



# International Union of Operating Engineers

AFFILIATED WITH THE AMERICAN FEDERATION OF LABOR AND CONGRESS OF INDUSTRIAL ORGANIZATIONS

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Re: IUOE's Comments on Proposed Silica Standard

Dear Sir or Madam:

The International Union of Operating Engineers ("IUOE") submits these comments to the U.S. Department of Labor, Occupational Safety and Health Administration, in response to the Notice of Proposed Rulemaking to amend its existing standards in 29 C.F.R. Part 1926 for occupational exposure to respirable silica exposure. *78 Fed.Reg.* 56274 (Sept. 12, 2013).

The IUOE is a labor organization that represents about 380,000 members, with about two-thirds of its membership employed as heavy equipment operators in "building construction" and "nonbuilding construction." *78 Fed.Reg.* at 56381. The IUOE strongly supports the proposed rule as a necessary measure to protect the safety and health of operating engineers. Operating engineers should not be forced to endure exposure to unsafe levels of silica to earn a paycheck.

The IUOE supports the comments of the Building and Construction Trades Department ("BCTD") and the AFL-CIO and incorporates their comments herein. The IUOE highlights their recommendations on task-specific training and "competent person," since these recommended modifications to the proposed rule are particularly important to the protection of operating engineers. Indeed, the engineering and work practices controls that OSHA has included on Table 1 for the protection of operators require action on the part of both operators and competent persons to function effectively. Additionally, in recognition of the fact that control technology changes over time and that OSHA may not engage in another rulemaking on silica in the foreseeable future, the IUOE recommends that Table 1 be included as an appendix to the final rule, with the direction that OSHA review the appendix within specified time frames as additional engineering controls are developed and changes in construction techniques either increase or decrease silica exposures.

The IUOE has chosen to submit extensive comments to supplement the comments of the BCTD and AFL-CIO because the work performed by heavy equipment operators presents unique safety and health concerns.



## INTRODUCTION

The IUOE recognizes that OSHA faces significant challenges in development of a regulatory scheme that addresses an industry in which workers are commonly employed on mobile sites and by multiple employers and on multiple “projects” during a year, or even at multiple locations/assignments during a single shift. IUOE members work in highly mobile workplaces, such as asphalt milling and paving sites, where milling operators often end their shift miles away from the location at which they began their workday. The “nonbuilding construction” performed by operators involves the building of private projects and “public works” such as roads, bridges, and other infrastructure, dams, and aqueducts. They also work in more “stationary” or “fixed” workplaces in the construction of private and public projects, such as schools, barracks, government office building, shopping malls, and parking garages, where heavy equipment operators typically begin and end their day in relatively circumscribed areas.

Many of the measures needed to protect heavy equipment operators from silica exposure overlap with controls implemented for other safety and health issues involving the same workers, such as noise, dust, and diesel fuel exposure, and to foster good industrial hygiene practices. These measures (*e.g.*, industry best practices for use of water trucks to suppress dust) also facilitate compliance with local nuisance laws since many construction activities, such as milling operations, are performed adjacent to private homes, public buildings, schools, and pedestrian sidewalks.

The IUOE applauds proposed Table 1 as a proactive means to the protection of workers before exposures occur during activities that fracture or abrade silica-containing materials. The IUOE represents workers who perform operations set forth in “Table 1 – Exposure Control Methods for Selected Construction Operations,” including:<sup>1</sup>

- operation of milling machines,
- use of heavy equipment during earthmoving,
- rock crushing,
- operation of vehicle-mounted drilling rigs for concrete,
- operation of vehicle-mounted drilling rigs for rock, and
- operation of driveable masonry saws.

OSHA has recognized a number of the unique characteristics of the work performed by operating engineers in the Preliminary Economic Analysis and Initial Regulatory Flexibility Analysis (“PEA”). The combination of the location of operating engineers in relation to the silica source, the effectiveness of enclosed cabs as an engineering control, and the duration of operator work performed in proximity to the silica source distinguish the work of the IUOE from the tasks performed by other construction workers. As stated in the PEA, OSHA has analyzed the work of heavy equipment operators “together” because (PEA, IV-395):

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<sup>1</sup> All these functions involve the “use of heavy equipment.” “Vehicle-mounted rigs” and “milling machines,” for

- 1) the similarity in worker position relative to the point of tool action (operators' seat is usually 5 to 20 or more feet from the point of action); 2) the potential for enclosing (in a cab) the workers who operate this type of equipment; and 3) the large percentage of the shift that these operators typically spend in the operator's seat rather than at a point closer to the point of tool action.

The IUOE's comments will focus on Table 1 construction operations as the proposed protections apply to operators working inside and outside of enclosed cabs and to two IUOE-represented crafts – field surveyors and field material testers – who work in coordination with operating engineers.

### **SUMMARY OF IUOE'S POSITION**

Table 1 is an innovative solution to a complex problem. With traditional exposure assessments, the results of exposure monitoring become available **after** the exposure has already occurred regardless of the duration of the project. On short-term projects, the operator moves to another project and there is a perpetuation of a pattern of exposure first with subsequent test results, and the harmed worker may not receive any benefit from the exposure monitoring.

The IUOE proposes that rather than including broad, undefined terms for earthmoving and milling, OSHA subdivide operations included within these activities. Greater specificity would enable OSHA to tailor Table 1 exposure controls to the anticipated exposure levels based upon the data cited in the PEA for particular operations within each broad category. The IUOE recommends inclusion of a definition of "earthmoving" in proposed 1926.1053(b) and improvements to Table 1 so that contractors who employ operators have more explicit guidance on the construction activities encompassed therein.

The following modifications to Table 1 would provide explicit direction to employers and improve the controls set forth in Table 1:

- Define "earthmoving" in 1926.1053(b) to clarify that "earthmoving," as used on Table 1, is a subset of the broad scope of work performed by "heavy equipment" operators, and identify on Table 1 "earthmoving" activity that fractures or abrades silica-containing materials
- Substitute "use of earthmoving equipment for activity that abrades or fractures silica-containing materials" for "use of heavy equipment during earthmoving" to better target compliance resources to earthmoving operations that pose safety and health threats
- Exclude "demolition" data, such as demolition of roads, masonry,<sup>2</sup> and buildings, from the analysis used by OSHA for estimating exposures related to milling and earthmoving

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<sup>2</sup> See 29 C.F.R. 1926.854, "Removal of walls, masonry section, and chimneys."

- Conduct a separate analysis of demolition to determine which, if any, types of demolition performed with heavy equipment might be included as separate operations on Table 1
- Treat “asphalt milling” and “concrete milling” separately so that OSHA’s analysis is more precise and exposure controls are better targeted to milling operations based on relative exposure levels. Greater precision will ensure that compliance resources are best utilized and will reduce hazards related to prolonged respirator use by workers who work adjacent to moving heavy equipment and traffic
- Include additional, mandatory “characteristics” of “enclosed cabs” to better ensure cab integrity
- Provide guidance on “regulated area” as applied to Table 1 activities
- Clarify that full compliance with controls for the protection of workers outside the cab does not exempt employers from exposure monitoring of workers operating heavy equipment if the employer does not use enclosed cabs or uses enclosed cabs without all the characteristics identified in Table 1
- Clarify that for Table 1 activities requiring use of respirators after four hours, OSHA intends that workers shall wear respirators for the duration of the entire shift when the activity is performed for four or more hours in a workday

Greater precision in delineating construction activities (and the tasks encompassed therein) in Table 1 will enable contractors to better plan for implementation of controls to comply with the new standard. Since the only protection identified in Table 1 for operation of heavy equipment during earthmoving is working within an enclosed cab with specified characteristics, contractors who wish to use Table 1 as a “safe harbor” will need to budget for the retrofitting of cabs. Advance notice and clear guidance are particularly important to employers of operating engineers because the retrofitting of cabs in their fleet of equipment requires an upfront expenditure of resources. The number and types of pieces of equipment that a contractor will have to retrofit will be contingent upon the scope of activity encompassed within earthmoving. For small and medium-sized contractors, in particular, this will have a direct impact on the type of “earthmoving” work for which they can submit bids.

The IUOE further recommends that, in view of the integral role played by operators in the effective functioning of engineering controls, OSHA require task-specific training on engineering controls applicable to the specific construction tasks performed by the trainee.

