American Federation of Labor and Congress of Industrial Organizations

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AMERICA'S UNIONS

October 28, 2019

Mr. David G. Zatezalo
Assistant Secretary of Labor for Mine Safety and Health Administration
Mine Safety and Health Administration
U.S. Department of Labor
201 12th Street South
Arlington, Virginia 22202

Re: Respirable Silica (Quartz) *(Docket No. MSHA-2016-0013)*

Dear Mr. Zatezalo:

The AFL-CIO is a federation of 55 national and international unions, representing more than 12.5 million working people in their workplaces. Our unions represent workers in a broad range of industries including coal, metal, and non-metal mining and they work side-by-side millions of non-union workers. We strongly support MSHA creating a comprehensive silica (quartz) standard to protect all workers in coal, metal, and non-metal mining. We also strongly support the comments submitted by the United Mine Workers of America (UMWA) and the United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service Workers International Union (USW).

I. MSHA must urgently issue a rule to protect all mine workers from silica (quartz) exposure.

While the AFL-CIO acknowledges that MSHA initiated the rulemaking process for silica by issuing this request for information, this is a severely lagging response to the nation's crisis of lung disease associated with silica exposure in mine work. Miners have been dying and becoming very ill from black lung and progressive massive fibrosis (PMF)—chronic, irreversible diseases caused by occupational silica exposure and coal dust exposure—for decades and a more recent resurgence of silicosis and other silica-related disease cases called renewed attention to the need for immediate protections that have not been addressed by the agency. Despite mounting evidence of disease, exposures and feasible methods to control worker exposure to silica dust in mines, MSHA has failed to take concrete action to mitigate this epidemic; instead, it has been prolonging miners' exposures to this deadly and well-recognized hazard.

OSHA published its silica rule in 2016, which updated silica exposure regulations for the first time since 1971, and was long overdue. The MSHA silica rulemaking had been delayed until OSHA's was complete; it made sense for MSHA to rely heavily on the OSHA silica record. Instead of immediately following the publication of OSHA's final rule, MSHA stalled again. On June 19, 2019, the UMWA and USW jointly submitted a petition to MSHA calling for the agency to

immediately issue a new mandatory standard for respirable crystalline silica. The AFL-CIO hopes this issuance of an RFI, rather than a proposed rule or an emergency temporary standard, is not another stall tactic by this administration.

The promulgation of an MSHA silica rule must be pushed forward with expediency.

A. MSHA long has been aware of the hazards of silica exposure and the recent resurgence of silica-related disease.

Overwhelming evidence over decades has described the crisis of occupational lung disease among miners —evidence reasonably and even easily available to the agency. MSHA has had a close relationship with NIOSH in mining and NIOSH and MSHA both have developed partnerships with the mining industry over the years. The problem is well understood.

In 1996, due to a request from MSHA, NIOSH's Advisory Committee on the Elimination of Pneumoconiosis among the Nation's Coal Workers issued recommendations to reduce the exposure limit for both respirable dust to 1.0 mg/m^3 and silica to 50 ug/m^3. MSHA did not heed NIOSH's recommendations.

Within the past decade, cases of black lung and PMF have increased among our nation's miners. The trend was first reported by National Public Radio in 2016, when they discovered 962 cases of PMF from the last decade—almost ten times the cases previously reported by NIOSH.[1] Later in 2017, NPR released findings of an additional 1,000 cases of PMF in the Appalachian region.[2] However, the true number is likely higher as many clinics were unable to provide data or had incomplete data.

Around the same time, NIOSH publications also showed a resurgence of PMF in central Appalachia. In a 2016 Morbidity and Mortality Weekly Report, one clinic in Kentucky reported 60 cases of PMF within twenty months and stated that the disease incidence show "an urgent need for effective dust control in coal mines to prevent coal workers' pneumoconiosis" and "is a strong signal that action is needed in the area to identify existing cases at an earlier stage and prevent future cases." [3]

In 2018, additional evidence of the rising epidemic was reported. NIOSH reported the largest known cluster of PMF with 416 cases, some in miners as young as 38 years old and with under a decade of mining experience.[4] Later in June 2018, The National Academies of Science, Engineering, and Medicine (NAS) reviewed MSHA's 2014 Coal Mine Dust Rule implemented in

