

3 May 2019

Safe Work Australia
GPO Box 641
CANBERRA ACT 2601

Dear Sir/Madam,

SWA DRAFT EVALUATION REPORT – RESPIRABLE CRYSTALLINE SILICA

The Chamber of Minerals and Energy of Western Australia (CME) appreciates the opportunity to comment on Safe Work Australia's (SWA) draft evaluation report for Respirable Dust Crystalline Silica (RCS).

CME is the peak resources sector representative body in Western Australia (WA). CME is funded by its member companies who are responsible for most of the State's mineral and energy production and employment of the sector's workforce.

In 2017-18, the value of WA's mineral and petroleum industry was \$115 billion. Iron ore is currently the State's most valuable commodity at \$61 billion. Petroleum products (including LNG, LPG, crude oil, condensate and natural gas) followed at \$26 billion, with gold third at \$11 billion. Both commodities saw an increase in value of 39 and 5 per cent respectively from the previous financial year.

The resources sector is a major contributor to the local, State and Australian economy, with an estimated \$108 billion of WA projects in the pipeline. The value of royalties from the sector totalled \$5.8 billion (iron ore providing 77%), accounting for 19 per cent of the State Government's revenue.¹

Summary of Recommendations

A summary of recommendations is included below with further supporting detail outlined in the following submission.

- CME does not support SWA's proposed WES value of 0.02mg/m³ and recommends the proposal be reconsidered using a pragmatic methodology that considers a more appropriate suite of evidence and available information. Further detail on this position is outlined below.
- CME considers the evidence used in the review to be limited and recommends SWA include a more robust scientific evidence base including data from the Australian mining industry regarding health incidence of silicosis which has utilised acceptable diagnostic tools.
- There are significant practical challenges associated with measuring and analysis of RCS at the levels required to comply with SWA proposed WES. CME recommends SWA take a more holistic approach when considering WES values that considers the feasibility and practicality of implementing the change. Failure to do so is not in the best interest of health outcomes.

¹ Department of Mines, Industry Regulation and Safety, 2017-18 Statistics digest: Industry activity indicators, October 2018: http://www.dmp.wa.gov.au/Documents/About-Us-Careers/Stats_Digest_2017-18.pdf

Context

The WA resources sector is committed to the health and safety of its workforce. As with all health and safety hazards, industry take a risk-based approach to the management of occupational health hazards.

Crystalline silica is a commonly occurring mineral in the earth's crust and is present in minerals of almost all types of rock, sands, clay, shales and gravel. Inhalation of crystalline silica of a respirable size (less than 10µm) can penetrate deep into the lungs and cause damage. The degree of lung damage increases with the dose (cumulative exposure). Given the nature of mining and exploration operations in the WA resources industry, the sector is one of many industries where crystalline silica is often present. Therefore worker exposure to RCS is a risk that needs to be managed.

Exposure standards are levels of airborne concentrations of a particular chemical or substance in the workers' breathing zone that should not cause adverse health effects or undue discomfort to nearly all workers. Under model work health and safety (WHS) law, WES's are legal concentration limits that must be adhered to. Although WA has not yet adopted model WHS legislation, mandatory workplace exposure standards (WES) currently exist in line with the WA *Mines Safety and Inspection Act 1994* and supporting regulations which require employers to establish and maintain a system for the surveillance of the health of their employees. Further, it should be noted, WA is taking steps towards harmonising its WHS laws and under the WA State Government's current timeline a version of the model WHS laws will be adopted in 2020.

It is important to note that exposure standards establish a maximum statutory limit, they do not identify a dividing line between a healthy or unhealthy working environment.² Variations in the susceptibility of individuals and with natural biology mean some people might experience adverse health effects below the exposure standard. As such, they are used by hygiene professionals as a tool assess workplace situations and do not represent quantitative estimates of risk at different exposure levels.