The IUOE also recommends expansion of the definition of “competent person” in 1926.1053(b), and the role of the competent person. The role of the competent person is essential since the factors that impact silica exposure change during the course of a workday based upon local topography and environmental conditions, such as wind and humidity. An asphalt miller may, for example, grind through asphalt and then unexpectedly encounter a concrete sub-base with higher silica concentration. During an earthmoving job, a heavy

equipment operator may be required to perform another Table 1 operation, such as rock drilling, or rock ripping,<sup>3</sup> the latter of which is a type of earthmoving activity that produces substantially higher levels of silica exposure than moving such clay or virgin earth.

The IUOE urges OSHA to explore at the public hearing the use of geotechnical profiling for silica content when there is a reasonable expectation that operators will be exposed to silica at or above the action level and the employer chooses not to implement Table 1 controls. Use of this tool prior to the commencement of earthmoving activities that fracture or abrade silica-containing materials would better enable the employer to implement appropriate controls. Geotechnical testing is a proactive measure for the protection of workers **before** exposure occurs.

## THE IUOE'S RECOMMENDATIONS

### I. THE IUOE SUPPORTS TABLE 1 AS A PROACTIVE APPROACH TO PROTECT WORKERS DURING CONSTRUCTION ACTIVITY THAT ABRADES OR FRACTURES SILICA-CONTAINING MATERIALS

OSHA states in the preamble that in devising Table 1, it has identified the “12 construction activities, by job category, as being potentially affected by the proposed silica standard.” *Id.* at 56343. OSHA further states that it has “reviewed the industrial hygiene literature across the full range of construction activities, and focused on dusty operations where silica sand was most likely to be **fractured or abraded** by work operations.” *Id.* (emphasis added).

The IUOE agrees with this novel approach in concept since it is far more proactive than a standard that would require the implementation of protections after exposure monitoring determines that intermittent workers have already been exposed to high concentrations of silica. The IUOE supports inclusion of milling, rock and concrete drilling, rock crushing, and operation of driveable masonry saws on Table 1, since each operation fractures or abrades silica-containing materials.<sup>4</sup> As discussed in the PEA, milling machinery, for example, “often uses a rapidly rotating drum or a bit covered with nibs to abrade surfaces, although other mechanisms are also common (e.g., systems based on impact, shot-blast, or rotating abrasive cups).” PEA, IV-451. The PEA states that the “major activities” of a large driven milling machine are “grating or grinding solid surfaces such as asphalt roads.” *Id.* at IV-452.

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<sup>3</sup> Rock ripping is an alternative to drilling and blasting to loosen rock during excavation. The “rippability” of rock depends on its hardness; if rock is too hard to be ripped, it is fragmented with explosives or by drilling.

<sup>4</sup> The IUOE does not comment on Table 1 construction activities performed by other crafts.

**A. The Threshold Question for Inclusion of a Construction Activity on Table 1 is Whether the Construction Operation Fractures or Abrades Silica-Containing Materials**

The IUOE encourages OSHA to reconsider the threshold question of whether the undefined activity of “earthmoving” normally causes the fracturing or abrading of silica-containing materials in such a manner as to generate appreciable airborne concentrations of respirable silica. “Earthmoving” is commonly understood in the construction industry to broadly encompass the use of a wide variety of heavy equipment, such as excavators, backhoes, trenchers, bulldozers, scrapers, and graders to excavate or backfill the “earth” to change its topography in accordance with the requirements of the construction project. The answer to the threshold question will vary depending upon the specific earthmoving tasks under consideration.

The IUOE does not agree with inclusion of “use of heavy equipment” in **all** “earthmoving” on Table 1, since, as a general matter, this activity does not fracture or abrade silica-containing materials, and thus, does not expose heavy equipment operators to high concentrations of respirable silica. There is no risk of inhalation of respirable silica without the fracturing or abrading of silica-containing materials into small particles, since the size of the airborne silica particles determines the amount of risk.<sup>5</sup> Smaller particles can be inhaled deep into the lungs where they can cause damage. *Id.* Larger particles, such as beach sand, are not as great a concern because they are too large to inhale. *Id.*

There are earthmoving activities, such as “rock ripping,” which fracture or abrade silica-containing materials. It is appropriate to include on Table 1 clearly identified earthmoving activities that are known to fracture or abrade silica-containing materials **and** for which OSHA has sufficient exposure control data to support both their inclusion and effective controls.

There is no evidence that exposure levels are, or can reasonably be expected to be, above the PEL or even at the action level for **all** uses of heavy equipment during earthmoving. Indeed, the PEA demonstrates that there is a broad range of earthmoving functions with silica exposures far below the PEL. *See e.g.*, PEA, IV-396, *citing* NIOSH study, *Control Technology and Exposure Assessment for Occupational Exposure to Crystalline Silica: Case 20 – Road Demolition and Construction* (NIOSH ECTB 233-120c, 1999), which demonstrates low exposure rates for operators of excavators and backhoes for excavation, grading and/or trenching:

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<sup>5</sup> University of Washington School of Public Health, “Construction Silica Exposures and Solutions,” Field Research and Consulting Group, September 2006, 1 *Department of Environmental and Occupational Health Sciences*.

Job Title	Silica Concentration (mg/m <sup>3</sup> )	Activities
Excavator Operator 1	0.012	100% of time spent operating an excavator in order to excavate soil and load dump trucks
Excavator Operator 2	0.012	100% of time spent excavating existing road asphalt and dropping the asphalt into a dump truck. The greatest amount of dust is generated when the asphalt is dropped from the bucket to the ground or into the dump truck
Backhoe Operator 1	0.013	100% of time spent operating a backhoe in digging trenches and moving soil
Backhoe Operator 2	0.013 and 0.012	100% of time spent grading the road after excavation of asphalt

Accordingly, the IUOE recommends that OSHA clarify that earthmoving work potentially exposes workers to silica dust above the permissible exposure limit only when the activity causes the fracturing or abrading of silica and the materials excavated have a high silica concentration. With regard to the percentage of silica in materials, OSHA stated in the 2009 study that “concentrations of respirable silica in soil and rock may **vary widely** depending on the type of underlying rock formation and history of volcanic eruptions.” *Id.* at 45; emphasis added.

**B. “Earthmoving” is Undefined in the Standard**

There is no discussion in the preamble of the range of activities encompassed within “earthmoving” and only one reference in the entire preamble to “earthmoving.” 78 *Fed.Reg.* at 56465. The term “earthmoving” is not used even once in the PEA, and “earthmoving” is not defined in the proposed standard or in any other OSHA construction standard. The IUOE recommends that OSHA make clear which operations constitute “earthmoving” as intended on Table 1, and indicate whether “material moving,” such as moving crushed demolition debris, is intended to be encompassed within earthmoving.

Likewise, “heavy equipment” is not defined in the standard. The standard does not state which pieces of equipment are encompassed within the term “heavy equipment.”<sup>6</sup> No pieces of heavy equipment are identified in Table 1, and none are even mentioned in the

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<sup>6</sup> By contrast, in the PEA, OSHA states that workers in the job category of heavy equipment operator “drive crawlers or rubber-tired tractors and maneuver large attached construction tools.” PEA, IV-395. The PEA further states that “Attachments include (but are not limited to) augers, backhoes, buckets, cranes, hammers, dozer blades, draglines, forklifts, graders, rippers, rollers, scrapers, shovels, and trenchers (Russell, 1985). The category also includes dump-truck drivers, as well as operators of other heavy construction equipment (e.g., power cranes and power shovels).” *Id.* The PEA states that “drilling rigs, rock crushers, milling machines, and tunnel boring machines” are excluded from its analysis of the silica exposure of heavy equipment operators.” *Id.*

preamble. The IUOE notes that 29 C.F.R. 1926.602(a)(1) defines "earthmoving equipment" to include the following equipment:

These rules apply to the following types of earthmoving equipment: scrapers, loaders, crawler or wheel tractors, bulldozers, off-highway trucks, graders, agricultural and industrial tractors, and similar equipment. The promulgation of specific rules for compactors and rubber-tired "skid-steer" equipment is reserved pending consideration of standards currently being developed.

The IUOE intends to provide testimony at the public hearing on the scope of activity included in earthmoving, recommend a definition of earthmoving, and present exposure data on earthmoving.