[1] Howard Berkes. National Public Radio. "Advanced Black Lung Cases Surge In Appalachia." December 15, 2019. https://www.npr.org/2016/12/15/505577680/advanced-black-lung-cases-surge-in-appalachia

[2] Howard Berkes. National Public Radio. "NPR Continues To Find Hundreds Of Cases Of Advanced Black Lung." July 1, 2017. https://www.npr.org/sections/thetwo-way/2017/07/01/535082619/npr-continues-to-find-hundreds-of-cases-of-advanced-black-lung

[3] Blackley DJ, Crum JB, Halldin CN, Storey E, Laney AS. Resurgence of Progressive Massive Fibrosis in Coal Miners — Eastern Kentucky, 2016. MMWR Morb Mortal Wkly Rep 2016;65:1385–1389. DOI: http://dx.doi.org/10.15585/mmwr.mm6549a1

[4] Blackley DJ, Reynolds LE, Short C, et al. Progressive Massive Fibrosis in Coal Miners From 3 Clinics in Virginia. JAMA. 2018;319(5):500–501. doi:10.1001/jama.2017.18444

2016 and noted that "these approaches may not guarantee that exposures will be controlled adequately or that future disease rates will decline." [5]

B. The current standard for respirable silica in mining is woefully out of date.

Currently there are two different standards for respirable silica, also known as quartz, for coal and metal/non-metal (MNM) mining; however, both are outdated, leaving workers unprotected. In MNM mining the existing standard is based on a 1973 American Conference of Governmental Industrial Hygiene (ACGIH) Threshold Limit Value (TLV). The standard was recodified in 1985, but is woefully out of date. In coal mining, there is no separate standard for silica; the standard for respirable silica dust is based off the respirable dust standard, requiring a reduction of respirable dust when the concentration of quartz exceeds 100 $\mu g/m^3$. The formula for permissible exposures are based on an ACGIH recommendations from the 1970s, which were approximately 100 $\mu g/m^3$, yet these were based on even older science. Exposure limits in these existing standards exceed both the National Institute of Occupational Safety and Health's (NIOSH) Recommended Exposure Limit (REL) and the Occupational Safety and Health's (OSHA) Permissible Exposure Limit (PEL) of 50 $\mu g/m^3$ for an 8-hour TWA.

II. There is significant risk of silica-related health effects among miners.

There is significant evidence of silica exposure in coal and MNM mining resulting in increased incidences of black lung, progressive massive fibrosis and silicosis among workers. In addition, silica is known to cause other non-malignant respiratory diseases, lung cancer, kidney disease, and other adverse health effects. OSHA discusses these in its preamble to the final OSHA silica rule.

OSHA's peer reviewed risk assessment determined that workers face a significant risk of harm from silica exposure at levels below the current MSHA standards. In fact, the lifetime cumulative risk of lung cancer mortality at 50 $\mu g/m^3$ was estimated to be between 5 and 23 per 1,000 workers. The lifetime cumulative risk of silicosis and non-malignant lung disease mortality at 50 $\mu g/m^3$ was estimated to be between 7 and 44 per 1,000 workers. OSHA also has estimates for lifetime renal disease mortality, silicosis morbidity, and other health endpoints at higher and lower silica concentrations. *See* 81 FR 16386, Table VI-1. Summary of Lifetime or Cumulative Risk Estimates for Crystalline Silica. MSHA should utilize this recent, peer-reviewed risk analysis completed by OSHA to expedite its own rulemaking.

While the black lung and PMF epidemic is occurring among coal miners, the serious effects of silicosis is a significant risk to all miners. In MNM mining, deaths from silicosis have been reported by NIOSH, MSHA, and the New Jersey Department of Health Silicosis Surveillance Project. In a 2008 study, NIOSH reported 134 silicosis deaths in the MNM miners from selected states between 1990 and 1999.[6] Using MSHA data, NIOSH researchers reported 55 cases of silicosis among MNM miners surveyed between 2006 and 2015—80% of all pneumoconiosis

[5] National Academies of Sciences, Engineering, and Medicine 2018. Monitoring and Sampling Approaches to Assess Underground Coal Mine Dust Exposures. Washington, DC: The National Academies Press. https://doi.org/10.17226/25111.

