ADDITIONAL INFORMATION PROVIDED TO THE NATIONAL OCCUPATIONAL HEALTH & SAFETY COMMISSION (NOHSC)

REGARDING THE
PROPOSED AMENDMENTS TO THE

NATIONAL EXPOSURE STANDARD FOR CRYSTALLINE SILICA

BY THE

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1. INTRODUCTION

Government intervention typically occurs where there has been market failure. That is, where behaviour in an industry sector results in unacceptable risks to customers, the community generally or the environment. These risks generally increase over time and are recorded or can be quantified is some manner.

In the case of crystalline silica dust the proposal to increase the standard is based on:

- An understanding of selected international standards in particular from the United States of America; and
- The Western Australian Department of Health's report.

In its first submission on this matter the CMPA raised serious doubts about the conclusions drawn from the Western Australian Report. These doubts should either lead to a cessation of action in the matter or to a strategy that sets in train an organised search for data so that informed decisions can be made about the standard of silica in the future, that is, once sufficient data is collected.

Notwithstanding the tenuous basis for any action, NOHSC has sought information from industry about the cost impacts of the introduction of the proposed new standard.

The CMPA, as a responsible organisation intent on ensuring optimum outcomes for both the industry as well as those engaged in it, provides information in this Paper that, it is hoped, will inform decision-makers about the impact of the proposed changes to the standard. It must be recognised that unsafe exposure levels in the quarry industry are generally centred around exposure to **certain essential quarry activities rather than confined to particular tasks of employees**. The greatest difficulty therefore is in managing this exposure.

2. UNITED STATES OF AMERICA

Differing claims are made in various forums about the existing standard of silica exposure in the USA. The CMPA understands the following to be the current state in relation to silica standards in that country:

- There has been a move from various groups to link exposure to silica dust with lung cancer but these have been found to be unproven.
- There are two exposure standards in America: 0.1micrograms/m^3+ 0.1 micrograms/m^3 for the mining/quarrying sector and a range of 0.09-0.12 micorgrams/m^3 for general industry (depending on the concentration of silica in the ore body being used eg if in the glass industry the allowed exposure would be at the higher range).
- The method for measuring silica concentration is different to the Australian method which adopts the United Kingdom's approach (BMRC is picked up in the Australian standard).
- The essential difference between the two approaches is in the volume of air that passes through a quantity of water. (1.9-1.7 litres per minute). The American method employs the lower quantity and it is therefore estimated that there is a 10% difference in the measures.

- Lobby groups within the country are campaigning for the exposure standards to be lowered but no decisions have been made as yet and strong opposition to this stance is based on an inability to achieve any lowering of the exposure levels.

The difficulty in achieving lower exposure standards is the Victorian experience as well. Data provided to the NOHSC representatives at the meeting with the CMPA on 17 May 2004 illustrated this point where personal respirable crystalline silica monitoring data was provided for a 15-year period until 2004. The data recorded 276 samples with an average of 0.18mg/m^3 for the period with a high of 5.5 and low of 0.01mg/m^3. Importantly, of the 276 samples, 41 exceeded 0.2 with a further 72 exceeding 0.1mg/m^3. 123 exceeded 0.05mg/m^3.

These results, which do not take into account the use of personal protection equipment (PPE), illustrate the point that the industry is already finding meeting existing standards very difficult and in many cases is not complying. Achieving lower exposure levels, if indeed this is practical, must necessarily require significant capital upgrading of plant and equipment generated from systems of management designed to contain emissions of dust. The Victorian quarry industry regulator has indicated the use of PPE must not be regarded as the industry's sole response to achieving required exposure levels.

The CMPA supports this position which can be best explained by Maxwell[1] when he says

> *"...there is universal condemnation of the notion that exposure to the risk of injury or death in the workplace is simply "the price you pay for having a job". On the contrary, it is agreed that is the job cannot be done safely, it cannot be done."*

3. IMPACT COST OF THE PROPOSED CHANGE TO THE EXPOSURE STANDARD

In the very limited time available to consider this, the CMPA has chosen to assess the impact of the proposal on the basis of a cost per tonne of producing quarry product. This approach has been chosen because in this very competitive market every business activity affects costs and this is reflected in the rate per tonne of product that can be sold. Reliable information systems are therefore in place to track and assess these impacts.