### **C. A Clear Definition of "Earthmoving" Would Facilitate a More Precise Selection of Exposure Data and Development of More Targeted Exposure Controls**

The record shows that OSHA has combined exposure data on workers engaged in earthmoving with data on "heavy equipment operators" as a whole regardless of the function performed by the operator. Earthmoving is only a single subset of the diverse work functions performed by heavy equipment operators, such as dredging, demolition, hoisting objects with a crane, and loading and moving debris and materials. This conflation of earthmoving with other distinct functions has caused an imprecise analysis of the exposures of earthmovers using heavy equipment.

The record shows that researchers and scientists have developed substantial data based upon exposure monitoring of heavy equipment operators during a variety of construction activities. OSHA did not, however, develop a comprehensive understanding of the work activities included within "use of heavy equipment during earthmoving" before selection of this exposure data for the purpose of analyzing whether such data supports inclusion of earthmoving on Table 1. In its discussion of "earthmoving" in the preamble, OSHA relies upon exposure data on heavy equipment operators performing a variety of functions, rather than only those involved in "earthmoving." See 78 *Fed.Reg.* at 56465 for citations to the PEA.

The drafters of the "Heavy Equipment Operator" section of the PEA include a wide array of functions performed by heavy equipment operators, but most of those functions are not "earthmoving." The PEA's description includes work that is not encompassed within "earthmoving," as that term is understood in the construction industry.

The PEA states that the tasks performed by heavy equipment operators include "demolition; displacement (excavation); loading; and dumping of rock, soil, concrete, and other construction materials and debris." PEA, IV-395. The PEA further states that Table IV.C-53, "Job Categories, Major Activities, and Sources of Exposure of Heavy Equipment



Operators,” provides the following overview of the tasks performed by heavy equipment operators (*Id.*):

From an operator’s seat, manipulating tractor or vehicle-based implements (e.g., backhoe, crane, power shovel, excavator, hammer, dump truck) to perform demolition; excavation; loading; and dumping of rock, concrete, soil, and other construction materials and debris.

While all Table IV.C-53 functions in the “Heavy Equipment Operator” section of the PEA - loading, demolition, and moving construction materials - are performed by heavy equipment operators, those functions are not “earthmoving.” The operation of a crane to hoist heavy objects, such as machinery and construction materials, does not involve “earthmoving.” The demolition of a building and removal of debris and materials, such as concrete, asphalt, wood, brick, metals, wallboard, and roofing shingles, is not “earthmoving.” The loading and moving of materials - as contrasted with moving “earth” - is not “earthmoving.”

If OSHA removes from its earthmoving analysis activities that do not abrade or fracture silica-containing materials, there will obviously be less earthmoving data upon which OSHA can base its analysis. However, in light of the fact that earthmoving is key function in the construction of roads, infrastructure, buildings, and a wide range of other construction projects, the IUOE anticipates there will be additional exposure data submitted during this rulemaking on earthmoving, including those earthmoving activities that fracture or abrade silica-containing materials.

The IUOE does not recommend removal of earthmoving from Table 1 since some earthmoving activities are dust-filled operations which are likely to expose operators to respirable silica. The IUOE supports inclusion of these earthmoving activities on Table 1 provided that OSHA has sufficient data to support inclusion. However, if OSHA does not adopt the IUOE’s recommended modifications, the IUOE urges OSHA to remove earthmoving from Table 1 since the exposure data does not support a reasonable expectation that **all** earthmoving will expose operators to silica at or above the PEL or even above or even at or above the action level.

#### **D. Limit “Earthmoving” on Table 1 to Identified Activities That Abrade or Fracture Silica-Containing Materials**

OSHA’s inclusion of the undefined term, “earthmoving,” on Table 1 creates a false assumption that earthmoving normally fractures or abrades silica-containing materials. To avoid such an interpretation, the IUOE proposes that OSHA:

- Substitute “use of earthmoving equipment for activity that abrades or fractures silica-containing materials” for “use of heavy equipment during earthmoving”
- Define “earthmoving” in 1926.1053(b)

- Identify on Table 1 those earthmoving activities that fracture or abrade silica-containing materials

In so doing, OSHA would clarify that contractors are not required to undertake exposure monitoring, have objective data, or implement Table 1 engineering controls for **all** earthmoving activity, but are required to do so only for only those earthmoving activities that abrade or fracture silica-containing materials in a manner likely to generate airborne respirable silica concentrations of significance. The recommended modifications would provide guidance to enable employers to determine: 1) whether a particular earthmoving activity fractures or abrades materials; 2) if so, whether the materials contain silica; and 3) whether there is, thus, a reasonable expectation that employees are or may be exposed to respirable silica at or above the action level.

By identifying earthmoving functions, such as rock ripping, that fracture or abrade silica-containing materials, OSHA would provide better guidance to the employer to enable him or her to determine whether OSHA deems the activity to be an earthmoving activity that fractures or abrades silica-containing materials. The employer could compare the particular activity required on the construction project to the activities identified on Table 1 as earthmoving functions that abrade or fracture silica-containing materials in determining whether there is a reasonable expectation that employees are or may be exposed to respirable silica at or above the action level. Adoption of the modification would require OSHA to re-analyze the exposure data and the descriptions of work in the PEA to determine which activities within earthmoving are appropriate for inclusion on Table 1.

**E. If Modified, Table 1 Would Provide a Targeted, Proactive Solution for the Protection of Earthmovers Involved in Activities That Fracture or Abrade Silica-Containing Materials**

If only those earthmoving activities that abrade or fracture silica-containing materials are included on Table 1, employers would be on notice that there is a reasonable expectation that engineering controls are needed to reduce silica exposures to achieve exposures below the PEL unless the employer has silica exposure data which demonstrate that the silica content of the abraded or fractured materials is low. In light of the extremely short duration of most earthmoving work, a substantial percentage of these projects will be over before the required exposure assessment is undertaken. Site preparation work may be completed within a few days on a small construction project or may last many months on larger projects. It is the rare exception rather than the norm for earthmoving work on a project to last a year or more.

The proposed exposure assessment options would not protect operators on those earthmoving projects that involve fracturing or abrading of silica-containing materials. Indeed, the operators may already be exposed on one project involving fractured or abraded materials with high silica concentrations and assigned to a new project by the same contractor or by a new employer before the results of the assessment are known.

Proposed rule 1926.1053(d)(d)(1)(i) states that an employer “shall assess the exposure of employees who are or may reasonably be expected to be exposed to respirable crystalline

silica at or above the action level,” but provides no guidance on the time frame within which the exposure assessment must occur. The addition of words “as soon as practicable” or “immediately” would clarify that employer “shall assess the exposure of employees” without any preventable delays. However, even such clarification of OSHA’s intent would not prevent unsafe exposures to silica on short-term employment.

Furthermore, under the proposed standard, the follow up assessments when initial monitoring is above the action level or above the PEL are inadequate to protect short-term workers who will no longer be on the job. The proposed rule (29 C.F.R. 1926.1053(d)(3)(i)(A),(B), and (C)) does not require repeat monitoring for another three months even when the initial or subsequent monitoring shows exposures above the PEL:

- (A) Where initial or subsequent exposure monitoring reveals that employee exposures are at or above the action level but at or below the PEL, the employer shall repeat such monitoring **at least every six months.**
- (B) Where initial or subsequent exposure monitoring reveals that employee exposures are above the PEL, the employer shall repeat such monitoring **at least every three months.**
- (C) The employer shall continue monitoring at the required frequency until at least two consecutive measurements, taken at least 7 days apart, are below the action level, at which time the employer may discontinue monitoring for that employee, except as provided in paragraph (d)(4) of this section.

The three or six-month intervals for follow-up exposure assessment will do nothing to protect operators on jobs of short duration more typical in earthmoving.

**F. Substitution of “Use of Earthmoving Equipment for Activity That Fractures or Abrades Silica-Containing Materials” on Table 1 Would Clarify That There is No Expectation or Presumption That Operators Engaged in All Earthmoving Will Be Exposed to Silica at or Above the PEL or Even the Action Level**

If OSHA does not modify “use of heavy equipment during earthmoving” or remove earthmoving from Table 1, the IUOE urges OSHA to make clear that there is no presumption or reasonable expectation that a heavy equipment operator’s exposure during all “earthmoving.” is above the PEL since the studies cited in the PEA demonstrate that most earthmoving does not involve exposure to materials with high silica concentrations.

