their shift?

The method of dust sampling is designed to give the average result for the duration of the shift taking into account periods of high and low exposure dust.

The dilution effect of a worker being exposed to a non-contaminated atmosphere following a short but high exposure would therefore be beneficial to the worker such as job rotation during the shift.

One of the key factors involved in the onset of lung dust disease is the total amount of coal dust or quartz that a person has inhaled during their working life. It is not based on whether the person has been exposed to a high level of dust in a single event on one part of a shift or due to a particular mining method.
What method is used to determine the inhalable dust concentration?

The gravimetric method used for respirable dust sampling is also used for inhalable dust sampling. The main difference is the sampling head which collects dust particles below 100 microns rather than only the very small respirable dust particles.

![Dust Particle Size Comparison](image_url)

- **Human Hair**: 89 microns (0.089 mm)
- **Inhalable Dust**: < 100 microns (0.1 mm)
- **Respirable Dust**: < 5 microns (0.005 mm)
What is the location and frequency of sampling inhalable dust?

As per the NSW Coal Mine Health & Safety Regulation 2006, mine workers are sampled regularly. For longwall faces, sampling is carried out on each producing shift at intervals not exceeding 12 months. For continuous miner panels, any part of a mine where cement products are being applied, other underground places including crusher stations, open cuts and coal preparation plants are all sampled on one shift only at intervals not exceeding 12 months.
Exposure Standards:

What is the respirable dust exposure limit in NSW coal mine?

As you will remember, the dangerous dust consists of those very small particles (less than 5 microns in size) which can penetrate deep into your lungs. This is called respirable dust. The limit under the Coal Mine Health & Safety Act 2002 and Regulation 2006 is based on the weight of respirable dust in the air. It is the concentration in milligrams of respirable dust per cubic metre (abbreviated to mg/m$^3$) of air collected in the breathing zone (not inside respirators or airstream helmets) of mine workers during their working shift.

The concentration of respirable dust should not exceed 2.5 mg/m$^3$ over the sampling period.

The concentration of respirable quartz dust should not exceed 0.12 mg/m$^3$ in underground coal mines and not exceed 0.1 mg/m$^3$ in open cut coal mines and the surface parts of underground coal mines.

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1 Approved method for the collection and analysis of airborne dust – see copy of New South Wales Government Gazette No. 185, 21 December 2007 attached
How were the limits determined?

The current coalmine exposure standard was determined after extensive research at a number of NSW coalmines in the early 1980’s and these levels are constantly being reviewed in the light of new research. There has been a steady decrease in dust disease patterns in NSW coalmines over the last 30 years and consequently the Standing Dust Committee considers that compliance with current exposure standards will provide effective protection. The gravimetric measurement of respirable dust and quartz is the internationally recognised technique for monitoring the dust exposure of coal mineworkers.
What is the inhalable dust exposure limit in NSW coal mines?

Inhalable dust is the visible dust particles below the 100 microns size. The limit under the Coal Mine Health & Safety Act 2002 and Regulation 2006 is based on the weight of inhalable dust in the air. It is the concentration in milligrams of inhalable dust per cubic metre (abbreviated to mg/m³) of air, collected from the breathing zone (not inside respirators or airstream helmets) of mine workers during their working shift.

The concentration of inhalable dust should not exceed 10 mg/m³ in all coal mining operations.

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2 Approved method for the collection and analysis of airborne dust – see copy of New South Wales Government Gazette No. 185, 21 December 2007 attached
Control Measures:

What are the most effective methods of dust control?

(i) Adequate ventilation and the application of water, in sufficient quantity and in the correct location, are the best answers to the problem. Since water will not control dust once the dust is airborne, water should be applied as near as possible to the point where the dust is produced in order to wet the dust and prevent it being carried away in the air current. Water sprays are useless unless they are operating effectively.

(ii) Dust capture by using scrubber systems on continuous miners and longwall BSL crusher and discharge to conveyor belt.

(iii) In continuous miner panels, in particular, ventilation must be maintained at the face by erection of tightly fitting brattice or ducting which should be extended systematically so that mine workers are never working ahead of the ventilation.