[6] NIOSH. (2008c). Work-related lung disease surveillance report 2007. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. DHHS (NIOSH) Publication No. 2008-143. Docket ID: OSHA-2010- 0034-1308.

cases among the sector.[7] The state of New Jersey reported 561 cases of silicosis between 1979 and 2011, with 14% occurring in the mining sector, and most frequently in MNM surface mining.[8]

Surveillance data from the U.S. Centers for Disease Control show that while the number of coalworker pneumoconiosis cases has decreased over the years—tracking the decrease in size of this industry overall—the number of death and disease cases are still a severe problem and importantly, the proportion of cases by age groups illustrate the reality that young workers are becoming sick and dying from exposure to silica in mining.[9]

Table 1. Percentage of Coalworker Pneumoconiosis Cases in Each Year Among 55-64 Year Olds

Year	Percent (%)
1999	4
2000	4
2001	3
2002	5
2003	5
2004	4
2005	5
2006	4
2007	4
2008	7
2009	10
2010	7
2011	8
2012	11
2013	9
2014	14
2015	12
2016	18
2017	17

[7] Yorio PL, Laney AS, Halldin CN, et al. Interstitial Lung Diseases in the U.S. Mining Industry: Using MSHA Data to Examine Trends and the Prevention Effects of Compliance with Health Regulations, 1996-2015. Risk Anal. 2018;38(9):1962–1971. doi:10.1111/risa.13000

[8] New Jersey Department of Health. Environmental and Occupational Health Surveillance Program. Silicosis Surveillance and Intervention Project. "Tracking Silicosis in the New Jersey Mining Industry – What Have We Learned?" March 2013. https://www.nj.gov/health/workplacehealthandsafety/documents/silicosis/mining/njmining_silicosis.pdf

[9] Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2017 on CDC WONDER Online Database, released December, 2018. Data are from the Multiple Cause of Death Files, 1999-2017, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at http://wonder.cdc.gov/ucd-icd10.html on Oct 23, 2019 3:00:08 PM

Table 2. Summary and Trend from Table 1 (Percentage of Coalworker Pneumoconiosis Cases in Each Year Among 55-64 Year Olds)

Year range	Percent (%) (range) makeup of cases
1999-2007	3-5%
2008-2013	7-11%
2014-2017	12-18%