The substitution of “use of earthmoving equipment for activity that fractures or abrades silica-containing materials” on Table 1 would clarify that there is no expectation or presumption that operators engaged in all earthmoving will be exposed to silica at or above the PEL or even the action level. Such clarification would avoid confusion concerning the circumstances under which employers of operators engaged in earthmoving are required to monitor employee exposure or have “objective data” that demonstrate that respirable silica is not capable of being released at or above the action level under any expected conditions of use or handling. 29 C.F.R. 1926.1053(d)(2)(ii)(A) and (B). As currently written, the

proposed regulation could be misread as creating a presumption or expectation that all earthmoving activity exposes operators to silica at or above the PEL.

The proposed standard states that for the purpose of complying with the requirements of “Exposure assessments” (29 C.F.R. 1926.1053(d)), the “employer must **presume** that each employee performing an operation listed in Table 1 that requires a respirator is exposed above the PEL, unless the employer can demonstrate otherwise in accordance with the exposure assessment requirements in paragraph (d) of this section.” 29 C.F.R. 1053(d)(8)(ii); emphasis added. Paragraph (d) requires that covered employers “assess the exposure of employees who are or **may reasonably be expected** to be exposed to respirable crystalline silica at or above the action level.” 29 C.F.R. 1926.1053(d)(1)(i); emphasis added. Paragraph (d) also states that (29 C.F.R. 1926.1053(d)(2)(i)):

Except as provided for in paragraph (d)(2)(ii) of this section, each employer shall perform initial monitoring of employees who are, or **may reasonably be expected to be**, exposed to airborne concentrations of respirable crystalline silica at or above the action level.

The inclusion of **all** earthmoving on Table 1 creates the false impression that there is a reasonable expectation (and possibly a presumption) that earthmoving will normally expose operators to silica above the PEL. The Table 1 controls for earthmoving do not specify a respirator requirement and paragraph 1926.1053(d)(8)(ii) states that the employer must presume exposure above the PEL when Table 1 requires a respirator, the rule should not be read (or misread) to require that an employer **presume** that exposures during earthmoving will be above the PEL. However, OSHA can avoid potential misreading of the rule by clarifying that there is no presumption that earthmoving will expose operators to silica above the PEL during **all** earthmoving. The IUOE proposes that OSHA further clarify (if earthmoving is not removed from Table 1) that the inclusion of earthmoving on Table 1 does not create a reasonable expectation that operators will be exposed to exposed to airborne concentrations of respirable crystalline silica at or above the action level.

The proposed standard could easily be misread as requiring an across-the-board reasonable expectation of exposures above the action level for all operators engaged in earthmoving regardless of whether the task involves the fracturing or abrading of silica and the silica content of the materials moved. Such an automatic expectation would require all contractors engaged in earthmoving to comply with paragraph (d)(2)(ii), which provides that: an employer may rely on existing data to satisfy the “initial monitoring” requirement if it has monitored employee exposure within 12 months of the effective date of the proposed rule under conditions that “closely resemble those currently prevailing” or has “objective data that demonstrate that respirable crystalline is not capable of being released in airborne concentrations at or above the action level under any expected conditions of processing, use, or handling.”

The preamble further contributes to the misconception that earthmoving will normally expose operators to silica above the PEL. As noted above, in discussing compilation of Table 1, the preamble states that OSHA reviewed industrial hygiene literature across the “full range

of construction activities” and “focused on dusty operations where silica sand was most likely to be fractured or abraded by work operations.” 78 *Fed.Reg.* at 56343.

## **II. GEOTECHNICAL PROFILING FOR SILICA CONTENT IS ANOTHER PROACTIVE APPROACH**

In light of the fact that the required exposure monitoring may occur too late and too infrequently to provide adequate protection for earthmovers, the IUOE recommends that OSHA explore the usefulness of geotechnical profiles of sites for silica content to enable employers to better target compliance resources and to protect workers at risk of elevated exposure before exposure occurs.

Under circumstances in which there is a reasonable expectation that operators will be exposed to high concentrations of silica during earthmoving, a geotechnical profile of the silica content before commencement of the project would be most protective of operators. OSHA noted in a 2009 publication that if a construction company will be doing substantial excavation at a site, then obtaining a profile of the silica content of soil and rock from bulk samples of the projected excavation represents “good industrial hygiene practice.”<sup>7</sup>

By obtaining a profile of silica content before the work of operating engineers begins, the employer could then act proactively to prevent the exposure from occurring. A regulatory approach that ensures that prophylactic measures are in place before operators commence work is the best method of reducing silica exposure. Since earthmoving jobs are of brief duration, operators who perform earthmoving that fractures or abrades silica-containing materials might otherwise be unprotected under the proposed regulatory scheme if employers do not either 1) implement the Table 1 engineering controls; or 2) perform a geotechnical profile for silica content before the operators commence work to refute the reasonable expectation that the Table 1 earthmoving that fractures or abrades silica-containing materials will not expose operators to respirable silica concentrations above the PEL. The role of the competent person would be critical in determining the engineering controls, work practices, and respirator use that must be implemented to control exposures when geotechnical profile indicates that the silica content of the earth is high.

Geotechnical profiling with testing for crystalline silica content will enable an employer to better rely on prior exposure assessments. Proposed rule 1926.1053(d)(2)(ii)(A) permits an employer to “rely on existing data to satisfy” the initial monitoring requirement where the employer:

- (A) Has monitored exposures after [INSERT DATE 12 MONTHS PRIOR TO EFFECTIVE DATE OF FINAL RULE] under conditions that closely resemble those currently prevailing, provided that such monitoring satisfies the requirements of paragraph (d)(5)(i) of this section with respect to analytical methods employed; or

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<sup>7</sup> *Controlling Silica Exposure in Construction*, OSHA 3362-05 (2009), at 45.

Reliance on prior data without geotechnical testing is not sufficiently protective of workers in light of the variability of site characteristics where the earthmoving will occur and in the crystallinity of silica from different deposit.<sup>8</sup>

The IUOE will present testimony at the public hearing of the costs associated with testing silica content as part of a geotechnical profile.

### **III. A SEPARATE ANALYSIS OF “DEMOLITION” WOULD FACILITATE BETTER TARGETING OF TABLE 1 EXPOSURE CONTROLS**

The PEA recognizes the importance of separately analyzing different construction activities performed with the use of heavy equipment by excluding from its analysis of exposures of heavy equipment operators using “rock or concrete drilling rigs, rock crushers, milling machines, or tunnel boring machines” and treating activities associated with these types of equipment in other sections of the feasibility analysis. PEA, IV-395.

The IUOE commends OSHA for separately analyzing these activities performed by heavy equipment operators, and for listing the activities separately on Table 1. The IUOE notes that another construction activity performed by heavy equipment operators – demolition – is discussed in the analysis of a wide range of activities throughout the PEA. Additionally, in view of the fact that demolition is an activity involves the use of heavy equipment in both construction and construction maintenance in general industry (refractory demolition, for example), there will be substantial testimony and evidence on demolition during this rulemaking.

OSHA cites exposure data throughout the PEA on various types of “demolition.” Rather than treating demolition as a distinction construction activity, OSHA has conflated demolition data with data for other construction functions, and has not assessed demolition separately from other functions. The result of this conflation of data is that demolition work that exposes workers to silica above the PEL has been combined with data for milling work<sup>9</sup> and for earthmoving work, and has contributed toward development of certain exposure controls for these activities that are unnecessary to achieve exposures below the PEL. A separate analysis of the substantial research cited in the PEA on “demolition” would facilitate better targeting of the Table 1 exposure controls.

The IUOE does not intend to imply that the exposure data cited in the PEA indicates that all demolition exposes workers to high concentrations of respirable silica. However, in light of the substantial amount of exposure data on demolition, OSHA has the necessary research available to analyze demolition as a separate construction activity. OSHA could then make a determination whether 1) demolition should be a standalone activity on Table 1; or 2)

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<sup>8</sup> CRYSTALLINE SILICA, PRIMER. Staff, Branch of Industrial Minerals, U.S. Department of the Interior, Manuel Lujan, Jr., Secretary, U.S. Bureau of Mines, T S Ary, Director.

