October 28, 2019

Ms. Sheila A. McConnell, Director
Office of Standards, Regulations, and Variances
Mine Safety and Health Administration
201 12th Street South
Room 4E401
Arlington, VA 22202-5452

Filed electronically to *zzMSHA-comments@dol.gov*

Dear Ms. McConnell:

**Re: Request for Information, Respirable Silica (Quartz), RIN 1219-AB36, Docket No. MSHA-2016-0013**

The National Mining Association (NMA) offers the following comments in response to the Mine Safety and Health Administration's (MSHA) request for information (RFI) on "Respirable Silica (Quartz)" published in the Federal Register, Vol. 84, No. 168, on August 29, 2019. NMA is the national trade association whose members produce most of the nation's coal, metals and minerals. NMA's membership also includes the manufacturers of mining machinery and equipment.

The safety and health of our nation's miners is the primary concern of all our members, and NMA has a long history of engagement in efforts to improve protections for miners. We have worked and continue to work with MSHA, the National Institute of Occupational Safety and Health (NIOSH), equipment manufacturers and others to examine new technologies and techniques to protect miners' safety and health. To that end, the prevention of lung disease is an area that needs our collective attention.

While progress is positive, disease persists and as explained in further detail below, we believe more can be done. To that end, NMA urges MSHA to allow mine operators to deploy a comprehensive approach that uses the "hierarchy of controls"[1] to protect miners' health and to comply with any new respirable silica standard that the agency may promulgate. Although MSHA has historically rejected this approach to control exposures to respirable coal dust,[2] it

[1] "Hierarchy of Controls" (Hierarchy) is a process to control occupational hazards to protect individuals. The hierarchy states the most effective controls are elimination, substitution, engineering, administrative, and personal protective equipment. It is an accepted industrial hygiene practice to use the controls in combination to act a redundant measures and best protect employees from hazards.
https://www.cdc.gov/niosh/topics/hierarchy/default.html

[2] 79 FR 24931 (May 1, 2014).

should be evaluated in the context of this potential new silica dust standard that will be applicable to both the coal and metal/nonmetal (MNM) sectors. NMA believes the Federal Mine Safety and Health Act of 1977 (the Mine Act)[3] does not preclude the use of the hierarchy of controls approach. Such an approach would allow use of administrative controls and personal protective equipment (PPE) in the form of respirators to achieve any reduction in the permissible exposure limit (PEL) for silica dust.

The Occupational Safety and Health Administration's (OSHA) crystalline silica rule[4] demonstrates the benefits of such an approach. In that rule, OSHA treats engineering and administrative controls (work practices in the form of job rotation) as equals in controlling respirable crystalline silica as methods to achieve compliance in both the general industry and construction sectors.[5] If these controls do not achieve compliance with the PEL, OSHA allows the use of respirators. MSHA should follow OSHA's precedent to allow the use of loose-fitting, powered, air-purifying respirators (PAPR) as the agency proposed in the rule "Verification of Underground Coal Mine Operators' Dust Control Plans and Compliance Sampling for Respirable Dust"[6] and accept either an assigned protection factor (APF) or an effective protection factor (EPF)[7] as a method of compliance for any reduced PEL for silica.

## Background

Over the last two decades, effective ventilation engineering controls have been widely adopted in both surface and underground coal and hard rock mines. Best practices, strict adherence to ventilation and dust control plans and increased miner and operator awareness have all contributed to exponentially lowering dust levels in both surface and underground mines.[8] The most recent technological advance deployed in mining is the continuous personal dust monitor (CPDM). Mandated by the Coal Dust Rule,[9] the CPDM provides a coal miner with the percentage of the allowable exposure to which he/she is exposed in real time throughout the shift.

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[3] Public Law 91-173, as amended by the Mine Improvement and New Emergency Response Act of 2006 (MINER Act), June 15, 2006.

[4] FR Vol 81, No. 58, March 25, 2016.

[5] Id., pp 16651, 16863, 16880.

[6] FR, Vol. 65, No. 131, July 7, 2000.

[7] Id., pp 42136-42137. In the section, "Selection of Respirators: Loose-fitting PAPRs", MSHA discussed the APF and EPF of PAPRs in the context of reducing dust exposures to miners working on a longwall panel, specifically the longwall operators. NIOSH assigned a protection factor of 25 to the PAPR. NIOSH determined the effectiveness of the PAPR depends on three factors: ventilation air velocity, the miner's work rate, and his angle of orientation to airflow. The EPF reflects the protection provided by a respirator over an actual work shift in consideration of these three environmental factors. MSHA proposed an EPF of 2 for a loose-fitting PAPR based on laboratory and in-mine testing which showed that the most protection is provided to the PAPR-wearing miner when he is facing directly against the air current.