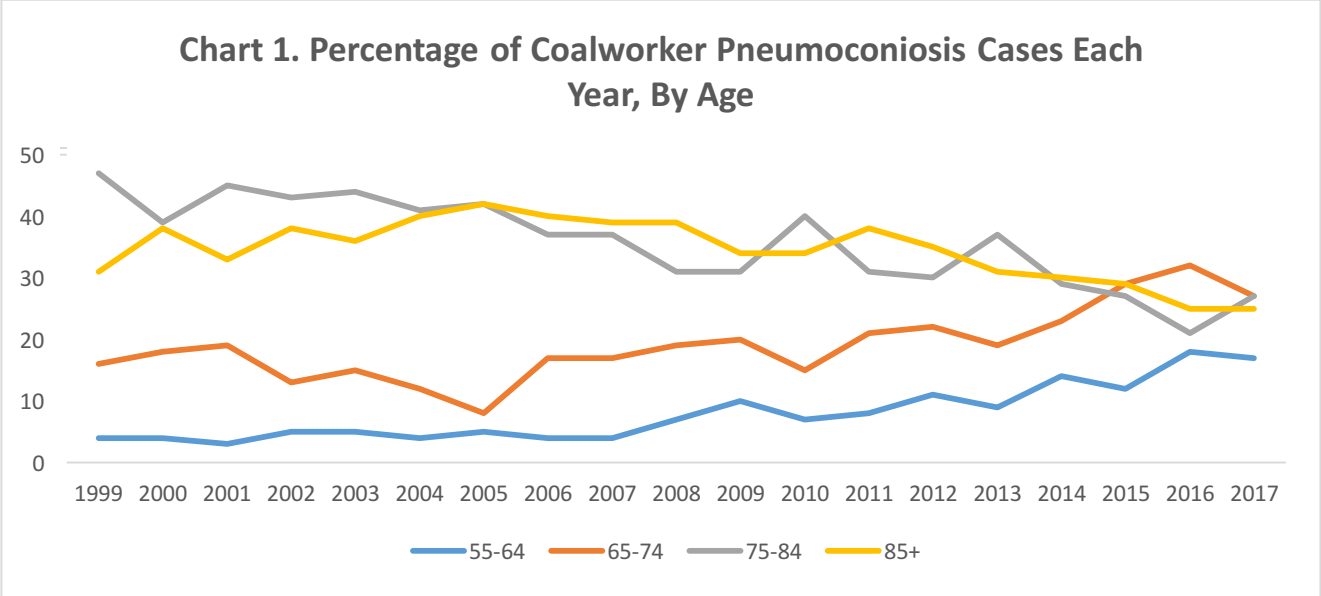

Table 3. Number of Coalworker Pneumoconiosis Cases in Younger Workers, by year.

Year	15-24 years old	25-34 years old	35-44 years old
1999			1
2004			1
2006		1	
2008		1	
2009			1
2013	1		
2014			1
2016	1		
2017			1

Tables 1 and 2 illustrate the percentage of workers 55-64 years old in each year from 1999 to 2017 who were identified as fatality cases with coalworker pneumoconiosis as the cause of

death. As shown, the percentage among this age group has increased consistently since 1999. In fact, Chart 1 shows an increase in coalworker pneumoconiosis among workers in the next age group, 65-74 years old. Workers are developing diseases at younger ages than they used to. Table 3 illustrates the incidence of cases of very young workers appearing in recent years. As was raised in the public hearings during the OSHA silica rulemaking, (younger) workers newer to the workforce are using silica differently. They use more mechanization to handle and process silica dust—larger machines with greater force, generating greater exposures of silica dust than hand tools.

It is important to note that surveillance data that relies on death certificates, such as this CDC data, misses many cases without proper classification and is an undercount of the real problem.

Two factors for the increase in silica exposure to miners have been identified by MSHA and NIOSH. First, coal seams are thinner resulting in the cutting of more rock material containing quartz. Also, like the construction industry, the mining industry is more mechanized than it used to be: using large, more powerful machinery that pulverizes silica-containing materials—and all other material—into greater amounts of respirable dust.[10] *See* 84 FR 45454. The use of changing technologies resulting in more airborne silica dust has been seen across industries. However, exposures from newer, high-powered machinery can be controlled in mining, as it has been done in the construction industry using newer dust control technologies. For example, in the asphalt milling and paving industry, a dust control system was created for milling machines, including ventilation and water controls, which reduced silica exposures below 50 $\mu g/m^3$.[11]

III. MSHA's silica standard must be comprehensive to protect miners.

While MSHA should take immediate action to limit silica exposure in mining, a final rule must contain a protective exposure limit and additional provisions, such as exposure monitoring and medical surveillance, to ensure miners are protected from unnecessary disease and death. MSHA should set an exposure limit that is at least as protective as the OSHA PEL and NIOSH REL for miners. At the PEL OSHA had to set due to feasibility (50 $\mu g/m^3$), the agency determined substantial significant risk remains. *See* 81 FR 16386. Significant health risk to workers remains even at 25 $\mu g/m^3$ for silica-related mortality and morbidity—a critical reason for the standard to trigger certain, life-saving provisions at the action level. NIOSH recommends an exposure limit of 50 $\mu g/m^3$ and the current ACGIH threshold limit value for silica is 25 $\mu g/m^3$.