<sup>9</sup> As discussed in Section V, the combination of data on “asphalt milling” and “concrete milling” has also contributed toward the development of certain exposure controls for asphalt milling that are unnecessary to achieve exposures below the PEL.

certain types of demolition, such as demolition of concrete or brick structures, should be combined with existing Table 1 activities.

The IUOE recommends that silica standard make clear that earthmoving and demolition are not the same construction activity, and milling and road demolition are not the same activity. OSHA regulation, 29 C.F.R. 1926.850 *et seq.*, would serve as appropriate guidance for the activity encompassed within “demolition.”

#### **A. Demolition of Structures is Not Earthmoving**

The PEA uses exposure data on the separate activity of demolition of structures in determining exposure controls for earthmoving. The high exposure level for demolition of silica-containing structures is not evidence of exposure levels during “earthmoving.” The PEA relies on the use of heavy equipment in the demolition of a plaster ceiling in support of the exposure profile of heavy equipment operators. PEA, IV-396, *citing* NIOSH EPHB-247-15b, 2002, *In-Depth Report of Exposure to Silica from Demolition of Plaster Ceilings*. With regard to this NIOSH report, the PEA states that:

Two results were obtained from an additional NIOSH report (NIOSH EPHB-247-15b, 2002), which describes two operators participating in the demolition of a plaster ceiling. A track-hoe operator was responsible for pulling down the ceiling (87 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), one of the three highest results for this job category), and a skid-steer loader operator removed construction debris from the area ( $49 \mu\text{g}/\text{m}^3$ ).

This data is clearly inapplicable to an analysis of earthmoving but would be useful in OSHA’s analysis of demolition.

#### **B. Other Data on Road Demolition**

As noted above, some of the data in the PEA demonstrates that there is demolition work that exposes workers to silica at or below the PEL. The PEA states, for example, that the “results from a road demolition site were among the lowest available to OSHA.” PEA, IV-396 (emphasis added). According to the PEA (*Id.* (footnotes omitted)):

At this site, over the sampling period of 6 to 8 hours the operators of a crane, a backhoe, and two excavators all had 8-hour TWA results of  $12 \mu\text{g}/\text{m}^3$  (the limit of detection [LOD]) while breaking and removing pieces of asphalt and concrete road and the underlying sandbed (NIOSH ECTB 233-120c, 1999). At a third work site, where OSHA visited a tunnel construction site, a tractor operator removing dirt at the mouth of the tunnel experienced a result of  $41 \mu\text{g}/\text{m}^3$  (OSHA SEP Inspection Report 116179359). This result is similar to the mean ( $32 \mu\text{g}/\text{m}^3$ ) and range ( $8 \mu\text{g}/\text{m}^3$ ) of exposure values published by Blute et al.

(1999) for five operating engineers involved in the “cut and cover” and tunnel finishing phases of a major highway tunnel construction project.

OSHA cites Table IV.C-54, “Respirable Crystalline Exposure Range and Profile for Heavy Equipment Operators,” which shows that 16 results are “less than or equal to 12  $\mu\text{g}/\text{m}^3$ ” and three results equal 50  $\mu\text{g}/\text{m}^3$ .

#### **IV. THE SAME PIECE OF HEAVY EQUIPMENT MAY BE USED FOR A RANGE OF OPERATIONS THAT PRODUCE VARYING LEVELS OF SILICA EXPOSURE**

In reviewing exposure data on heavy equipment operators, the IUOE has noted that exposure studies often group all activities performed using a particular piece of heavy equipment together, such as a backhoe, even though the piece of equipment is used to perform a number of different functions which expose operators to varying levels of silica. The IUOE encourages OSHA to be mindful of the fact that the same piece of heavy equipment may be used for a range of operations that produce varying levels of silica exposure when it analyzes the activities performed with heavy equipment.

An integral part of delineating the activities performed with heavy equipment is recognition that the same piece of heavy equipment may be used for a range of operations that produce varying levels of silica exposure. The function performed by a piece of heavy equipment varies depending upon the attachments. A backhoe is used for earthmoving, but the same machine can be used for other operations based upon the attachment affixed thereto. The silica dust generated by the operation of the backhoe correlates to both the silica content of materials moved or drilled and the degree to which these materials are fractured or abraded and become airborne.

The Washington School of Public Health’s compilation of exposure data is an example of the tendency to combine data based upon the equipment used without consideration of function. The Washington School of Public Health collected and analyzed information on 1,374 air monitoring samples obtained by OSHA offices (Washington, Oregon, and Chicago), universities, other research groups, and several construction contractors. In this study, samples were grouped by tool and equipment across a wide range of diverse activities, with heavy equipment as one of the types of equipment used for data analysis. According to the analysis, based on 28 samples, the average silica exposure for “backhoe/excavator/bulldozer/bobcat” was 0.01 and the maximum was 0.12  $\text{mg}/\text{m}^3$ , and only 7 percent of the exposures were over the PEL of 0.10  $\text{mg}/\text{m}^3$ , which was the lowest of the 12 “tools” construction tools analyzed. This data is useful in ascertaining which construction activities (rock drilling versus earthmoving, for example) performed by operators of backhoes/excavators/bulldozers/backhoes produce higher levels of silica exposure only if OSHA finds out, in greater detail, which activities were actually monitored.



Similarly, in a NIOSH exposure study of interstate highway repair,<sup>10</sup> NIOSH monitored operators operating a backhoe with a “special drill attachment” to drill concrete pavement. While the operator used a backhoe, the results of the monitoring are pertinent to concrete drilling, not to earthmoving or highway repair in general:

During interstate highway repair, four workers drilled horizontal holes in concrete pavement after a rectangular portion of damaged concrete was removed (Figure 4). Two of the workers operated backhoes fitted with a special drill attachment, and the other two workers positioned the drill and drilled the holes. No dust collection system or water suppressant was in use. One of the backhoe operators wore a disposable particulate respirator, and the other wore a half facepiece particulate cartridge respirator. One drill operator wore a disposable particulate respirator, and the other wore a quarter-facepiece particulate filter respirator. Personal air samples (approximately 200 minutes each) were taken on two different days. Air concentrations were above the REL for one of the backhoe operators on the first day (0.08 mg/m<sup>3</sup>) and for both drill operators on both days (0.81 and 0.41 mg/m<sup>3</sup> on day 1, and 0.42 and 0.32 mg/m<sup>3</sup> on day 2).

If OSHA re-evaluates the exposure data for the purpose of considering the construction activity for which heavy equipment is used and the materials involved in the activity, OSHA will find that the specific functions in which a piece of equipment is engaged and the materials used are more determinative of the exposure than the type of equipment used.

#### **V. CREATION OF AT LEAST TWO SUBCATEGORIES WITHIN MILLING WOULD ENHANCE SAFETY AND BETTER TARGET COMPLIANCE RESOURCES**

Table 1 is essential to the reduction of silica exposure in milling operations because milling sites are among the most mobile in the construction industry. Indeed, exposure monitoring would be particularly difficult in milling, since milling operators may end their shifts miles away from the location at which they begin their workday.

The IUOE strongly supports Table 1 for milling, but recommends that OSHA re-examine the exposure data on milling with the goal of creating a minimum of two subcategories – asphalt milling and concrete milling - within milling on Table 1. In so doing, OSHA will be better able to tailor controls based upon relative exposure levels generated by the activity.

The IUOE understands that NIOSH, the Asphalt Partnership, and possibly other organizations are providing exposure data, which supplements the data in the PEA, and looks

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<sup>10</sup> “Preventing Silicosis and Deaths in Construction Workers,” DHHS (NIOSH) Publication Number 96-112, “Interstate Highway Repair” <http://www.cdc.gov/niosh/docs/96-112/>

forward to further commenting on this evidence and other evidence submitted in comments and at the hearing on milling operations.

**A. The Combination of All Milling Operations into a Single Category of “Milling” Creates Burdens and Hazards**

As proposed, Table 1 requires respirator use for the duration of the entire shift during **all** milling operations after four hours of time at task regardless of the silica concentration of the materials milled or any other factors that influence the exposure of workers performing particular tasks, such as the location of the worker relative to the silica source. This approach is based upon OSHA’s well-intentioned goal of ensuring that workers performing milling operations with the very worst silica exposures will be protected. However, this over-inclusive approach places a burden on milling workers across-the-board regardless of exposure during the milling operations performed;<sup>11</sup> creates safety and health hazards associated with prolonged respirator use; and misdirects compliance resources of employers.