[8] SME Annual Conference & Expo, Denver, Colorado, February 27, 2019. Assistant Secretary for Mine Safety and Health David Zatezalo provided statistics showing the number of MSHA and operator-collected coal dust samples proved that overexposures of the coal dust permissible exposure limit have exponentially decreased since 2000, that the average concentration of quartz in all samples taken in the coal sector since 2009 averaged 25.6 micrograms/$m^3$, and that the number of quartz overexposures in coal have decreased from 23.3% to 1.2% from 2000 – 2019. https://www.msha.gov/sites/default/files/events/SME%20presentation%202-26-19.pdf

[9] FR, Vol. 79, No. 84, May 1, 2014.

Technological progress in engineering controls has been positive, but challenges remain, and more can be done if lung disease is to be eradicated among miners. Mandating respiratory protection for miners in occupations with the potential for high silica exposures adds another layer of protections for preventing pulmonary disease.

**Disparities in MSHA and OSHA Respirable Silica Regulation**

There are differences in the respirable silica regulations that MSHA and OSHA administer and enforce. Provisions for the PEL, action level (AL), monitoring, use of supplemental controls and medical surveillance are shown in Table 1, and are summarized below.

1. The MSHA PEL is equivalent to 100 µg/m³ for a working shift, and OSHA PEL is 50 µg/m³ as a time-weighted average (TWA) over 8-hours.[10]

2. MSHA has no AL, but the OSHA AL[11] is one-half that of the OSHA PEL.

3. MSHA's silica monitoring program is conducted by MSHA inspectors (primarily), with samples collected in the coal sector either quarterly or semi-annually. The MNM sector has not established the frequency for collecting samples to monitor exposures. OSHA's silica monitoring is done primarily by the employer to establish compliance or lack thereof.[12]

4. MSHA does not allow supplemental controls to achieve compliance in the coal sector, but allows miners in the MNM sector to work for reasonable periods of time in locations where silica exposures exceed limits if they wear respiratory protective equipment in compliance with 42 CFR Part 84 and ANSI Z88.2-1969.[13] OSHA views engineering and administrative (work practice) controls as equally effective in reducing silica dust exposures to achieve compliance.[14] If both fail, OSHA requires employers to supplement them with respiratory protection to achieve compliance.[15] OSHA further requires employers to provide respirators to employees, and employees to wear the respirators provided by the employers when they enter regulated areas.[16]

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[10] If more than 5% quartz mass is determined to be in the coal mine worker dust sample, the applicable respirable dust standard is reduced to the quotient of 10 divided by the percentage of quartz in the dust sample. If more than 1% quartz mass is determined to be in the MNM miner dust sample, the applicable standard is 10 divided by the percentage of quartz plus 2. Both standards are intended to limit worker respirable crystalline silica in the form or quartz to 100 micrograms or less for the miner's shift. The OSHA PEL is 50 micrograms or less for the worker's shift, as found in 29 CFR 1910.1053(c) *Permissible Exposure Limit*

[11] 29 CFR 1910.1053(b) *Action Level*

[12] 29 CFR 1910.153(k)(1) *Air monitoring data* and (k)(2) *Objective data*

[13] 30 CFR §§ 56/57.5002 Exposure monitoring and 56/57.5005 Control of exposure to airborne contaminants

[14] 29 CFR 1910.1053(f)(1) *Engineering and work practice controls*

[15] Id.

[16] 29 CFR 1910.1053(e)(4). (A "regulated area" is one where the employee is expected to be exposed to levels of airborne silica dust is, or can be expected to be, in excess of the PEL).

5. NIOSH administers a medical surveillance program for coal miners[17], and MSHA requires coal operators to have a NIOSH-approved medical surveillance plan.[18] Coal miners have job transfer options to a lower dusty environment if x-rays show evidence of black lung disease.[19] MSHA does not require a NIOSH-approved plan for MNM operators, but MNM operators may administer a medical surveillance plan voluntarily. Miner participation in medical surveillance is largely voluntary. Under OSHA's silica regulation, employers must make medical surveillance available to employees who are exposed to respirable silica dust above the AL 30 days or more/year.[20] There is no requirement for a NIOSH-approved plan. Employees have no job transfer option when there is evidence of lung impairment.