A. Exposure assessment

An essential part of protecting miner health and a long-standing industrial hygiene practice is understanding the mine environment through exposure assessment. Exposure assessment determines when miners need protections, how much protection is required, if controls are effective and continuing to be effective, and to evaluate if work practices need to be changed to reduce exposure. This is particularly important in mining activities to ensure proper water- and air-flow rates are required to control exposures at the source of dust generation, limit

[10] Blanc, Paul D., and Anthony Seaton. "Pneumoconiosis redux. Coal workers' pneumoconiosis and silicosis are still a problem." 2016: 603-605. https://www.atsjournals.org/doi/full/10.1164/rccm.201511-2154ED

[11] National Asphalt Pavement Association and CPWR-The Center for Construction Research and Training. Field Guide for Controlling Silica Dust Exposure on Asphalt Pavement Milling Machines. 2017. https://www.silica-safe.org/training-and-other-resources/manuals-and-guides/asset/NAPA_Silica_Field-Guide_2015_Final-Rule-Edits_FINAL.pdf

variabilities associated with wearing respirators, and prevent the dust from spreading to other areas exposing other workers to silica.

B. The hierarchy of controls is embedded in MSHA's mandate and continues to be fundamental to ensure effective control of silica dust.

A comprehensive rule must follow the legal requirements of the 1969 Coal Mine Safety and Health Act (Coal Act) and the Federal Mine Safety and Health Act of 1977 (Mine Act). Both Acts are clear in their intents to protect miners from respirable dust by controlling the mine atmosphere. During legislation of the Coal Act, Congress made their intentions clear stating "the average dust level at any job, for any miner, in any active working place during each and every shift shall be no greater than the standard." They also clarified their intentions for dust to be controlled using the hierarchy of controls by prohibiting personal protective devices, including respirators, as a substitute for environmental control measures in mining operations. The Mine Act is unmistakably straightforward in its requirements to protect miners from respirable dust using the hierarchy of controls. It requires MSHA to ensure that the *mine atmosphere* is free from dust to the levels dictated in the Act or any regulation. Additionally, Section 202(h) blatantly states "[u]se of respirators shall not be substituted for environmental control measures in the active workings." In the RFI, MSHA has acknowledged their responsibility to require control of respirable dust through the hierarchy of controls, referring to Sections 201(b) and 202(h) of the mine act, stating:

> MSHA reiterated that engineering or environmental controls are the primary means to control respirable dust in the mine atmosphere, which is consistent with sections 201(b) and 202(h) of the Mine Act.
>
> As specified in Sections 201(b) and 202(h) of the Mine Act and since passage of the Federal Coal Mine Health and Safety Act of 1969, MSHA has enforced an environmental standard at coal mines; that is, the concentration of respirable dust in the mine atmosphere is measured rather than the breathing zone of any individual miner. 84 FR 45454

While any deviation away from the statute would be both illegal and breaking with agency precedent, the AFL-CIO reiterates that Congress' intentions and requirements on respirable dust exposure and prohibition of respirator use over engineering controls are fundamental, widely-accepted and effective industrial hygiene practices used today. The hierarchy of controls is a long-established practice based on evidence and experience that implementing engineering controls to reduce exposures at their source is a far more effective means of protecting workers than personal protective equipment. This practice is used by industrial hygiene professionals, businesses, and regulatory agencies throughout the U.S. and the world. The ANSI/ASSE Z88.2-2015 standard, a widely-recognized national voluntary standard on practices for respiratory protection, recognizes that respiratory protection is the least effective method for controlling workplace exposures, stating:

> [Minimizing the workplace exposure] shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being implemented or evaluated, appropriate respirators shall be used according to the requirements of this standard.

The hierarchy of controls is well-known in the mining industry and is utilized within National Mine Association's CORESafety initiative:

> Following the identification of health risks, controls shall be implemented with priority given to engineering (elimination, isolation, separation, etc.), followed by administrative and finally Personal Protective Equipment as means for controlling hazards.[12]

The RFI suggests that MSHA is considering increased reliance on respirators, specifically PAPRs, because several industry groups have argued the use of PAPRs not only as a temporary supplementary control, but also an engineering control. The AFL-CIO urges MSHA not to abandon its statutory mandate and longstanding practice to control dust in the mine atmosphere using the hierarchy of controls. PAPRs are not engineering controls.