**B. By Dividing Milling Operations into Subcategories, OSHA Could Include on Table 1 More Targeted Exposure Controls Rather Than Developing Generic Exposure Controls for All Milling Based on the Worst-Case Scenario**

By dividing milling operations into subcategories, OSHA could include in Table 1 more targeted exposure controls that are not based on the worst-case scenarios. As acknowledged in the preamble, respirator use is not needed “most of the time” when engineering controls for milling are properly implemented.

In the preamble, OSHA states “even when workers operate drivable milling machines for eight hours, water delivery systems will reduce TWA exposures to or below the proposed PEL **most of the time.**” 78 *Fed.Reg.* at 56462 (emphasis added). OSHA further states that it cannot, however, “rule out the possibility that silica exposures will occasionally exceed the PEL **under certain circumstances**, when workers operate these machines for more than four hours.” *Id.* (emphasis added). Based upon the fact that OSHA cannot rule out the possibility of exposure above the PEL “under certain circumstances,” OSHA has included respirator use for milling operators over four hours in a day (*Id.*):

Because, in the absence of an exposure assessment, employers will not be able to confirm that exposures are below the PEL, or identify circumstances in which exposures may exceed the PEL, the proposed rule requires that employers provide respiratory protection to workers who operate drivable milling machines for more than four hours.

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<sup>11</sup> See 43 *Fed.Reg.* 27384 (June 23, 1978) (cotton dust exposure)(“it is not appropriate to place the burden of compliance principally on the employee, as would be the case if respiratory protection were the principal means of reducing employee exposure”). Since the construction industry is seasonal, with peak employment rates in summer, operators could be required to wear respirators in over 100 degree weather for up to full shifts.

The preamble does not, however, identify the “circumstances” when milling workers will “occasionally” exceed the PEL even though available exposure data would enable OSHA to do so. Improved targeting will promote safety and reduce compliance costs.

NIOSH concurs with OSHA’s view that respirator use is not needed most of the time. Citing its studies conducted in cooperation with the Asphalt Partnership,<sup>12</sup> NIOSH states in its comments that respirator use is unnecessary to keep the exposure level of “full-shift” workers below the PEL in milling operations on newer machines<sup>13</sup> when both local exhaust ventilation and water-spray are used to control silica dust:

Silica/Milling Machines Partnership recently evaluated successful controls that used both local exhaust ventilation and water-spray to control silica dust on drivable milling machines. Forty-two full-shift personal breathing zone samples (21 days with 2 workers per day) were collected; all were below the NIOSH REL (i.e., the proposed OSHA PEL) for respirable crystalline silica for workers using drivable milling machines equipped with local exhaust ventilation plus water-spray dust suppression [NIOSH 20 13b,c). Use of the controls resulted in worker silica exposures below the NIOSH REL (the proposed PEL) during all shifts, including several shifts longer than II hours, **indicating that workers would not need to wear respirators to keep full-shift worker silica exposures below 50 fig/m 3 for drivable milling machines equipped with local exhaust ventilation and water-spray dust controls.** The local exhaust ventilation and water-spray dust controls were integrated into the design of new (current model) drivable milling machines and evaluated by NIOSH through the Silica/Milling Machines Partnership [NIOSH 2013b,c].

Rather than a blanket requirement that operators wear respirators for an entire shift when milling operations exceed four hours, the IUOE recommends that OSHA define “milling” with greater specificity on Table 1 so that the exposure controls for subcategories within milling more accurately target the anticipated exposure levels. There are a number of options that OSHA can explore separately or in combination depending upon the record developed during the rulemaking: 1) treat asphalt milling and concrete milling separately in

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<sup>12</sup> Comments of the National Institute for Occupational Safety and Health on the Occupational Safety and Health Administration (OSHA) proposed rule (PR) on Occupational Exposure to Respirable Crystalline Silica (“NIOSH Comments”), Feb. 6, 2014, at 20.

<sup>13</sup> NIOSH states in its comments that it has not evaluated older models of driveable milling machines. NIOSH Comments at 20. NIOSH cautions in its discussion of Table 1 that “Fully implementing the exposure control methods described in Table 1 would not automatically ensure compliance with the PEL. The employer must be careful to select equipment that is designed to fully comply with the intent of the requirements specified in Table 1.” *Id.* at 17. The Asphalt Partnership states that it is “convinced that the water spray system being provided by milling machine manufacturers for retrofitting older machines are effective at controlling worker exposures below the PEL.” Asphalt Partnership’s Comments at 11, *citing* Van Rooij and Klaasse (2007). The IUOE will comment on this issue after it has had the opportunity to review all the evidence on retrofitting older models of driveable milling machines.

analyzing exposure data and in determining the Table 1 exposure controls; 2) treat large milling machines and walk-behind milling machines separately (recommended by the Asphalt Partnership);<sup>14</sup> and 3) exclude “road demolition” or asphalt reclamation (removals of a depth of more than four inches) from asphalt milling.

If OSHA finds, after examining silica exposures for subcategories of milling, that “under certain circumstances” milling operations cannot be performed with exposures below the PEL with a single engineering control, OSHA should explore a combination of engineering controls. The combination of engineering controls targeting for milling operations that generate the greatest amounts of respirable silica would reduce both the overall costs of compliance, including costs associated with respirator use, for milling operations that produce the lowest silica exposures. PEA, IV-467. With regard to combined controls, the PEA states that engineering controls in combination, such as wet suppression, exhaust ventilation, and modifications to the grinding drum box so that it can be held under negative pressure by the ventilation system, reduce exposures to levels of 29 µg/m<sup>3</sup> or less. *Id.* See also Asphalt Partnership Comments at 1: The technology on half lane and larger asphalt milling machines has “now evolved to a combination of optimized vacuum and water systems for suppression, removal, and minimization of silica dust surrounding these asphalt milling machines.”

### **C. Separate Treatment of Asphalt Milling and Concrete Milling Would Result in Designation of More Targeted Exposure Controls**

The IUOE recommends that OSHA separately analyze the exposure data for asphalt milling and concrete milling, and develop more targeted exposure controls based upon a more precise analysis. The combination of asphalt milling activity with a milling activity that generates higher concentrations of respirable silica has resulted proposed exposure control requirements for asphalt milling based on inapplicable exposure data on concrete milling.

The separation of concrete milling from asphalt milling on Table 1 would ensure that workers are not required to wear respirators while performing a milling activity with exposure levels well below the PEL when engineering controls are properly implemented. Since the “vast majority” of U.S. roadways are paved with asphalt and concrete milling is performed “less frequently,” treating asphalt milling and concrete milling separately would eliminate most of the unnecessary use of respirators during milling and the related costs. PEA, IV-453.

Industry associations within the concrete milling and asphalt milling sectors will have a greater incentive and ability to develop improved control technologies if OSHA recognizes the product of their investments - effective engineering controls – in determining appropriate exposure controls. As described in detail in the Asphalt Partnership’s comments, the asphalt milling industry has worked with NIOSH and has devoted substantial resources and has made significant strides in the development of exposure controls since the formation of the Asphalt Partnership in 2003. Asphalt Partnership’s Comments at 1.

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<sup>14</sup> The Asphalt Partnership states in its comments that it does not believe that the controls that have been shown to be effective for asphalt milling would be as effective in concrete milling or walk behind milling. Asphalt Partnership’s Comments at 9. The Asphalt Partnership’s field studies did not test walk-behind milling.

## 1. Concrete Milling Generates Higher Concentrations of Respirable Silica

In the preamble, OSHA does not differentiate between asphalt milling and concrete milling in its discussion of engineering controls, work practices, and respirator use. 78 *Fed.Reg.* at 56462. The PEA recognizes, however, that “milling concrete poses additional challenges for controlling silica exposure compared with milling asphalt” and that the “smaller teeth on concrete milling drums produce more fine dust.” PEA, IV-461, *citing* Schill, 2000. The PEA attributed the “difference” in asphalt and concrete exposures to the “potential for higher silica content in concrete compared with some asphalts and also due to the softness and “stickiness” of asphalt milled warm, which likely helps reduce separation of the pavement components and perhaps limits dust release in hot weather.” PEA, IV-457, *citing* NIOSH EPHB 282-14a, 2009; Wirtgen, 2010.

