Comments of the United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service Workers International Union (USW)
on the
Mine Safety and Health Administration Request for Information
on
Respirable Silica (Quartz)
Docket No. MSHA-2016-0013
RIN 1219 AB36
October 28, 2019

The USW is the predominant labor union in North American metal and non-metal mining, representing approximately 20,000 miners in the United States and an equivalent number in Canada. Our members work in underground and surface mines and quarries, using many different mining methods, mining almost every commodity. The exception is coal, and while our members in the United States are not subject to black lung or coal dust explosions, they do face every other health and safety hazard in the mining environment.

Historically, the most serious health hazard in mining has been the threat of silicosis. This deadly disease has been known since antiquity. More recently, we learned that crystalline silica can also cause or promote lung cancer. In 2016 the Occupational Safety and Health Administration updated its silica standard, effectively cutting the permissible exposure limit in half and adding ancillary provisions for workplace monitoring, medical surveillance and means of control. MSHA did not follow suit; the Agency's limited rulemaking resources were consumed with other matters.

On June 19th of this year, the USW and the United Mine Workers of America jointly petitioned MSHA for a new silica standard, including the 50 ug/m^3 exposure limit already adopted by OSHA and adding appropriate provisions for workplace monitoring, means of control, and medical surveillance. The next day, Cecil Roberts, President of the UMWA, testified before the U.S. House of Representatives[1], urging the promulgation of an Emergency Temporary Standard (ETS) for silica. Such use of an emergency standard is fully justified. MSHA is well aware of the alarming increase of coal workers pneumoconiosis (CWP or black lung) and its most devastating form, progressive massive fibrosis (PMF). MSHA is also aware of the growing evidence that silica is a major contributor to that increase. In Section 101(b) of the Mine Act, Congress gave MSHA the authority to issue an ETS when the threat to miners is so grave that immediate action is necessary. If black lung disease does not qualify as a grave threat, then nothing does.

However, instead of issuing or at least beginning work on an ETS, MSHA chose to publish a request for information (RFI). It is hard to see this as anything other than a delay. In addition, the RFI spent a good deal of text on a discussion of respirators, especially powered air-purifying respirators. Although this discussion was factual and accurate, it could open the door to the same stale arguments made by mine operators in past rulemakings, that respirators should be redefined as engineering controls and considered as a primary means of protection.

In what follows the USW will argue that the black lung crisis fully justifies an ETS; that any revised silica standard should include all miners and all forms of crystalline silica; that a lower permissible exposure limit is both necessary and feasible; that silica exposure should be measured by both the new Rapid Quartz Monitor and traditional methods, and without regard to respirator use; that silica exposure should be reduced to the PEL through feasible engineering controls, and not respirators; and that in the final standard MSHA should consider the combined effects of silica and other toxic substances to which miners are exposed.

1. An Emergency Temporary Standard is Necessary to Protect Miners

The evidence for the recent increase in black lung disease is effectively summarized in the recent report of the National Academy of Sciences, *Monitoring and Sampling Approaches to Assess Underground Coal Mine Dust Exposures (2018)* pp. 15-20.[2]

Major changes have occurred over the past several decades in underground coal mining practices and coal mining conditions, some of which might have affected RCMD exposures and contributed to changing disease patterns. Lengths of continuous mining cuts and longwall passes (coal-face cutting) extended; cutting sequences changed to bi-directional cutting on longwalls and supersection continuous mining increased in use. Increased sizes and horsepower of mining equipment, more-efficient coal preparation methods, and an increased volume and speed of coal loading and transporting activities have led to increases in coal mine extraction productivity. Higher productivity certainly increases the total dust load generated.

Concurrent with changes in mining practices, there was a shift to thin seam mining, as relatively thick and high-quality coal seams became depleted in the United States. To ensure adequate head room for miners and equipment, more rock strata were mined as thin coal seams were being extracted for continuous mining and longwall mining. The actual section of strata mined may include portions of roof or floor or both. In some cases, the coal seam itself may contain partings of shale or clay materials that are mined along with coal. Mining surrounding rock along with the coal likely results in changes in particle size, shape, composition, and concentration, and probably increasing miners' exposure to respirable crystalline silica from adjacent rock.

The NAS report also identified one likely cause of the increase:

Increased silica exposure appears to explain at least some of the observed cases of rapidly progressive pneumoconiosis. (pp. 16-17)

In fact, the worst exposures to silica may come during development, when the mine or mine section is not producing coal but tunneling through rock, and the operator is not required to sample for coal mine dust.

