

**SUBMISSION OF  
THE NEW ZEALAND MINING INDUSTRY  
SAFETY COUNCIL (MinEx)  
TO WORKSAFE  
ON**

**Consultation on Workplace Exposure Standard (WES-TWA) for  
Quartz (Crystalline Silica) as Respirable Dust  
7 August 2015**

**CONTACT:**

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**Organisation: MinEx**

**Position: CEO**

### INTRODUCTION

MinEx<sup>1</sup> welcomes the opportunity to submit on the Workplace Exposure Standard (WES-TWA) for quartz (crystalline silica) as respirable dust. We note the submission deadline of 7 August 2015.

### SUBMISSION

#### Introduction

This submission is a submission on behalf of all of the Extractive industry and particularly the MinEx members listed in Attachment I.

Accordingly this submission represents the views of all of those industry organisations and companies that are MinEx members with the exception of the EPMU who have submitted separately.

Worksafe has invited comment on:

1. the proposed 8 hour TWA WES value of 0.025mg/m<sup>3</sup> for respirable quartz;
2. the feasibility of meeting the proposed WES value; and,
3. the sampling and analytical methods that are proposed and the suitability of those methods in New Zealand.

#### The WorkSafe Technical Report

WorkSafe have supplied a report by TERA entitled *Occupational Exposure Limit Evaluation: Silica, Crystalline Quartz* dated 2 December 2014 in support of the proposed WES value.

This report looks at the various agencies around the world involved in establishing variations of workplace exposure standards and recommended:

*The OSHA evaluation is the most reliable source for an OEL recommendation since they have evaluated the most recent literature for their assessment. Risk estimates for silicosis at the proposed PEL of 0.05 mg/m<sup>3</sup> is 20 and 55 in 1,000 for pottery workers and miners, respectively. Risk estimates for lung cancer at the proposed PEL of 0.05 mg/m<sup>3</sup> ranged from 6-26 deaths per 1,000 for 45 years of exposure and ranged from 3-22 deaths per 1,000 for the OSHA action level of 0.025 mg/m<sup>3</sup>. A threshold effect level of 0.036 mg/m<sup>3</sup> (45 years exposure) for the lung burden associated with inflammation that is a precursor to silicosis was determined from a rat/human toxicokinetic/toxicodynamic model. Given that silicosis and lung cancer risk estimates are above 1 at 0.05 mg/m<sup>3</sup> exposure level and an inflammation threshold effect level was modeled at 0.036 mg/m<sup>3</sup>, an OEL of 0.025 mg/m<sup>3</sup> is recommended to protect against both silicosis and lung cancer.*

#### MinEx Submission

##### Expert Report

Given the highly technical nature of the proposal, the industry has commissioned an expert report on the WorkSafe proposal. The technical report appears in Attachment II and forms part of the MinEx

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<sup>1</sup> MinEx is the national Health & Safety Council for the New Zealand quarry, coal and minerals industry. Its main purpose is to help industry to improve its health and safety performance, and to provide centralised industry representation on matters relating to health and safety.

submission.

A short summary of the expert's conclusions follows.

1. TERA use OSHA, NIOSH and ACGIH evaluations to recommend a respirable quartz standard that is 50% of the value given in the OSHA proposed rule for US industry and one eighth of the current New Zealand WES-TLV. TERA is also a US based organisation and influenced by the different legislative approaches (adversarial or consensual) taken in respect of minimising risk and achieving compliance.
2. The earliest safe limit for dust of less than 10 mppcf (million particles per cubic foot) was obtained from the Vermont epidemiological survey. When converted to respirable quartz exposure this is approximately  $0.2 \text{ mg/m}^3$  and is the source of most standards used outside of the US when gravimetric sampling was introduced in the 1970's. This standard has been demonstrated to eliminate silicosis where it has been diligently applied.
3. Most of the epidemiological studies used by the US organisations to support standards for respirable quartz underestimate the actual exposures by using the ACGIH conversion factors and thus inflate the potential hazard to silicosis at low respirable quartz levels. In addition, conversion errors in the South African exposure estimates have compounded the proliferation of studies that underestimate respirable quartz exposures.
4. Regulatory reliance on respirable quartz assessments requires that measurements are accurate. Unless a laboratory is routinely and independently tested there can be significant errors. This is particularly true for infrared spectroscopy (IRS) and it may be necessary to use X-ray diffraction (XRD) on fewer samples with estimates based on a fraction of quartz content of the host rock for the rest of the respirable dust measurements.
5. The link between exposure to quartz and cancer was postulated in the 1990's mainly based on the results of non-human studies (*in vitro* and *in vivo*). To date, no definitive link has been found at normal respirable quartz exposure levels with any cancers found related to other confounders (carcinogens) such as smoking.
6. There is no evidence for any acute or short term effects from typical respirable quartz exposures and, any extended shift or week reductions such as provided by the Brief and Scala adjustment are unnecessary. If significantly more hours are worked in a year, a pro rata reduction based on a standard working year of 1920 hours can be applied.