## 2. Exposures Are Below the PEL for Operators of Driveable Milling Machines During Asphalt Milling

The IUOE urges OSHA to consider the NIOSH data collected during extensive prototype trials of water-system design in 2008 and 2010. The NIOSH data referenced in the proposed rule does not include data collected by the Asphalt Partnership after 2006. Working with NIOSH scientists and engineers, who provided assistance in water nozzle design and placement of dust controls, the Asphalt Partnership collected, analyzed, and reported data in field studies of milling machines produced by five major manufacturers - Caterpillar, Wirtgen, Roadtec, Terex, and Volvo. *Id.* at 1.

In any event, the results of NIOSH studies conducted between October 2003 and November 2006 demonstrate low exposure rates, with a very limited number of exceptions. In assessing the limited exceptions, it is important to note that one of the purposes of the studies was to “evaluate the effects of water flow rate and pressure on machines equipped with existing typical water spray nozzles” and to identify the water flow and pressure that best reduced emission of silica-containing dust. Asphalt Partnership’s Comments at 15. While the overwhelming evidence demonstrates exposure rates below the PEL, the fluctuating water pressures during at least two of the studies appear to have caused the higher exposures.

The PEL states that median exposure level obtained during the NIOSH studies is 17  $\mu\text{g}/\text{m}^3$ , with a mean of 40  $\mu\text{g}/\text{m}^3$  and a range from 5  $\mu\text{g}/\text{m}^3$  to 181  $\mu\text{g}/\text{m}^3$ . PEA, IV-453. According to the PEA, three of the fourteen results (21 percent) exceed 50  $\mu\text{g}/\text{m}^3$ , and only one result (7 percent) exceeds 100  $\mu\text{g}/\text{m}^3$ . *Id.*

Of the three results that exceed the PEL, one study involved road demolition which is discussed below in the IUOE’s analysis of the difference between asphalt milling and road demolition. A 2004 study yielded a result above the PEL when the engineering control used was an older model of water spray with flow rate averages ranging from 5 gallons per minute (gpm) to 9 gpm at the cutting drum as the engineering control. As stated in the PEA, low results were observed in an August 2006 study, which tested a late-model mill retrofitted with the newest manufacturer spray system with average total (cutter drum and conveyor) water

spray flow rates between 12 gpm and 19 gpm. One result in the 2006 study was 8  $\mu\text{g}/\text{m}^3$  and two were below the limits of detection (LOD).

If the data involving road demolition (100  $\mu\text{g}/\text{m}^3$ ) and the older model of water spray (91  $\mu\text{g}/\text{m}^3$ ) are removed, there is only one result (181  $\mu\text{g}/\text{m}^3$ ) above the PEL. That result was obtained when the water spray was “systematically varied” for the purpose of studying the water flow and pressure that best reduced emission of silica-containing dust. In light of the vast disparity between that rate and the other exposure data on driveable milling machines, further review of that study is warranted.

The PEA also cites a separate review of construction data from a variety of sources, Flanagan et al. (2006) summarized 48 respirable quartz samples associated with the use of road milling machines in construction and found a geometric mean of 11  $\mu\text{g}/\text{m}^3$ . PEA, IV-456.

3. The PEA Acknowledges That, at the Time of its Compilation, There Was Limited Data on Concrete Milling

The PEA states that “available data are not enough to conclude with certainty that workers milling concrete roads would achieve the sample exposure level as seen for asphalt millers.” PEA, IV-461. Since there is a substantial amount of exposure data on asphalt milling,<sup>15</sup> particularly if OSHA considers the more recent exposure data compiled through the NIOSH/Asphalt Partnership field studies, the IUOE urges OSHA not to combine the limited data on concrete milling with the data on asphalt milling, and thereby, establish generic exposure controls for milling on Table 1 that are unnecessary in asphalt milling.

If the concrete milling sector presents exposure data at the public hearing, the IUOE looks forward to reviewing the data and making a recommendation on exposure controls for concrete milling.

4. Table 1 Treats Rock Drilling and Concrete Drilling Separately Based on “Differences” in Operations

By analogy, although the PEA addresses workers “using drilling rigs of all types for rock, earth, and concrete together in the same section of the technological feasibility analysis,” OSHA proposed that rock drilling and concrete drilling should be treated separately on Table 1 based on “differences” in the operations. 78 *Fed.Reg.* at 56460. OSHA states that it is “proposing to require separate additional specifications for rock drilling and concrete drilling.” *Id.*

In the case of “operating vehicle-mounted drilling rigs for concrete,” a half-mask is required for workers working outside of an enclosed cab after four hours of this construction

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<sup>15</sup> See PEA, IV-453: “All of the additional data in the current exposure profile comes from more recent research in which NIOSH conducted a series of five studies in association with the National Asphalt Association investigating wet methods of dust control during asphalt milling.”

activity. A half-mask is not, however, required for “operating vehicle-mounted drilling rigs for rock.”

#### **D. Define “Asphalt Milling” to Exclude “Road Demolition” and “Asphalt Reclamation”**

At meetings hosted by IUOE Local Unions on the proposed silica standard in Nevada, Illinois, and Connecticut, safety & health directors of contractors expressed the view that the depth of milling does not result in an inability to control exposures below the PEL when engineering controls are properly implemented. However, in the interests of avoiding the serious hazards that would be created by prolonged respirator use during milling, the IUOE believes that it is prudent to explore all options.

As discussed in Section III above, asphalt milling and road demolition are not the same construction activity. Milling crews typically grind away the top one to four inches of existing roads to grade the road to a specified thickness in preparation for application of new asphalt. Road demolition, on the other hand, involves removal of both the surface and substructure of the road.

The separation of exposure data on demolition from data on other activities involving the use of heavy equipment will result in a more precise analysis of exposures on all these construction activities and more targeted exposure controls. The combined effect of treating asphalt milling and concrete milling separately, and excluding road demolition from asphalt milling, should eliminate the need for respirator use by operators during asphalt milling when engineering controls are properly implemented. *See* PEA, IV-457-458 (emphasis added): “Operators of road milling machines typically experience silica exposure levels less than 50  $\mu\text{g}/\text{m}^3$ , but airborne concentrations can be higher, particularly when workers mill **concrete** road surfaces, but also depending on environmental conditions, status and design of the water feed system, and **depth** of milling.”

The PEA shows that the asphalt “milling” activity with one of the highest exposure rates involved “road demolition,” and concludes that engineering controls measures “even in combination, might not be sufficient to maintain exposure levels below the proposed PEL of 50  $\mu\text{g}/\text{m}^3$  during road demolition activities, such as full-depth removals or removals greater than 4 inches deep. For these rare occurrences, respiratory protection will be required to protect the milling machine operators until additional controls can be developed.” PEA, IV-468.

The exposure data on asphalt milling cited in the PEA includes data on removal of “12 inches of pavement all at once.” The PEA characterized the removal as “a highly unusual operation, essentially a specialized form of road demolition,” which “reportedly does not represent typical ‘mill and fill’ repaving activity.” PEA, IV-457. According to the PEA, milling operators will rarely encounter these “worst case” conditions during their careers. *Id.*

This worst case condition occurred on the second day of a two-day exposure monitoring. On the first day, NIOSH investigators collected air samples while evaluating an

asphalt milling machine water spray dust suppression system using two different types of nozzles, high-flow and low-flow. PEA, *citing* NIOSH EPHB 282-11b, 2004. NIOSH obtained an exposure result of 14 µg/m<sup>3</sup> for the milling machine operator on the first day, which was a typical day of wet-milling (although water flow rate was not evaluated). A higher result of 100 µg/m<sup>3</sup> was obtained for the operator on the day that the workers removed 12 inches of pavement all at once. PEA, IV-457.

#### **E. Separate Treatment of Operators and Tenders on Table 1**

If OSHA finds that it cannot rule out that the possibility that engineering controls will not reduce exposure levels below the PEL, with a combination of controls for all workers involved in asphalt milling, the IUOE recommends separate treatment of operators and tenders since the exposures of operators are lower than the exposures of tenders. Operators are located farther from the silica source than tenders, and appropriate protection varies depending upon the location of the worker from the silica source.