**Developing and New Technologies to Reduce Miners' Exposure to Silica (NIOSH Research on Ventilation and Dust Control)**

In January 2010, NIOSH published an information circular that contained a review of engineered products and best practices to control dust generation on both longwall and continuous miner sections in underground coal mines.[21] The publication contains detailed descriptions of engineering control systems for managing dust generation at the coal mine face in 2010. In May 2019, the Mine Safety and Health Research Advisory Committee met, and NIOSH's Pittsburgh Mining Research Division (PMRD) presented an overview of dust control research projects in which the research group is engaged. Representatives from PMRD's Dust, Ventilation and Toxic Substances Branch described projects. More detailed descriptions of projects may be found in the section titled, "Current and Future Control Technologies to Eliminate Respirable Dust." As presented by PMRD, projects included:

1. Wet collector box on roof bolter in continuous mining – The dry dust collector box on a roof bolting machine was modified to incorporate a water spray at less than one gallon per minute output. The initial results showed the wet collector box reduced dust levels by 27% to 60% during collector box cleaning. There was no secondary exposure from handling collector bags.

2. Canopy air curtain for roof bolters in continuous mining – Air curtain technology was placed on a roof bolting machine by mounting the curtain on the canopy to provide filtered air over the operator. The initial mine survey results showed the air curtain reduced operator dust levels by 35% - 89%.

3. Canopy air curtain for shuttle cars in continuous mining – Air curtain technology was placed on a shuttle car. Laboratory testing at NIOSH showed 70% reduction

[17] 42 CFR Part 37
[18] 30 CFR 72.100
[19] 30 CFR 90.102
[20] 29 CFR 1910.1053(i)(1)(i)
[21] Information Circular 9517, Best Practices for Dust Control in Coal Mining, Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute of Occupational Safety and Health, Colinet, Jay F., January 2010 https://www.cdc.gov/niosh/mining/UserFiles/works/pdfs/2010-110.pdf

in dust levels at 120 cubic feet per minute (cfm) entry air velocity and 51% reduction at 850 cfm velocity.

4. Fan-powered shearer scrubber in longwall mining – NIOSH was asked to test a water-powered shearer scrubber. At high scrubber airflow of 13,000 cfm, there was a dust reduction of 50% in the return side air course; at low scrubber airflow of 6,500 cfm, there was a 25% dust reduction.

5. Underside shield sprays in longwall mining – NIOSH dust surveys showed that underside shield sprays could negatively impact dust control at the shearer. There were laboratory tests in progress to evaluate spray type, spray angle, spray pressure and location.

6. Foam application in longwall mining – NIOSH has identified a suitable foam system and settled on research topics, including blower versus. compressed air, nozzle type and operating parameters. Researchers noted that using surfactant additives in water dust control systems are particularly effective in quelling dust.

In addition, NIOSH's Mine Safety and Health Research Division started two studies on October 1, 2019, one each addressing respirable quartz dust in the coal and the MNM mining sector. NIOSH determined that research is needed to evaluate common dust controls, including water sprays and surfactants, flooded bed scrubbers, and foam, to develop improvements for respirable dust control.[22] The coal project has three objectives: examine and evaluate water spray systems for knockdown performance on respirable quartz dust (RQD) and the use of additives to improve airborne capture; examine and evaluate flooded-bed scrubber systems to improve operation and develop associated techniques to maintain and/or restore performance when subjected to both respirable coal dust the RQD; and evaluate acqueous foams to control dust emissions from longwall shield movement, surface blasthole drilling, and the operation of stageloaders/cursher s.

Likewise, NIOSH proposes a study project[23] with three goals in the MNM sector: characterize the performance of low-cost dust sensors and evaluate their use in operational environments; specify, construct, and demonstrate smart filtration and pressurization systems for mobile equipment; and quantify the effectiveness of emerging dust control technologies that have the potential to lower worker's exposure to respirable crystalline silica and welding fume in the MNM industry. NIOSH's research deserves consideration as MSHA considers how to best protect miners from silica dust exposures.