Respirators and other forms of personal protective equipment do nothing to address bystander exposure and leave wide variability in the times they are worn, their fit, working conditions such as temperature, communication between workers, and the ability of workers to do their job tasks without compromising the fit and efficacy of the respirator. The limitations of respirators are thoroughly explained with supportive evidence in our previous comments on OSHA's silica standard. See OSHA-2010-0034-4204, pp. 69-72. Respirators and other PPE often create a false sense of protection to workers who believe they are wearing them properly and a false sense of the reality that the responsibility to ensure a safe workplace is on the worker, not the employer. MSHA has already recognized these limitations in the RFI and noted the exposure potential when relying on respirators as a primary control stating, "removing the respirator for 24 minutes during the 8-hour exposure duration, the protection factor is reduced to 6.9." See 84 FR 45455-6.

Respirators should only be used as a method to prevent dust exposure when, in areas where exposures exceed the exposure limit, respirators are required during the installation and implementation of engineering and work practice controls; during work operations where engineering and work practice controls are not feasible; when all feasible engineering and work practice controls have been implemented but are not sufficient to reduce exposure to or below the exposure limit; and during periods when any employee is in a regulated area or an area for which an access control plan indicates that use of respirators is necessary.

C. Engineered dust controls are available and feasible in the mining industry.

On October 17, 2019, at the public meeting for this RFI, the National Mining Association began its testimony stating that the industry had worked with companies and NIOSH to develop dust controls that were widely implemented throughout the industry. NMA and NIOSH should submit this extremely valuable information and control technologies to this record. NIOSH's Mining Division conducts state of the art research on effective dust controls and exposure assessment, with research initiatives in coal mining, continuous mining and surface mining. In coal mining, some dust control methods established or improved included water-powered dust collectors, underside canopy spray systems, foam applications, ventilation and dust collectors, and dry

[12] National Mining Association. CORESafety Standard Operating Procedures. Industrial Hygiene. Module 13. January 2013. Accessed October 28, 2019. Page 3. https://www.coresafety.org/wp-content/uploads/2014/12/12-352MOD_13C.pdf

scrubbers.[13] In surface mining dust control methods for drilling, hauling, and labor intensive operations were created and current technologies for activities such as continuous mining, cross-cutting, and blasting were improved.[14] In the industrial minerals and metal/nonmetal mining industry, research has addressed issues in enclosed control rooms and operator compartments, mobile workers, bagging operations, and thermalling operations. All the projects work with industry to validate promising technologies, encourage adoption of valid interventions, and to reduce the incidence and prevalence of respiratory diseases in miners. NIOSH has published best practice documents for dust control in the mining sectors and continues to improve upon and share new control processes.[15]

One NIOSH success worth highlighting is the commercially available Helmet-CAM system with free EVADE software that identifies high exposures within the mining industry with simple control solutions. Through field tests, they found that cloth chairs in mobile equipment, break rooms, and offices were a source of dust exposure. However, the exposure is controlled by substituting cloth chairs with vinyl or leather seat covers or plastic chairs—a simple solution using the hierarchy of controls.[16]

CPWR—The Center for Construction Research and Training maintains and updates a "Create-A-Plan" tool to help contractors easily create the written exposure control plan required by the OSHA silica standard on www.silica-safe.org. The planning tool includes examples of commercially-available equipment/control options with the goal of increasing awareness of available control options for employers to install and for workers to request. As some construction workers work in and around operations such as sand loading, offloading, and transferring, the planning tool includes commercially-available control options for these tasks. As of October 2019, some dust control examples are available for both chemical coating and vacuum systems. These are listed in Appendix A.

Additionally, the industry has developed larger, more powerful mining technologies—part of the reason for the increase in occupational lung disease among miners as they create more dust. With new mining technology must come new dust control technology. One driving force in technological advancements is pending or existing regulations. There is consistent evidence of the development of effective and efficient controls due to a new regulation, or even the threat of a regulation.[17] This effect has been seen widely across the promulgation of workplace health and safety regulations. [18]

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[13] NIOSH. Research Program. Mining Project: Controlling Respirable Dust in Coal Mining Operations. Accessed October 25, 2019. https://www.cdc.gov/niosh/mining/researchprogram/projects/project/controlling_respirable.html

[14] NIOSH. Research Program. Mining Project: Respirable Dust Control for Surface Mines. Accessed October 25, 2019. https://www.cdc.gov/niosh/mining/researchprogram/projects/Project_2008_030.html

[15] NIOSH. Best Practices for Dust Control in Metal/Nonmetal Mining. IC 9521. 2010. https://www.cdc.gov/niosh/mining/UserFiles/works/pdfs/2010-132.pdf; NIOSH. Best Practices for Dust Control in Coal Mining. IC 9517. 2010. https://www.cdc.gov/niosh/mining/UserFiles/works/pdfs/2010-110.pdf; NIOSH. Dust Control Handbook for Industrial Minerals Mining and Processing. RI 9689. 2012.