Additional evidence is referenced in the June 19 letter to MSHA from the UMWA and the USW, and in Cecil Roberts' June 20 testimony. Dr. John Howard, the Director of NIOSH, also testified at that hearing, and gave an update of the science supporting crystalline silica as an important contributing cause in the development of CWP.[3]

The most dramatic account came in December 18, 2018 report by National Public Radio[4] and a later documentary by *Frontline*.[5] Their investigation found more than 2000 miners suffering from the disease since 2011 in just five Appalachian states. The report documented the terrible human toll of the disease. The coal miners interviewed had little doubt about the impact of silica due to modern mining conditions. As Greg Kelly, a 54 year-old miner suffering from PMF put it:

"All the good seams were gone because there were hardly no solid seams of coal left. And there [was] more rock in the coal."

2. All Miners Should be Covered by a Revised Silica Standard

The MSHA RFI states that recent studies indicate that over-exposure to quartz presents [the] same health risks to MNM miners. The USW agrees. The RFI references a number of those studies. Others were referenced in the June 19 UMWA-USW letter.

Silica control is increasingly important in metal and nonmetal mines because such mines will likely experience potentially higher dust exposures as new technology comes into use. Continuous miners have long been used in softer rock like trona and gypsum. They are now being adapted for use in hard rock, as are longwall systems.[6] Of course many hard rock ores contain high levels of silica.

The risk of silicosis in MNM mines is not confined to underground operations. Rock crushing in iron and other surface mines can release silica-laden dust. Silica is also a hazard in cement plants, a fact that is well-recognized by the industry.[7] Under the new OSHA standard, workers who cut and install precast concrete have considerably more protection than the workers who produce it in MSHA regulated cement plants. Any new silica standard should apply to all workers under MSHA's jurisdiction.

3. The Standard Should Cover All Forms of Crystalline Silica

The title of the RFI seems to define respirable silica only as quartz. However silica comes in several crystalline polymorphs, and most standards for crystalline silica, such as OSHA's, also cover crystobalite and tridymite. While these minerals are rare, their toxicity is similar to that of quartz. There is no reason why the MSHA standard should exclude them.

4. A Lower Exposure Limit is Necessary

We are far past the point where the inadequacy of the current 100 ug/m^3 exposure limit can be debated. MSHA's sister agency, OSHA, has already adopted a 50 ug/m^3 limit, based on very extensive evidence in that rulemaking record. Thus, the U.S. Department of Labor has determined that the 50 ug/m^3 limit is fully justified on health grounds. Of course the OSHA standard does not take into account additional fibrogenic or carcinogenic agents like coal dust, diesel particulate and radon.

OSHA is not the only organization to adopt a lower exposure limit. The NIOSH Recommended Exposure Limit is also 50 ug/m^3 and the ACGIH Threshold Limit Value is 25 ug/m^3. The International Agency for Research on Cancer classifies quartz and cristobalite as Group 1 carcinogens, for which there is sufficient evidence in humans, and which must be controlled to the lowest feasible level.

5. A Lower Exposure Limit is Feasible

A feasible standard is one that most employers can meet most of the time. A recent analysis by the Center for Science in the Public Interest showed that only 6% of MSHA dust samples taken in underground coal mines in 2016-2018 exceeded 50 ug/m^3. For surface coal mines, the exceedances were 12% in 2016-17 and 10% in 2018.[8] Of course that is a limit that mine operators are not even required to meet. We do not yet have comparable data for MNM mines, but we are confident that a similar analysis would demonstrate feasibility in that sector as well.

Other jurisdictions have adopted even lower standards, for example British Columbia and Alberta, which have robust mining industries, successfully enforce a 25 ug/m^3 limit.

6. Both the Rapid Quartz Monitor and Traditional Methods Should be Used to Measure Silica Exposure

The ultimate goal for silica sampling should be a real-time direct-reading monitor that is tough enough, small enough and light enough to be easily carried by a miner. Until it becomes a reality, the NIOSH Rapid Quartz Monitor (RQM) offers significant advantages. Like the traditional MSHA compliance method, it uses a personal sampling pump and cassette, but the filter does not need to be sent off to a laboratory. Instead, it can be quickly analyzed in the field at the end of the shift using a Fourier-transform infrared analyzer and software developed by NIOSH. The results can be used to implement control measures at the beginning of the next shift, instead of days later.

In his June 20 testimony, Dr. Howard stated that the RQM would need additional validation and development before it could be used for compliance measurements, but that the testing conducted so far shows close agreement between the RQM and the current laboratory-based MSHA P7 method. The MSHA silica standard should therefore require mine operators to use the RQM as an engineering tool to find and address operations and areas with high silica exposures. It should specify a sufficient number of samples per shift to adequately characterize the mine environment. Since miners move around during the shift, some of those samples should from area (fixed-site) monitors in places like belt transfer points, longwalls, or near continuous miners. (This was Recommendation 7 of the NAS study.) The standard should also be sufficiently flexible to allow MSHA to require the use of the RQM for compliance when it is validated, and a portable real-time monitor if one is developed.