**Engineering Technologies Currently in Widespread Use in Coal Mining and Hardrock Mining (Best Practices)**

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[22] Reed, William R (Principal Investigator)
https://www.cdc.gov/niosh/mining/researchprogram/projects/project_SilicaDustControls.html
[23] Patts, Justin (Principal Investigator )
https://www.cdc.gov/niosh/mining/researchprogram/projects/project_DustSensing.html

In November 2008 NIOSH investigated the capacity of enclosed cabs on trucks to reduce equipment operators' silica dust exposures at surface MNM mines, and investigators produced a report of the study results.[24] Researchers reported that the most influential factors in reducing drivers' exposure to silica dust were the intake air filter and the recirculation air filter. A high-efficiency intake air filter had a capture rate of over 99% for submicron dust particles, while use of a recirculation filter further changed the cab penetration rate by submicron particles by an order of magnitude.[25]

Although PAPRs are not considered an engineering control by MSHA, they are, like other engineering control systems, required to be tested, approved and certified by MSHA's Approval and Certification Center (ACC)[26] for use in underground mines with a potentially explosive atmosphere. The description of the ACC on MSHA's web site focuses on the "engineering, scientific and technical expertise" the group provides. The unit and its assembled pieces, particularly the battery and motor assembly, are "permissible"[27] in underground coal and MNM mines, and the ACC issued its permissible certification.

Many underground coal and MNM mine operators make PAPRs available to their employees, and some operators require employees to wear them as a best practice to lower mine dust levels to the individual beyond that which other engineering controls accomplish in the mine environment. The manufacturer of the Airstream™ PAPR notified customers in early 2019 that the unit will be discontinued[28], leaving the mine operators with no alternative. A different PAPR unit, the "3M™ Versaflo™ TR-800 Intrinsically Safe Powered Air Purifying Respirator" that is UL-certified for use in Division

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[24] Report of Investigation 9677, Key Design Factors of Enclosed Cab Dust Filtration Systems, Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute of Occupational Safety and Health, Organiscak, John, A., Cecals, Andrew B., November 2008, file:///T:/Harman/Respirable%20Silica/June%20Testimony/2009-103.pdf

[25] Id., p. 21.

[26] The description from MSHA's web site: Technical experts evaluate and test equipment, instruments, and materials for compliance with Federal regulations. Products evaluated and tested range from extremely small electronic devices to very large mining systems. Following successful completion of evaluation and testing of a product, an approval is issued authorizing a manufacturer to produce and distribute products for use in mines. The MSHA approval issued by the Center is internationally recognized. The Center also performs other technical functions in support of MSHA's programs where engineering, scientific, and technical expertise is provided to other Agency project areas. This work involves conducting surface and underground field investigations to maintain the health and safety of miners; participating in accident investigations; investigating safety and health issues related to mining equipment; providing technical expertise in litigation cases; identifying technical solutions to problems concerning mining equipment, materials, and explosives; assisting in the development of new or revised Federal standards and regulations; and providing research assistance to other government agencies on research programs that directly relate to MSHA. The Center also provides engineering support and technical assistance in the area of industrial safety.

[27] 30 CFR 18.2

[28] Customer notification letter titled "Product Discontinuation Notice" from Chris Sneden, US Marketing and Business Unit Manager, 3M Personal Safety Division, 3M Center, 235-2W-70, St. Paul, MN, February 28, 2019.

1: IS Class I, II, III; Division 1 (includes Division 2) Groups C, D, E, F, G; T4, **under the most current standard** (UL 60079, 6th Edition, 2013),[29] but it has not been approved or certified by ACC for use in underground mines.

Additional engineering controls have been widely adopted by mine operators and are requirements in the ventilation and dust control plans; they include water sprays at dust generation source locations and flooded-bed scrubber filtration systems on continuous mining machines (CMM). Dust collector systems on CMM and roof bolters (RB) are in widespread use.

**Monitoring Results Extracted From MSHA's Public Database**

There are certain job classifications that require redundant controls to protect miners from overexposures to respirable silica in mining and to ensure that mine operators can achieve compliance with any future silica standard. MSHA must prescribe another layer of supplemental controls, including both administrative controls, such as job rotation, and respiratory protective equipment. Relying exclusively on engineering controls has not stopped lung disease among miners; supplemental controls are necessary to protect health.

Table 2 in spreadsheet format shows the results from MSHA's monitoring for silica dust exposures among miners working in surface and underground coal mines. Researchers looking for the sampling results for MNM hardrock mines could not locate the monitoring results from MSHA inspector samples on MSHA's public database. The monitoring period in Table 2 is January 2, 2019 – September 26, 2019.

In underground coal mining, MSHA inspectors collected 5498 samples, with 76 exposures over 100 µg/m³ and 409 above 50 µg/m³. Similarly, inspectors collected 538 samples at surface coal mines, and results showed 28 overexposures of the 100 micrograms standard and 95 exposures above 50 µg/m³. A summary description of select occupations and exposures is shown below. These occupations require supplemental controls to protect miners' health and to achieve compliance with the PEL for silica dust in the form of quartz, whether the PEL is 100 µg/m³ or a lower level.