In line with industry's risk-based approach to managing occupational health hazards, the WA resources sector's focus is on ensuring the risks associated with contaminant exposure are minimised to as low as reasonably practicable (ALARP) levels. This approach aims to achieve the highest possible level of protection as opposed to simply complying with a set exposure standard. Exposure standards play an important role in this approach and are commonly used to assess exposure to contaminants and to review the effectiveness of controls.

Given the role of exposures standards in managing exposure, CME has from the outset supported ongoing reviews of WES values to ensure that workers are protected from the development of occupational illnesses, as outlined in our previous submissions on the matter ([2015](#) and [2018](#)).

Currently in Australia, the workplace exposure standard (WES) set by SWA for RCS is an 8 hour time weighted average (TWA) of 0.1mg/m³. SWA is proposing to reduce this to 0.02mg/m³. Adopting this proposal would make it the lowest in the world. CME notes the only countries to currently have exposure standards below 0.1 mg/m³ for RCS are Finland (0.05 mg/m³), South Korea (0.05 mg/m³), The Netherlands (0.075 mg/m³) and the United States of America (USA) – the National Institute for Occupational Safety and Health (NIOSH) (0.05 mg/m³), Association Advancing Occupational and Environmental Health (ACGIH) (0.025 mg/m³).

² ACGIH (2015). Documentation of the TLVs and BEIs with Other Worldwide Occupational Exposure Values - CD-ROM version (7th Edition Documentation). American Conference of Governmental Industrial Hygienists Cincinnati, Ohio.

WES review methodology

When reviewing WES values, CME's 2018 submission stressed the importance of quality review processes that use data from multiple trusted sources and consider not only available research but practical and pragmatic aspects of exposures. CME is concerned the methodology used by SWA to make the current recommendation of a 0.02mg/m³ WES value for RCS is fundamentally flawed and omitted consideration of critical information.

The recommendation is 'health-based' meaning it is based purely on available academic health literature, which is limited. This methodology sets a standard at a level where known adverse health effects are unlikely to occur. This level is sometimes referred to as the 'no observed adverse effect level' (or the NOAEL/NOAEC). The draft evaluation report clearly states: "There is no clearly defined NOAEC (no observed adverse effect concentration) in humans" however studies have indicated NOAECs in animals.

Further, the review did not consider the practicality or feasibility of implementing the change nor has it considered other available statistics related to health outcomes, for example that are available through state regulators. Further information in relation to all these aspects is outlined in greater detail in below sections of the submission. By way of example, there are serious issues with measuring and analysis of RCS at the low levels proposed that warrant consideration as part of this review.

An alternate approach to setting exposure standards is a "pragmatic" approach. Pragmatic exposure standards take a range of factors into account, for example, the cost of compliance and technical feasibility and are also used where there are difficulties with measurement. Currently, SWA do not distinguish which WES values were set using a health based methodology and a pragmatic methodology.

Given that potential health impacts were considered in isolation and not based on an appropriate suite of considerations and evidence, as outlined in the below submission, CME considers adopting a health-based recommendation in this instance is simplistic and overly conservative.

CME is also concerned adopting such a conservative approach, in the absence of supporting evidence, will have a damaging effect on the way risks in this area are managed. As noted above, the WA resource sector focuses on managing exposures to levels ALARP. This is important as WES values are not 'a line in the sand' between safe and unsafe levels. The ALARP approach is strongly supported by the Australian Institute of Occupational Hygienists, Inc. (AIOH) as outlined in the *Respirable Crystalline Silica and Occupational Health Issues Position Paper* (AIOH Position Paper) published in December 2018. AIOH is Australia's premier professional association representing the interests of occupational hygienists. They aim to promote and preserve the health and wellbeing of Australian workers through application of the knowledge, practice and standing of occupational health and occupational hygiene and are a highly regarded body in the occupational health space.

An unnecessarily conservative WES value risks driving a compliance based culture whereby the focus is simply on complying with an exposure standards and not striving for continuous improvement to reduce exposures to ALARP levels. CME is concerned the current proposal will drive a compliance based culture in this regard.