In accord with current MSHA and OSHA policy, neither the compliance nor the engineering measurements should account for respirator use. It is important to know how much

respirable silica is in the air, not some calculated exposure based on a presumed respirator protection factor.

7. Miners Should Continue to be Protected Through the Hierarchy of Controls

The MSHA RFI contains a useful discussion of the hierarchy of controls applicable to all toxic substances, including silica. Engineering controls are far more effective than administrative controls or personal protective equipment. The record should already contain an extensive literature on effective engineering controls, for example the NIOSH handbooks of recommended practices for dust control.[9]

In the past, MSHA correctly rejected the use of powered air-purifying respirators as a primary means of control. The author of these comments has worn PAPRs in various operations and once discovered their limitations in a dramatic way. I was testing an experimental filter for sulfur dioxide in a primary copper smelter, using a loose fitting helmet-type PAPR, when I suddenly breathed enough sulfur dioxide to cause severe respiratory distress. Fortunately my companions got me to fresh air. It was later determined that the filter had worked, but because were climbing ladders carrying equipment, I had overbreathed the respirator.

In another case I investigated high urinary arsenic levels among Canadian miners processing gold mine tailings. The cause turned out to be high exposures during maintenance operations, while they were wearing the same kinds of loose fitting helmet-type PAPRs.

The USW recognizes that respirators must be provided in limited and temporary circumstances. We believe that respirator use should be subject to a comprehensive respiratory protection program. MSHA currently relies on the recommended respiratory protection practices contained in a 50 year-old ANSI standard. The RFI seeks comment on the 2015 version of that standard. While it would be an improvement, it would be far better for MSHA to promulgate its own respiratory protection standard, similar to the OSHA standard found at 29 CFR 1910.134. MSHA should also recognize that some miners may be unable for medical reasons to wear a respirator. They should be transferred to a job where respirator use is not required, with full protection of their employment, earnings and benefits. We believe this is required by Section 101(a)(7) of the Mine Act.

8. The Final Standard Should Recognize the Combined Effect of Silica and Other Toxic Exposures

MSHA's coal mine respirable dust standard recognizes that coal dust and silica are both fibrogenic. Accordingly, the permissible amount of coal mine dust is adjusted based on the amount of silica present in a bulk sample.

Silica is also a respiratory carcinogen, but no adjustment is made for the combined effect of silica with other carcinogens in the mine environment, such as diesel particulate and radon. This issue should be considered in the final standard, and if possible, a formula should be found to protect workers from the combined risk of multiple carcinogens in mine air. This will require

both scientific and economic analysis, so it should not be attempted in an emergency temporary standard.

9. Conclusion

The USW requests that the record of the OSHA silica rulemaking and the MSHA RFI on the retrospective study of the respirable coal mine dust rule be incorporated into this rulemaking. We also ask that the record remain open to new evidence as it becomes available.

Finally, the USW thanks MSHA for considering these and other comments on the need for a new respirable silica standard. We urge the Agency to act quickly to propose that standard.

Respectfully submitted,

Michael J. Wright
Director of Health, Safety and Environment

Endnotes

[1] House Education and Labor Committee, Subcommittee on Workforce Protections, "Breathless and Betrayed:e What is MSHA Doing to Protect Miners from a Resurgence of Black Lung Disease?" June 20, 2019.
[2] National Academies Press, 2018. http://nap.edu/25111. (The author of these comments was a member of thee study committee for the report.)
[3] John Howard, MD, https://www.cdc.gov/washington/testimony/2019/t20190620.htm
[4] https://www.npr.org/2018/12/18/675253856/an-epidemic-is-killing-thousands-of-coal-miners-regulators-could-have-stopped-it
[5] https://www.pbs.org/wgbh/frontline/film/coals-deadly-dust/
[6] Alexandra Lopez-Pacheco, "Hard Rock Revolution on the Horizon," CRM Magazine, May 03, 2017.
[7] National Precast Concrete Association, "Silica: It's not Just Dust," https://precast.org/2012/11/silica-its-not-just-dust/
[8] E. Greenthal, P Lurie, G. Wagner and D. Michaels, "Comment on Request for Information Regarding thee Retrospective Study of Respirable Coal mine Dust Rule," July 9, 2019, in the MSHA record.
[9] NIOSH Mining Program Report of Investigations, *Dust Control Handbook for Industrial Minerals Mining and Processing*, Second Edition, 2019.
NIOSH Information Circular 9521, *Best Practices for Dust Control in Metal/Nonmetal Mining*, 2010.
NIOSH Information Circular 9517, *Best Practices for Dust Control in Coal Mining*, 2010.