### MinEx's Submission

Consequently, the expert recommended and we submit:

- A. **The proposed WES value of  $0.025 \text{ mg/m}^3$  (measured as crystallized quartz) is too low and that the recommended exposure standard for respirable quartz should remain the current  $0.2 \text{ mg/m}^3$ .**
- B. **No additional allowance should be imposed for extended shifts other than a pro rata adjustment if the working year exceeds 1920 hours.**

MinEx has collected silica sampling results from existing underground and opencast mines as well as quarries and analysed the results against both the existing and proposed WES with the following results:

1. All samples taken from an underground gold mine would pass the proposed WES;

2. 80% of samples taken on a single day in a Christchurch alluvial aggregate quarry would fail the proposed WES while all samples passed the current WES;
3. 72% of samples taken from an opencast gold mine would fail the proposed WES while all samples passed the current WES; and,
4. 53% of samples taken from various aggregate quarries across the north and south islands since 2004 would fail the proposed WES while only 4% or 3 samples failed the current WES.

In buildings, dust extraction is an option operators have to control silica along with PPE. Dust filters in air conditioners are clearly an option in mobile plant. Obviously dust suppression and PPE are the only options in the open-air.

Any control measures required for the proposed WES will add cost to mining and quarrying operations. There is a risk that some operations would not be able to fund the capital improvements required and would close.

Based on the advice of our expert, the lowering of the WES is highly unlikely to have any effect on reducing the incidence of silicosis. Current rare examples of silicosis are most likely to result from isolated non-compliance with the current WES and there is nothing to suggest that lowering the WES will change the behaviour of these errant operators.

In conclusion: the proposed WES value of  $0.025\text{mg}/\text{m}^3$  would not be able to be met by many opencast mines and quarries.

Consequently MinEx submits:

- C. **Mine and quarry closures along with increased costs of aggregates are a real possibility if the proposed WES is adopted with the MinEx expert advising that this would be for no beneficial effect whatsoever.**

Submitters have been asked in the response form to submit on the sampling and analytical methods that are proposed and the suitability of those methods in New Zealand. No such methods have been proposed.

### ATTACHMENT I – MINEX MEMBERSHIP

This submission is made on behalf of the following list of MinEx members.

A B Equipment Ltd	McGregor Concrete Ltd
A B Lime	Mike Edridge Contracting Ltd
Atlas Quarries Ltd	MITO
Bellingham Quarries Ltd	Monovale Sand Quarry Ltd
Birchfield Coal Mines Limited	New Creek Mining
Blackhead Quarries Ltd	Newmont
Bradken Resources Pty Ltd	NZ Steel
Brightwater Engineering	Oamaru Shingle Supplies Ltd
Buller Coal Limited	OceanaGold
Burkes Creek Coal	ORICA Mining Services
Byfords Construction Co Ltd	Origin Quarries Ltd
Christchurch Ready Mix Concrete Ltd	Perry Resources (2008) Ltd
CRL Energy Ltd	Porritt Sand
Digger School	Porter Group
Downer Edi Works Ltd	Prenters Aggregates Ltd
Envirofert Ltd	Pukepoto Quarries Ltd
First Break Mining & Construction Ltd	Quality Roding & Services (Wairoa) Ltd
Francis Mining Co Ltd	Rangitikei Aggregates Ltd
Fulton Hogan Ltd	Ravensdown Fertiliser Co-op
Glencoal Energy Ltd	RealSteel
Goughs	RedBull
Green Vision Recycling Ltd	River Run Products Ltd
Groeneveld New Zealand Ltd	Roa Mining Co Ltd
H G Leach & Co Ltd	Road Metals Co Ltd
Harliwich Holdings Ltd	Roding New Zealand
Hauraki District Council	Rock Products Ltd
Higgins Aggregates Ltd	Rocktec Ltd
Higgins Contractors Wairarapa	Sandvik Mining & Construction Ltd
Holcim (New Zealand) Ltd	Selwyn Quarries Ltd
Holcim (NZ) Ltd Kiwi Point Quarry	Sibelco NZ Ltd
Horokiwi Quarries Ltd	Solid Energy NZ Ltd
Huntly Quarries Ltd	Southern Aggregates Ltd
Infracon Aggregates	Stevenson Resources Ltd
J Swap Contractors Ltd	Stevensons Mining
K B Contracting & Quarries Ltd	Taupo Scoria Ltd
Kai Point Coal Co Ltd	Taylor Coal Ltd
Kaipara Excavators	Taylor's Contracting Co Ltd
Kenroll Industrial Coal (2011) Ltd	The Isaac Construction Co Ltd
Lake Road Quarries	Total Lubricants/Oil Imports
Liebherr Australia Pty Ltd	Transdiesel Ltd
Longburn Shingle Company Ltd	Tyreline Distributors Ltd

# Submission:

## Workplace Exposure Standard (WES-TWA) for Crystalline Silica

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Materials Processing Ltd  
Maungaraki Lime Ltd  
McCallum Bros Ltd

Victory Lime 2000 Ltd  
Waiotahi Contractors Ltd  
WaterCare Laboratory Services  
Wharehine Ltd  
Winstone Aggregates

MinEx board members include representation from:

- Straterra
- the AQA
- Civil Contractors Inc
- the NZ branch of the IOQ
- the NZ branch of the AusIMM and
- the EPMU.

## ATTACHMENT II

Digital copy of the expert's report as file: DUST1501R1g FINAL.pdf.

**Report to MinEx New Zealand**

**Attention Mr L McCracken**

**Regarding respirable crystalline silica (quartz)  
standards and measurement for New Zealand  
workplace exposure standards**

**by**

**Dr Michael John Howes**

**of**

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**31 July 2015**