One of the worst mining practices causing high dust results is working inbye ahead of the ventilation ducting or brattice.
In what way does longwall mining in particular differ from continuous miners in respect to airborne dust hazards?

Longwall mining now provides the most difficult situation for dust control in coal mines, because:
(i) Longwall mining systems produce more coal which equals more coal dust.
(ii) There are different ventilation flow patterns involved.
(iii) Workers’ positions vary in relation to dust sources and ventilation flows
(iv) Additional dust sources for example coal crushers, powered roof support movement, BSL discharge to the conveyor belt

One of the worst mining practices causing high dust results on longwalls is people working on the return side of the shearer.

Many innovations are being tried both in Australia and overseas and have resulted in reduced dust levels and research is continuing to improve current operational standards.
**Where are coalminers exposed to quartz?**

The most common exposures occur, but are not limited to, the following:

**Underground**
- cutting stone roof or floor or stone bands in the seam during continuous miner or longwall operations
- roof bolting or drilling into sandstone or mudstone, dry drilling
- at material transfer and loading points
- in ventilation returns

**Open Cut**
- drilling or shotfiring operations, dry drilling

It is important to remember that respirable dust & quartz particles (which are only a fraction of the width of a human hair) are too small to be seen with the naked eye. Therefore a lack of visible dust does not mean that respirable quartz is not present.

**One of the worst mining practices causing high quartz results is cutting or drilling of stone bands, rolls and / or roof.**
Can exposure to visible dust be harmful such as large dust clouds in an open cut coal mine?

Yes – because they may contain respirable dust and quartz and the large fraction (inhalable dust) is thought to contribute to respiratory disorders.

Visible dust, when breathed in, can cause irritation to the nose and throat. This dust is usually removed by the body’s natural clearance systems (coughing, sneezing, etc). A coal mineworker can be exposed to large clouds of dust but still be within the respirable dust exposure limit. This is a concept that some miners find hard to accept. Excessive dust levels however can cause respiratory disorders such as bronchitis and exposure should be kept to a minimum.

What about using personal protective equipment?

There are numerous respirators approved for use in coal mines and those respirators can be used to minimise a mineworker’s exposure to dust. It is very important that respirators are properly fitted to the individual and are regularly maintained. However, the use of personal respiratory protection is not a substitute for adequate dust control.
What are the key points in the management of airborne dust?

- Isolation or capture of dust sources via sealing of transfer points, BSL, crushers.
- Operating water sprays at appropriate locations and as near as possible to the point of breakage with sufficient water volumes, pressure and correct sizing of water jets / droplets.
- Ventilation of the correct quantities and at the right location.
- Advance ventilation ducting / brattice to standard
- Regular maintenance of dust suppression equipment.
- Operator positioning, job rotation and automation.
- Control of dust levels along travelling roads,
- Respiratory protection by personal protective equipment (PPE)
Further information

The Standing Dust Committee endeavours to provide the industry with the latest information on airborne dust. Publications such as this booklet can be viewed on the Coal Services website at www.coalservices.com.au

Coal Services can also provide information sessions on a range of occupational health exposure issues. Further information and training may also be provided by your employer.
COAL MINE HEALTH AND SAFETY ACT 2002
COAL MINE HEALTH AND SAFETY REGULATION 2006

Notice – Airborne Dust Limits, Collection and Analysis

I, ROBERT REGAN, Chief Inspector under the Coal Mine Health and Safety Act 2002, pursuant to clauses 3, 38(1)(b), 38(1)(d), 38(1)(e), 38(1)(f), and 38(1)(i) of the Coal Mine Health and Safety Regulation 2006 hereby specify:

Limits

1. the following limits for the concentration of airborne dust:

(a) Specified Limits for Respirable Dust – Underground Mines:

The specified limit for quartz-containing dust is 0.12 milligrams of respirable quartz and the specified limit for respirable dust, other than quartz-containing dust, is 2.5 milligrams. These limits are with respect to the mass of respirable dust per cubic metre of air sampled and apply only to the underground parts of underground mines. The limits below for open cut mines apply to the surface parts of underground mines.
(b) Specified Limits for Respirable Dust – Open Cut Mines:

The specified limit for quartz-containing dust is 0.1 milligrams of respirable quartz and the specified limit for respirable dust, other than quartz-containing dust, is 2.5 milligrams. These limits are with respect to the mass of respirable dust per cubic per cubic metre of air sampled. These limits also apply to coal preparation plants.

