MinEx submission on the Worker Exposure Standard (WES) for Respirable Crystalline Silica (RCS), September 2022.

Aluminium

Do you agree with the proposed WES-TWA value of 1mg/m3 for aluminium metal dust and insoluble compounds (including pyro powders, aluminium oxide and metal fumes) (as Al)?

No

Comment on the proposed WES-TWA

Welding fume in the respirable fraction is often found to have results less than the limit of analytical detection (Lenhert, et. Al, 2012). Although some metals can be found in the respirable fraction of welding fume, aluminium is poorly absorbed by the body and does not bioaccumulate. Therefore, measuring aluminium in the respirable fraction of welding fume offers limited value in protecting workers.

Do you agree with the proposed removal of individual WES-TWA for metal dust, aluminium oxide, pyro powders, welding fumes, soluble salts, and alkyl compounds?

No comment

Comment on the proposed removal of individual WES-TWA for metal dust, aluminium oxide, pyro powders, welding fumes, soluble salts, and alkyl compounds

We are neutral about the removal of the WES TWA for aluminium in welding fume. The limitations of the methodology in evaluating the inhalable fraction are acknowledged, although it is currently the best method available.

Additional Comments

Nitric Oxide

Do you agree with the proposed WES-TWA value of 2ppm?

Yes

Comment on the proposed WES-TWA value

Nitric Oxide is most likely to be present in underground environments, as well as possibly in some welding situations. Chronic exposure to NO may lead to respiratory issues and lung damage. At extractive sites NO exposure is most likely to occur simultaneously with SO2, CO, and Diesel Particulates exposure. The potential for an additive effect of these hazards on the respiratory system is high and thus the conservative proposed WES of 2ppm is supported.

Additional Comments

None.

Silica - Crystalline

Do you agree with the proposed WES-TWA value of 0.025mg/m3?

No

Comment on the proposed WES-TWA value

In 2019 WorkSafe New Zealand halved the Workplace Exposure Standard (WES) for crystalline silica (respirable fraction) from 0.1mg/m3 to 0.05mg/m3. It is now proposed to be halved again, without citing any new evidence or technological advances to support this position.

We support the Australian Institute of Occupational Hygienists' Inc. [AIOH] Position Paper on respirable crystalline silica which recommended an "as low as reasonably practicable" [ALARP] level to be at all times below an 8-hour TWA guidance value of 0.1mg/m3 respirable fraction, with an action level TWA value of 0.05mg/m3 which triggers investigation of the source of exposure and implementation of suitable control measures, as well as health surveillance (AIOH, 2018).

With research indicating that detrimental effects of exposure correlate to an exposure level of approximately 0.1mg/m3, most regulatory bodies in developed countries consider an exposure standard of 0.05mg/m3 to be sufficiently conservative to protect workers. Reported cases of silicosis are mainly due to poorly controlled exposures above 0.1mg/m3 (AIOH, 2018). Resources would be more effective if focused on education and controls around respirable crystalline silica rather than continually reducing a WES which had poor compliance to begin with.

It is only by reducing dust levels to As Low As Reasonably Practicable (ALARP) that we will see a reduction of detrimental health effects. The implementation and review of established control methods such as dust suppression, local exhaust ventilation, wet methods, on-tool extraction, wet housekeeping, positively pressurised cabins, and isolation of high-risk tasks will offer demonstrable, tangible protection to workers from exposure to respirable crystalline silica, as well as other hazards. Silicosis will only be eradicated through appropriate management and control, not by lowering legislative requirements and potentially driving workplaces to ignore unachievable limits.

The SafeWork Australia report "Measuring Respirable Crystalline Silica" (2020) concluded that uncertainty in measurement is significantly increased at and below a WES of 0.02 mg/m3. As noted in the AIOH Position Paper, using competently operated modern analytical instruments and methodology, an 8-hour sampling period should provide an acceptable level of uncertainty at an RCS concentration of 0.05 mg/m3. For a 4-6 hour air sample, results of 0.05 mg/m3 may fall short of the standard required to determine compliance against the WES or action level. For samples of 4 or more hours, the uncertainty is adequate for compliance monitoring and enforcement for concentrations of 0.1 mg/m3 and above.

Due to the nature of extractive operations, sampling is typically done for periods shorter than 8 hours and extrapolated to give an 8-hour WES-TWA. This also applies to sites working longer shifts. The current limit of detection (LOD) is 0.008mg/m3, meaning the WES will be only 3 times the LOD which is too close when determining compliance.

The uncertainty over the data may lead to confusion and discussion over the accuracy of the results rather than what needs to be done to manage worker exposure to RCS. Sites will have to target zero in order to be confident that they are compliant due to the uncertainty of monitoring data. We are also concerned the focus will be on the data and not on managing RCS.

Additional Comments

We do not believe a reduced WES will protect worker health. The basis for this position is:

• A reduced WES will not drive improved worker health protection

• Scientific evidence does not justify the change

• Measurement technology is not accurate

To compliment the unchanged WES, an action level of 0.025mg/m3 (TWA 8hour) should be rigorously adopted and a 95th percentile for all work groups should comply with this level. Exceedance of the action level should trigger an investigation of the sources of exposure and implementation of suitable control strategies as well as health surveillance. Furthermore, by limiting worker exposure to As Low As Reasonably Practicable (ALARP) and focusing on exposure management via hard controls, worker health will be adequately protected.

While we have attempted to outline all our concerns in this submission, we believe further discussion and consideration of all of the issues would better inform WorkSafe's decision on lowering the WES-TWA for RCS. We would be happy to participate in such discussions.

Titanium dioxide

Do you agree with the proposed WES-TWA value of 0.3mg/m3 respirable fraction?

No

Comment on the proposed WES-TWA value

The proposed value is based on theoretical quantification of titanium dioxide which in itself, is neither toxic nor biopersistent, but may elicit a general inflammatory response. The American Conference of Governmental Industrial Hygienists (ACGIH), who is conservative as a rule, has found no evidence to support a relationship between titanium dioxide and respiratory disease. In the absence of respiratory disease there is no benefit in attempting to evaluate the respirable fraction. Extractive sites will continue to evaluate titanium dioxide in the inhalable fraction, where most particles are detected in welding fume.

Additional Comments

None.