3.1 Methodology

In assessing the impact of the proposal a medium-sized quarry has been selected as the model. The following assumptions are adopted:

Plant Model

- The site crushes approximately 200,000 to 250,000 tonne per year.
- The value of fixed plant is approximately $4.9m.
- The total hours of employees and contractors are 15,000 hours or 6 people full time.
- The source material is hornsfels.
- The model excludes transports leaving the site (i.e. delivery drivers).
- Management of the site consists of one Quarry Manager and one trainee Manager.

[1] p6. Maxwell, C. March 2004. Occupational health and safety act review. State of Victoria.

- Mobile plant includes:
  1 sales loader 8.5m bucket
  1 dump truck (face) 40 tonne size
  1 excavator 40 tonne size
  Hire of 1 water tank 3600 gallon capacity
  Hire of 1 drill rig
- Fixed plant includes 4 screens, 4 crushers and 22 conveyors.
- The plant is less than 10 years of age.
- Crushing plant is not in buildings.
- Only 70% of water is available on-site at a cost of $100/ML. Off-site water is purchased at $155/3,600litres.
- The site is working to the work plan and complying to the regulator's requirements.
- The site has an access road of 1km.

<u>To meet Level 1 compliance</u>
- The site's plant dust collection is a 5 bag house system.
- A belt filter for removing water from fines or like capital is installed.
- The site's dust suppression involves:
  - Sealed roads to weighbridge
  - Wash down of tracks
  - Product restricted road systems
  - On-going rehabilitation
  - Minimal stockpile capacity
  - Increased plant size to pick up the demand for sales
  - Full plant hard stand
  - Wash down of all discharge points (full wash down or water mixed)
- The total value of the fixed plant is approximately $5.7 million.

3.2 Analysis

In assessing costs estimations have been made of the model site making changes to achieve the following silica exposure levels:

Level 1: <0.1mg/m^3
Level 2: 0.1-0.2mg/m^3
Level 3: >0.2mg/m^3

A range of cost types have been identified and these are attached as Appendix 1. As will be seen there are initial capital costs of upgrading equipment and ongoing costs associated with achieving and maintaining the levels. The data has been discounted (by $1.98 per tonne) for those sites that have not adopted best practice in silica suppression to date.

The results of the analysis as shown in Table 1 reveal a unit cost per tonne of $11.56 in the first year with ongoing costs of $3.13 per tonne for less than 0.1mg/m3, $7.26 and $2.01 for levels between 0.1 and 0.2mg/m^3 and $3.88 and $1.11 for levels greater than 0.2mg/m3.

Table 1 Impact Cost/tonne for various standards

Cost Type	Level 1 <0.1mg/m^3	Level 2 0.1-0.2mg/m^3	Level 3 >0.2mg/m^3
Initial capital upgrade	$8.43	$5.25	$2.77
1st year maintenance costs	$3.13	$2.01	$1.11
Total 1st Year Impact Cost	**$11.56**	**$7.26**	**$3.88**
Ongoing maintenance costs	$3.13	$2.01	$1.11

This analysis **has not taken into account** the following issues that will also impact on costs:

- Increased unit rate for the sale of products – that is, material being drawn from other areas, increased transport/Greenhouse gas impact and profound impacts on public infrastructure and private development.
- Ability to finance these projects – these upgrades will be difficult to finance as they will not result in increased production.
- Skills of the existing workforce to enact the projects – as reflected by the analysis the industry has a huge catch-up to achieve even existing standards.
- Life of the existing resource – this could result in an inability to comply.
- Effect on the end users of the products – not all users are able to use wet products (eg concrete and road construction)
- Selective capital acquisitions
  - Long term meeting stringent dust management and compliance objectives
  - Plant (both fixed and mobile) and building upgrades & replacement
- Demand crushing
  - Flexibility of crusher systems to match the market

3.3 Extrapolating Unit Costs to the Victorian Quarry Industry

Most Australian states lie on rock containing crystalline silica within the rock matrix which is freed in the crushing and handling process. Victoria is the exception as in the large part it is situated on basalt flows that do not contain crystalline silica within the matrix. With this in mind and taking into account other rock types that contain less than 20% crystalline silica within the matrix, it can be established that only 55% of Victorian material contains more than 20% crystalline silica within the matrix[2].