[16] Haas, E. J., and A. B. Cecala. "Quick fixes to improve workers' health: Results using engineering assessment technology." Mining engineering 69, no. 7 2017: 105. HTTPS://DOI.ORG/10.19150/ME.7622

[17] Ruttenberg, R. The Incorporation of Prospective Technological Changes into Regulatory Analysis Which is Used in the Planning of Occupational Safety and Health Regulations, unpublished Ph.D. dissertation, University of Pennsylvania, 1981.

[18] See OSHA-2010-0034-2256. Comment by Ruttenberg, Ruth; Ruth Ruttenberg & Associates.

D. MSHA should incorporate the large record of silica knowledge into its silica standard.

OSHA's silica standard was updated in 2016 after 19 years on the rulemaking agenda. The comprehensive OSHA standard is an invaluable record of knowledge, including decades worth of risk, technological feasibility, and economic feasibility analysis. MSHA has a mountain of information that identify the hazards and risks of silica for miners and should also incorporate the OSHA silica docket (OSHA-2016-0034) into their docket (MSHA-2016-0013). While much of OSHA's docket would be applicable to mining, we have highlighted some exhibit numbers to be included into the MSHA-2016-0013 docket in Appendix B.

Conclusion

The mining industry has been exposing workers to deadly silica dust for decades. The agency responsible for ensuring the industry protects its workforce has failed to take action, leaving the epidemic of lung disease among miners not only a trend of the past, but is responsible for the resurgence in mining-related lung disease we see today.

It is time for MSHA to issue comprehensive silica protections that include exposure monitoring and medical surveillance provisions, with a central focus on the hierarchy of controls in controlling dust exposure. It is feasible to control silica exposure in mines with existing technologies and issuing this standard with extreme urgency will hasten the development of modern technologies to protect workers from silica exposure. We urge MSHA to expedite this rulemaking process, relying on the overwhelming existing evidence on controlling silica dust exposure to prevent further disease and death among workers in the mining industry.

Respectfully submitted,

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Appendix A: CPWR Tools

Chemical Coating

1. Covia DST™ (DustShield)
   - See how it works
   - Manufacturer

2. Sentinel™ Dust Suppressant
   - Manufacturer
   - Learn More: Webinar

3. ArrMaz SandTec® USDA Certified Biobased Product
   - See how it works
   - Manufacturer
   - Learn More: Oil & Gas: Silica Dust Control in Hydraulic Fracturing
   - Learn More: Brochure
   - Learn More: Infographics

Vacuum System

1. Sierra Total Dust Control System
   - See how it works
   - Manufacturer

2. Airis ADV-4
   - Manufacturer
   - Learn More: Airis Video Discussion of Standard
   - Learn More: Airis Video Frac Sand & Silica

Appendix B: Relevant Dockets from OSHA Silica Docket (OSHA-2010-0034)