[29] The certification document is not available to NMA. However, the company's website advertises the unit as intrinsically safe for use in explosive atmospheres. https://www.3m.com/3M/en_Us/3M-Versaflo-TR-800-Series-Powered-Air-Purifying-Respirators/?N=5002385+8709322+8711017+8711405+8720539+8720547+8720780+8734499+3294857497&rt=r3

| (Underground) | | | |
|---|---|---|---|
| Continuous Miner Operator | 1340 | 135 | 25 |
| Longwall Headgate Operator | 10 | 4 | 3 |
| Longwall Tailgate Operator | 85 | 20 | 7 |
| Twin Head Roof Bolter Operator (Return Side) | 1120 | 140 | 14 |
| Shuttle Car Operator (Standard Side) | 1207 | 51 | 7 |
| **Occupation (Surface)** | **< 50 µg/m³** | **>50 µg/m³** | **>100 µg/m³** |
| Bulldozer Operator | 191 | 32 | 11 |
| Highwall Drill Operator | 217 | 33 | 14 |

## Comparison of OSH Act and Mine Act as They Relate to Setting Health Standards

The Occupational Safety and Health Act (OSH Act) authorizes setting occupational health and safety standards allowing for the use of protective equipment and other controls.[30] The Mine Act section 101(a)(7) contains a provision almost identical to OSH Act section 6(b)(7) allowing standards prescribing the use of protective equipment or other control procedures.[31] MSHA should conclude that the structure and language of the Mine Act supports an interpretation that the interim health standards in the Coal Act[32] are superseded in a rulemaking setting a new mandatory dust standard. Unencumbered by the legacy respirator caveat,[33] a rulemaking process could either set the standard based upon full consideration of a hierarchy of controls or afford compliance options for meeting the standard using supplementary non-engineering controls or provide both options.

## Summary

The time has long since passed for MSHA and public policy makers to ensure that supplemental controls can be used for compliance purposes to control miners' dust exposures in the mine atmosphere. Even engineering controls such as the flooded-bed scrubber that have been in widespread use for decades are being reevaluated[34] to improve performance. In conformance with the Mine Act's section 101(a)(6)(A)[35] NMA

[30] OSH Act §6(b)(7), ("...where appropriate, such standard shall also prescribe suitable protective equipment and control or technological procedures to be used in connection with such hazards...")

[31] Mine Act §101(a)(7). This provision was apparently borrowed from the OSH Act of 1970 when the Coal Act was amended and revised in 1977 to combine coal and MNM safety and health regulation under one law. The one difference is that the Mine Act provision includes a medical reassignment and pay protection requirement.

[32] The Coal Mine Safety and Health Act of 1969, PL 91-173 (Dec. 30, 1969).

[33] Id.

[34] Reed, William R (Principal Investigator)
https://www.cdc.gov/niosh/mining/researchprogram/projects/project_SilicaDustControls.html

[35] The Mine Act §101(a)(6)(A) (The Secretary, in promulgating mandatory standards dealing with toxic materials or harmful physical agents under this subsection, shall set standards which most adequately assure on the basis of

urges MSHA to take the following steps to lower individual miners' exposure to silica dust: 1) allow PAPRs and job rotation to be used to achieve the PEL of respirable silica in surface and underground coal and hardrock mines; and 2) include a provision that requires miners to wear PAPRs to avoid overexposure when the PEL for respirable silica (quartz) is exceeded.

Sincerely,

Thomas Harman

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the best available evidence that no miner will suffer material impairment of health or functional capacity even if such miner has regular exposure to the hazards dealt with by such standard for the period of his working life. Development of mandatory standards under this subsection shall be based upon research, demonstrations, experiments, and such other information as may be appropriate. In addition to the attainment of the highest degree of health and safety protection for the miner, *other considerations shall be the latest available scientific data in the field, the feasibility of the standards, and experience gained under this and other health and safety laws [emphasis].* Whenever practicable, the mandatory health or safety standard promulgated shall be expressed in terms of objective criteria and of the performance desired.

**From:** Harman, Thomas <tharman@nma.org>
**Sent:** Monday, October 28, 2019 2:01 PM
**To:** zzMSHA-Standards - Comments to Fed Reg Group
**Subject:** NMA Comment Docket No. MSHA-2016-0013
**Attachments:** Final Respirable Silica MSHA-2016-0013.docx; MSHA OSHA Silica Reg Comparison.docx; 2019-10-20 MSHA Quartz Samples - Coal - Summary.xlsx

Please find NMA's comment and two tables referenced in the comment attached to this email. Hard copies will follow via Fed Ex.

Thank you,
Tom Harman

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