It is important to note that this figure includes the sand fraction of 19% of the state's total tonnage[3] which is not typically crushed thereby reducing the opportunity for crystalline silica to be freed from the matrix. Sands are historically identified as not having an issue with crystalline free silica exposure however preliminary respiratory testing has indicated that there is potentially an issue.

[2] Based on DPI returns between the 1997-98 period and 2002-03 period. Appendix 2
[3] Based on the IOQ statistics, sand is produced at a rate of approximately 3 to 1 against gravel. Appendix 3

Removing the sand fraction, it can be stated that approximately 36% of Victoria's tonnage would have an identifiable issue with crystalline free silica. Using the data available from the DPI, Victoria's total tonnage in 2002-03 was approximately 37,521,000 tonnes. Thus, it can be stated that approximately 14,220,000 tonnes of the 2002-03 Victorian tonnage will be immediately affected by the NOHSC proposal.

Table 2 provides estimations of the cost impact upon the abovementioned tonnage with more than 20% crystalline silica. It can be seen that adopting a level of 0.1-0.2mg/m3 will incur costs of $148m in the first year with ongoing costs of $40m.

Table 2

Impact Cost on Victorian Production ($)

Cost Type	**Level 1 <0.1mg/m^3 @ $11.56**	**Level 2 0.1-0.2mg/m^3 @ $7.26**	**Level 3 >0.2mg/m^3 @ $3.88**
Total 1st Year Impact Cost	$147,906,680	$92,889,492	$49,643,420
Ongoing maintenance costs	$40,047,398	$25,717,338	$14,202,112

3.4 Australian Quarry Industry Context

There is no available data from a government body that consolidates the production of quarry materials across Australia. This information is however is available from the Institute of Quarrying as seen in Appendix 3.

It is important to recognise however that there are discrepancies between the IOQ data and that presented by the Victorian DPI. As the DPI is the industry regulator, it can be safely assumed that the data presented by the DPI is correct. In the data presented for 2000-01, this will result in a 35% underestimation of Victoria's tonnage by the IOQ. It can therefore be reasonably argued that the other states would be similarly underestimated however; a correction will only be made for the Victorian data in the IOQ figures.

When manipulating the IOQ data to give a representation of the country's potential silica issue, it is important to realise that a higher level of crystalline silica will be found in other states as discussed in section 3.3. This difference can be assumed to be around 15% higher than Victoria (55% of tonnage which contains more than 20% crystalline silica within the matrix), that is 70% of Australia's tonnage contains more than 20% crystalline silica within the matrix.

Using Victoria's data, it is taken that approximately 20% of material is sand which is not typically crushed (see section 3.3).

As such, it can be stated that of Australia's total tonnage of approximately 124 million tonnes, approximately 62 million tonnes will be immediately affected by the NOHSC proposal[4].

[4] This includes the adjustment for the Victorian data and excludes the 20% of materials recorded as sands.

Table 3 provides an estimate of the impact of the NOHSC proposal on the Australian quarrying industry. These very conservative estimates show that the proposal will cost approximately $717m to implement standards below 0.1mg/m^3 in the first year and have ongoing maintenance costs of $194m. Production data for Victoria has remained relatively constant with only a marginal increase over the period since 2000/01. Using this as an illustration of Australia-wide conditions the results of this analysis are unlikely to be reduced with more recent Australian data.

Table 3

Impact Costs for Australian Quarrying Industry ($)

	Level 1 <0.1mg/m^3 @ $11.56	**Level 2 0.1-0.2mg/m^3 @ $7.26**	**Level 3 >0.2mg/m^3 @ $3.88**
Total 1st Year Impact Cost	$716,720,000	$450,120,000	$240,560,000
Ongoing maintenance costs	$194,060,000	$124,620,000	$68,820,000

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