Title	Exhibit Number*	Link
AFSCME Final Brief	4203	https://www.regulations.gov/document?D=OSHA-2010-0034-4203
Post Hearing Brief of the United Steelworkers	4214	https://www.regulations.gov/document?D=OSHA-2010-0034-4214
BCTD Post Hearing Brief	4223	https://www.regulations.gov/document?D=OSHA-2010-0034-4223
IUOE Post Hearing Brief Parts 1-4, Appendix A and B	4234	https://www.regulations.gov/document?D=OSHA-2010-0034-4234
AFL-CIO Silica Post-Hearing Brief	4204	https://regulations.gov/document?D=OSHA-2010-0034-4204
BCTD Silica Post Hearing Comments Cover Letter and Index - Documentary Evidence	4073	https://www.regulations.gov/document?D=OSHA-2010-0034-4073
Post Hearing Comment from Seminario, Peg; American Federation of Labor and Congress of Industrial Organizations (AFL-CIO) - Documentary Evidence; Specifically see 14 British Columbia Municipal Safety Association. WorkSafeBC - Developing a silica exposure control plan. Retrieved 2014.; 25 MSHA Handbook Series. Coal Mine Health Inspection Procedures; 34 STEPS Network: Control Skirts for Dust Control. May 2013; 35 STEPS Network: Liquid Dust Suppressant.; 36 STEPS Network: J&J Truck Bodies; 37 STEPS Network : RCS IH Team monitoring project.; 48	4072	https://www.regulations.gov/document?D=OSHA-2010-0034-4072

GAO. Report on MSHA coal dust rule report. 2014;		
Testimony of Peter Dooley, April 1, 2014 and Testimony of Bill Kojola, April 1, 2014	3955	https://www.regulations.gov/document?D=OSHA-2010-0034-3955
American Federation of State, County and Municipal Employees (AFSCME); Silica comments	2106	https://www.regulations.gov/document?D=OSHA-2010-0034-2106
Comment from Grogan, James; Heat and Frost Insulators and Allied Workers	2219	https://www.regulations.gov/document?D=OSHA-2010-0034-2219
Comment from McNamara, Joe and Hoffner, Ken; New Jersey Laborers Health and Safety Fund (NJLHSF)	2164	https://www.regulations.gov/document?D=OSHA-2010-0034-2164
Comment from Boland, James; The International Union of Bricklayers and Allied Craftworkers (BAC)	2329	https://www.regulations.gov/document?D=OSHA-2010-0034-2329
Comment from Seminario, Peg; American Federation of Labor and Congress of Industrial Organizations (AFL-CIO); Comment from Mirer, Frank; CUNY School of Public Health; Comment by Ruttenberg, Ruth; Ruth Ruttenberg & Associates	2256	https://www.regulations.gov/document?D=OSHA-2010-0034-2256
Comment from Robinson, Kinsey; United Union of Roofers, Waterproofers and Allied Workers	2254	https://www.regulations.gov/document?D=OSHA-2010-0034-2254

Comment from Callahan, James T.; International Union of Operating Engineers (IUOE)	2262	https://www.regulations.gov/document?D=OSHA-2010-0034-2262
Comment from Trahan, Chris on behalf of McGarvey, Sean; Building and Construction Trades Department (BCTD), AFL-CIO and Copyright Material Release from Ruminski, Melissa J., Editor, Safety and Health Magazine, National Safety Council (NSC)	2371	https://www.regulations.gov/document?D=OSHA-2010-0034-2371
Comment from Shudtz, Center for Progressive Reform (CPR)	2351	https://www.regulations.gov/document?D=OSHA-2010-0034-2351
Comment from Byrd, Lamont; International Brotherhood of Teamsters (IBT)	2318	https://www.regulations.gov/document?D=OSHA-2010-0034-2318
AFL-CIO Silica Cover Letter 11Feb14; AFL-CIO Silica Testimony-Comments 2-11; Mirer OSHA Silica Comments 2014-2-10; Silica testimony-Ruttenberg	2257	https://www.regulations.gov/document?D=OSHA-2010-0034-2257
Documentary Evidence from Seminario, Peg; American Federation of Labor and Congress of Industrial Organizations (AFL-CIO)	2258	https://www.regulations.gov/document?D=OSHA-2010-0034-2258
Comment from Trahan, Chris; Building and Construction Trades Department (BCTD), AFL-CIO	2340	https://www.regulations.gov/document?D=OSHA-2010-0034-2340

Comment from Sivin, Darius; The International Union, UAW	2282	https://www.regulations.gov/document?D=OSHA-2010-0034-2282
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*All of the exhibit numbers that are cited in this appendix are exhibits from the silica docket OSHA-2010-0034 as posted on www.regulations.gov. The AFL-CIO is only using the last four digits of the posted exhibit numbers to cite these exhibits in this appendix.