(c) Specified Limits for Inhalable Dust – All Coal Operations:

The specified limit for inhalable dust is 10 milligrams. This limit is with respect to the mass of inhalable dust per cubic metre of air sampled.

Collection and Analysis

2. the following criteria for arrangements for the regular collection and analysis, by a licensed person independent of the operation, of airborne dust from the breathing zone of people whose health may be affected by the dust:

(a) Frequencies of sampling, places and persons to be sampled

The frequency of sampling, places and persons to be sampled in each part of a mine is not to be less than as specified in the Table below according to the operations in that part of the mine.
<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
<th>Column 4</th>
<th>Column 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Frequency of sampling respirable dust</td>
<td>Frequency of sampling respirable quartz-containing dust</td>
<td>Frequency of sampling inhalable dust</td>
<td>Persons to be sampled</td>
</tr>
</tbody>
</table>
| (a) In each part of a mine where longwall mining is carried out. | Each producing shift at intervals not exceeding six months. | Each producing shift at intervals not exceeding six months. | Each producing shift at intervals not exceeding twelve months. | Samples to be collected from the breathing zone of at least five persons including, where possible:  
  - A Shearer operator.  
  - Two powered support operators.  
  - A deputy. |
<table>
<thead>
<tr>
<th>Location</th>
<th>Frequency of sampling respirable dust</th>
<th>Frequency of sampling respirable quartz-containing dust</th>
<th>Frequency of sampling inhalable dust</th>
<th>Persons to be sampled</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>One other person selected by the Manager of Mining Engineering.</td>
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<tr>
<td>b) In each part of a mine where a continuous mining machine operates.</td>
<td>Each producing shift at intervals not exceeding twelve months.</td>
<td>Each producing shift at intervals not exceeding twelve months.</td>
<td>At intervals not exceeding twelve months.</td>
<td>Samples to be collected from the breathing zone of at least five persons including, where possible:</td>
</tr>
<tr>
<td>Column 1</td>
<td>Column 2</td>
<td>Column 3</td>
<td>Column 4</td>
<td>Column 5</td>
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</tr>
<tr>
<td>Location</td>
<td>Frequency of sampling respirable dust</td>
<td>Frequency of sampling respirable quartz-containing dust</td>
<td>Frequency of sampling inhalable dust</td>
<td>Persons to be sampled</td>
</tr>
</tbody>
</table>

- A continuous miner driver
- A sideman or cable handler
- A shuttle car driver
- A deputy, and
- A bootend attendant or other person
c) In any part of an underground mine where cement products are being applied.