CME does not support SWA's proposed WES value of 0.02mg/m³ and recommends the proposal be reconsidered using a pragmatic methodology that considers a more appropriate suite of evidence and available information. Further detail on this position is outlined below.

Toxicological Information

It is imperative the development and review of WES values is based on all relevant scientific data and information. CME's 2018 submission stressed the importance of a quality review process using data from multiple trusted sources to ensure outlier values are not adopted.

CME is concerned SWA's review of toxicological information relating to RCS does not acknowledge or attempt to account for the significant uncertainty surrounding approaches to health screening or how it relates to an actual diagnosis of lung disease.

The 2010 study by the American Conference of Government Industrial Hygienists (ACGIH) outlined in the RCS evaluation report appears to be the primary source upon which SWA's 0.02 mg/m³ recommendation was made. The study utilised X-rays evaluated against the International Labour Organization (ILO) Standard and indicated 0.025mg/m³ was protective of the effects in the lungs. In their discussion on the toxicological information available on RCS, SWA fails to acknowledge there is uncertainty about diagnostic information in relation to the ILO diagnostic framework. Both Australian and international reports have found this methodology of diagnosis to be biased towards false positive interpretations.^{3,4}

As a result of these issues, more recently, high-resolution computed tomography (HRCT) has increased in use by thoracic physicians as a more accurate diagnostic tool. HRCT was not used in the epidemiological studies that have been examined in the SWA review. Recent Queensland mine dust lung disease (MDLD) incidence data utilises HRCT in line with the [Coal Mine Workers Health Scheme Clinical Pathways Guide](#). Given the MDLD data removes this positive diagnosis bias, it seems logical for this data to be considered a relevant source of information for the SWA review.

CME is concerned that SWA's review did not consider any data from the Australian mining industry on rates of silicosis as part of the review. In addition to the MDLD data mentioned above, CME is aware of relevant available data in other jurisdictions for example the NSW mining industry and historical health surveillance data in WA currently under consideration by the WA WHS regulator, the Department of Mines, Industry Regulator and Safety (DMIRS).

Failing to consider Australian mining health data, particularly when there are known issues with diagnostic tools used in the study's considered in the review, is considered a major flaw in the reviews methodology. This data would no doubt provide valuable insights about the relationship between WES values and silicosis. By way of example, analysis of DMIRS data over the past decade indicates the average exposure within the WA mining industry to be 0.02mg/m³ and prior to that around 0.03mg/m³.⁵ Therefore, it would be beneficial to include comparison of these levels with incidents of silicosis as part of the current review.

CME considers the evidence used in the review to be limited and recommends SWA include a more robust scientific evidence base including data from the Australian mining industry regarding health incidence of silicosis which has utilised acceptable diagnostic tools.

Measurement and analysis

CME is aware of significant sampling and analysis issues which will result from the current proposal that warrant SWA's consideration as part of the review process.

3 Department of Natural Resources, Mines and Energy. (2018) 'Queensland Mines and Quarries Safety Performance and Health Report 2017-2018' available at https://www.dnrme.qld.gov.au/__data/assets/pdf_file/0007/1418182/safety-performance-report-2017-18.pdf

4 'CDC - Chest Radiography: Classification Issues - NIOSH Workplace Safety and Health Topic'. www.cdc.gov

5 Department of Mines Industry Regulation and Safety, Mining Industry Advisory Committee April 2019 agenda papers.

The current method used to measure crystalline silica in air samples are based on the [NIOSH 7602](#) and [7603](#) methods which quantifies respirable quartz based on the infrared method of crystalline silica determination. These two methods have different levels of detection (LOD), 0.01mg/m³ and 0.02mg/m³ respectively. Measurements at 0.025mg/m³ and short-term measurement (~4 hours) at 0.05 mg/m³ are at the limit of what can be reliably measured using the existing methods and techniques.