<table>
<thead>
<tr>
<th>Location</th>
<th>Frequency of sampling</th>
<th>Respirable Dust</th>
<th>Respirable Quartz-Containing Dust</th>
<th>Inhalable Dust</th>
<th>Persons to be Sampled</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At intervals not exceeding twelve months.</td>
<td></td>
<td></td>
<td></td>
<td>Samples to be collected from the breathing zone of at least two persons including, where possible:</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td>- Persons loading cement into a mixer.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Persons spraying or applying cement products.</td>
</tr>
<tr>
<td>Column 1</td>
<td>Column 2</td>
<td>Column 3</td>
<td>Column 4</td>
<td>Column 5</td>
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</tr>
<tr>
<td>Location</td>
<td>Frequency of sampling respirable dust</td>
<td>Frequency of sampling respirable quartz-containing dust</td>
<td>Frequency of sampling inhalable dust</td>
<td>Persons to be sampled</td>
<td></td>
</tr>
<tr>
<td>d) In any place in or about an underground mine other than those referred to in a), b) or c) above, but including crusher stations.</td>
<td>At intervals not exceeding twelve months.</td>
<td>At intervals not exceeding twelve months.</td>
<td>At intervals not exceeding twelve months.</td>
<td>Samples to be collected from the breathing zone of at least one person.</td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Frequency of sampling respirable dust</td>
<td>Frequency of sampling respirable quartz-containing dust</td>
<td>Frequency of sampling inhalable dust</td>
<td>Persons to be sampled</td>
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<tr>
<td>e) In any place in or about an open cut mine where dust may be present.</td>
<td>At intervals not exceeding twelve months.</td>
<td>At intervals not exceeding twelve months.</td>
<td>At intervals not exceeding twelve months.</td>
<td>Samples to be collected from the breathing zone of at least five persons including where possible.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Drill operators, shotfirers and stemmers.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>- Mobile equipment operators.</td>
<td></td>
</tr>
<tr>
<td>f) In any place in or about a coal preparation plant where dust may be present.</td>
<td>At intervals not exceeding twelve months.</td>
<td>At intervals not exceeding twelve months.</td>
<td>At intervals not exceeding twelve months.</td>
<td>Samples to be collected from the breathing zone of at least five persons where available.</td>
<td></td>
</tr>
</tbody>
</table>
Note:

1) The Table gives minimum locations, frequencies and persons for sampling only. The Nominated Operator has an obligation to maintain a workplace that is compliant with the airborne dust requirements pursuant to the Coal Mine Health and Safety Regulation 2006. Where difficult, dusty, or unusual circumstances occur then the Nominated Operator is obliged to implement more rigorous sampling arrangements suitable to the circumstances.

2) Any further samples required by regulation will be additional to these frequencies.

3) Persons sampled must, as far as possible, remain at the same job for the duration of the test.

4) In the case where the Manager of Mining Engineering selects the person to be sampled he must select those activities where persons are likely to be exposed to airborne dust.

5) Failed samples are to be re-sampled.

6) A Government Official may direct the Nominated Operator to arrange for a licensed person to collect samples of airborne dust and to analyse those samples. The direction may include the location, time and working conditions for the taking of samples.

(b) Determination of respirable dust

Samples are to be collected and analysed in accordance with Australian Standard AS2985 (Workplace Atmospheres – Method for Sampling and Gravimetric Determination of Respirable Dust), except where varied by this notice.
(c) Determination of respirable quartz

The preferred methods of determination of respirable quartz are one of either ‘The Potassium Bromide Disc Infra Red Method’ or ‘The X-ray Diffraction Method’ as described in “guidelines for Determination of Respirable Quartz”, publication MDG 3006 MRT 6, published by the Department of Primary Industries.

(d) Determination of inhalable dust

Samples are to be collected and analysed in accordance with Australian Standard AS3640 (Workplace Atmospheres – Method for Sampling and Gravimetric Determination of Inhalable Dust), except where varied by this notice.

(e) Sampling

Where practicable, sampling should commence at the start of the shift and cease at the end of the shift and be as close as practicable to the working place, for example, “crib room to crib room”. The minimum sampling period is five hours.
Definitions:

3. In this notice:

“airborne dust” includes both respirable and inhalable dust, it is also known as “airborne particulate matter” or “airborne particulates”;

“quartz-containing dust” means respirable dust which contains five percent or more by mass of respirable quartz;

“respirable dust” has the same meaning as it has in Australian Standard 2985-2004 (Workplace Atmospheres – Method for Sampling and Gravimetric Determination of Respirable Dust);

“respirable quartz” means the quartz present in respirable dust;

“inhalable dust” has the same meaning as it has in Australian Standard AS3640 (Workplace Atmospheres – Method for Sampling and Gravimetric Determination of Inhalable Dust.

This notice commences on the 22\textsuperscript{nd} of December 2007.

Dated this 17\textsuperscript{th} day of December 2007.

ROBERT REGAN,
Chief Inspector