In the WA mining industry WES values are adjusted for shift and roster length in line with DMIRS guide [Adjustment of atmospheric contaminant exposure standards](#). Applying this guidance to the SWA proposed WES of 0.02mg/m³ an operator working 2-week-on, 1 week-off and 12 hour shifts the adjusted occupational exposure limit (OEL/ WES) will be at the level of detection (LOD) at 0.0142mg/m³.

In addition to regulatory exposure standards, companies set internal 'action levels' which are typically at 50% of the WES to assist them in identifying and managing potentially problematic exposures. This process triggers an early internal investigation of the sources of exposure and implementation of suitable control strategies as well as health surveillance. In the case of the aforementioned example, the action level would therefore be 0.0071 mg/m³, which falls below the LOD.

Further, challenges with accurate measurement at such low levels would mean the current NIOSH 7602 and 7603 methods for the determination of crystalline silica cannot be used as they are not accurate enough to be able to measure below the adjusted exposure standard of 0.014 mg/m³. Accurate measurement of the RCS exposure is essential to understand who is at risk and to prioritise resources for control.

Not taking into account issues with accuracy of measurement just discussed, the impact of the proposed change on industry would be significant. Modelling of one company's data indicates they will have a greater than 1000% increase in recorded action level breaches. Given this significant range, there must be sufficient evidence that exposures at levels above the levels proposed by SWA lead to harm. CME understands and appreciates concerning trends such as the increase in incidence of silicosis in the stone bench top industry have likely been a driver for SWA to take a conservative approach to setting the proposed WES. However, CME considers there is no evidence to indicate the current proposal would protect against such cases. In fact, as of February 2019, there have been 106 accepted claims of silicosis from workers in the engineered stone benchtop industry in Queensland. Investigations into these cases have now revealed gross RCS exposures at levels orders of magnitude higher than the current WES of 0.1 mg/m³. There is no evidence that exposures below the current WES cause silicosis.

As outlined above, CME is concerned the proposal would drive a solely compliance-based culture. This is not in the best interest of health outcomes. CME reiterates WES values do not represent lines between 'safe' and 'unsafe' work environments. Companies should be encouraged to remain focussed on reducing exposure to levels ALARP, not just focus on compliance with a WES.

In order to reduce exposures below 0.02 mg/m³, significant changes will be required to infrastructure. There may not be any existing controls that can be retrofitted and new ones would then need to be sought, trialled and commissioned at considerable cost, if at all available. Adoption of these new controls, as part of a company's safety (and health) management system, would need to be considered carefully as they may introduce additional and potentially unintended issues. The reality is this change has real potential to shift the focus of businesses to low level controls such as PPE due to their inability to implement practical and effective engineering controls that reduce RCS.

[There are significant practical challenges associated with measuring and analysis of RCS at the levels required to comply with SWA proposed WES. CME recommends SWA take a more holistic](#)

approach when considering WES values that considers the feasibility and practicality of implementing the change. Failure to do so is not in the best interest of health outcomes.

Conclusion

The WA resources sector is committed to the health and safety of its workforce. As with all health and safety hazards, industry take a risk based approach to the management of occupational health hazards. Exposure standards play a role in assisting industry to manage exposures to ALARP levels, an approach that aims to achieve the highest level of protection.

CME considers it is fundamental that WES values are reviewed appropriately to ensure they are based on available evidence and information.

Given that potential RCS associated health impacts were considered in isolation, and the WES review did not holistically consider the best available evidence and has significant practical challenges, CME considers the current recommendation to be overly conservative and not in the best interests of preventing against occupational illness.

CME looks forward to the opportunity to continue to engage with the SWA on this important matter. Should you have any questions regarding this submission, please contact Elysha Millard, Senior Policy Adviser - People and Communities on 08 9220 8515 or e.millard@cmewa.com.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'RCarruthers', with a long, sweeping horizontal stroke at the end.

Robert Carruthers
Director – Policy & Advocacy