OSHA has divided milling on large driven machines into two “subcategories” to describe baseline conditions and control options (PEA, IV-451)(emphasis added):

- Workers who operate large driven (or road) milling machines from seats **on top of the equipment.**
- Workers who tend the large milling machines by walking beside the equipment.

The PEA identifies silica sources of operators of “large driven milling machine” and tenders of these machines. The operator and the tender of large driven milling machines are both exposed to dust from the action of cutting blades, and the tender is also exposed to “dust from related activities, such as sweeping or shoveling debris.” The PEA further notes the difference in location of the operator who is “often seated on top” and the tender who walks beside the machine. PEA, IV-452.

The IUOE urges OSHA to explore whether separate treatment of operators and tenders on Table 1 is warranted since the tenders are exposed to higher than the levels of silica than operators. Table IV.C-64, “Respirable Crystalline Silica Exposure Range and Profile for Millers Using Portable or Mobile Machines” provides a comparison of the exposure summary, range and profile of machine operators of large driven milling machine and tenders of these machines. PEA, IV-454. The exposures of operators are far lower than the exposures of tenders who work much closer to the source of the silica.

#### **VI. BETTER TARGETING OF EXPOSURE CONTROLS IN MILLING WILL ENHANCE SAFETY BY REQUIRING RESPIRATOR USE ONLY WHEN NECESSARY**

The IUOE urges OSHA to exhaust all alternatives before adopting a standard which would permit employers to require respirator use by milling operators for full shifts when a worker engages in milling operations for four or more hours in a workday. If OSHA better targets exposure controls for milling operations based upon the nature of the milling



performed, OSHA can both enhance safety and require respirator use only when necessary to achieve a safety and health benefit.

This approach would be consistent with OSHA's Hierarchy-of-Controls Policy in 29 C.F.R. § 1910.134(a)(1), which provides that the prevention of atmospheric contamination must be "accomplished as far as feasible by accepted engineering control methods (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 instituted, appropriate respirators shall be used pursuant to this section." OSHA would not implement all feasible engineering controls and work practices if it does not consider inclusion of engineering controls in combination, and division of milling into subcategories to avoid respirator use when unnecessary to achieve a safety and health benefit.

#### **A. Prolonged Restriction on Vision, Hearing and Communication Threaten the Safety of Milling Workers**

The IUOE endorses the Asphalt Partnership's view as expressed throughout its comments that prolonged respirator use during milling presents safety and health hazards, including but not limited to heat stress and restrictions on vision, hearing, and communication. Milling operators must have the ability to see without any obstruction and to hear and communicate clearly to avoid a multitude of hazards created by working adjacent to high speed traffic, to moving heavy equipment, and to workers walking alongside the machine.

There are a number of types of equipment that may be operated in the vicinity of milling machines, including trimmers, dump trucks, brooms, and bucket loaders. The trimmer grinds asphalt in areas that are unreachable by large milling machines; the bucket-loader collects the ground asphalt and asphalt chunks and loads the debris into the back of the dump truck, and the broom collects the finest ground material.

Milling operations are conducted using machines without enclosed cabs to maximize visibility.<sup>16</sup> Operators must have a clear view of other workers, equipment, ground structures, traffic, and the public at all times, particularly when operating in reverse. Ongoing communication with crew members is needed for safety and to perform the functions of the job.

OSHA acknowledges in the preamble that respirators "introduce independent occupational hazards, such as restrictions to vision, hearing, and mobility." *Id.* at 56362. The preamble and proposed 1926.1053(g) are consistent with OSHA's "long-held view" is that "excessive reliance on respirators to achieve a PEL should be avoided due to independent health, safety, and reliability problems that arise when workers are required to perform tasks with respirators." *Public Citizen Health Research Group v. U.S. Dept. of Labor*, 557 F.3d 165, 171 (hexavalent chromium). OSHA found in issuing its lead standard that respirators are

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<sup>16</sup> The PEA states that enclosed cabs are uncommon in milling because of concerns about visibility and safety even though the machines are available with or without cabs. PEA, IV-453.

useful “only on supplementary, interim, or short term basis.” 557 F.3d at 176, *citing* 43 *Fed.Reg.* 52,990.

### **B. Operators Will Better Cooperate With Respirator Use When There is a Realistic Threat of Exposure Above the PEL**

Employees are far more likely to cooperate with respirator use if there is a significant threat that their silica exposures will be above the PEL without personal protective equipment. The IUOE and the signatory contractors with whom the IUOE has conferred during this rulemaking anticipate that operators will not consistently wear respirators if their employer informs them that “OSHA cannot rule out the possibility that silica exposures will occasionally exceed the PEL under certain circumstances for more than four hours.” 78 *Fed.Reg.* at 56462.

By subdividing “milling” into operations that are more likely to expose workers to silica above the PEL and those that will not, OSHA will increase employee cooperation. In view of the discomfort of wearing respirators, particularly on warm days, and the limits on vision, hearing, and communication, operators dislike wearing respirators and will be far less vigilant in doing so if there is only a “possible” risk in limited circumstances. If an employer does not convey unequivocally that there is a clear and present threat to their health, operators will make their own determinations concerning the need for respirator use based upon the amount of visible dust in the vicinity of their work and weather conditions.

### **C. Operators Operate Equipment Far in Excess of Four Hours in a Work Day**

As stated in the PEA, unlike other construction workers, heavy equipment operators usually perform the same activity (operating their equipment) nearly constantly for more than seven hours per shift. PEA, IV-395, *citing* ERG-C, 2008. The PEA also states that “the duration of milling activities might vary substantially from shift to shift. For example, at a site evaluated by NIOSH, workers milled a road for more than 8 hours the first day but only 3.5 hours the next day because the job was finished.” *Id.*, *citing* NIOSH-Swank, 1995.<sup>17</sup>

When an operator finishes one milling job during their shift, the employer often assigns the operator to another location to perform the same work. It is not uncommon for an operator to work on three relatively small milling projects in one workday.

OSHA does not acknowledge in the preamble the extent to which operating engineers perform a Table 1 operation all day long, every single day. Rather, in describing the length of time during which Table 1 operations are performed in a work day, OSHA does not distinguish between operators and other crafts, and states that (78 *Fed.Reg.* at 56457)(emphasis added):

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<sup>17</sup> The PEA states that “Duration varies even more—from 1 to 8 hours—for smaller milling equipment.” PEA, IV-451. Smaller milling equipment is more likely to be used on smaller jobs.

The table divides operations according to duration into “less than or equal to” four-hours-per-day tasks and “greater than” four-hours-per-day tasks. The Agency recognizes that **some** activities do not last a full work shift, and often **some** activities are performed for half-shifts or less.

OSHA also states that “Construction workers are likely to spend a shift working at multiple discrete tasks, independent of occupational titles, and do not normally engage in those discrete tasks for the entire duration of a shift.” *Id.*

#### **D. An Overly Broad Rule Could End Careers of Asphalt Milling Operators Without Advancing a Safety and Health Benefit**

OSHA’s mission is to protect the health and safety of workers, not to create health problems by allowing the use of respirators for entire shifts as an exposure control method, when such use is unnecessary to reduce exposures below the PEL. An overly broad standard could literally end the careers of milling operators who are unable to pass the pulmonary function test for respirator use without achieving any safety or health benefit. A subdivision of the milling into more narrow categories would enable employers to accommodate operators with claustrophobia, perforated eardrums, pneumothorax, asthma, or other conditions who may be unable to wear respirators.

#### **E. Clarification of the Duration of Intended Respirator Use During Table 1 Operations**

In meetings with contractors and others on the proposed standard, the IUOE has learned that many in the regulated community misread Table 1 as requiring respirator use for four hours, and not for the entire shift, when a worker performs milling for four or more hours in an eight-hour workday.

The IUOE recommends that OSHA clarify on Table 1 itself and/or in a footnote below Table 1 the duration of respirator use required by the Table 1 approach. Unlike Table 1, the preamble clearly states that the worker must wear a respirator for the **entire shift** when certain operations are performed for more than four hours (*Id.* at 56457 (emphasis added)):

If an employer anticipates that a worker will perform a single operation listed in Table 1 for more than four hours, then the employer must ensure that the worker uses the respirator specified in the “>4 hr/day” column in Table 1 **for the entire duration of the operation**

The IUOE suggests that OSHA incorporate the explanation quoted-above from the preamble on the duration of intended respirator use on Table 1 and/or in a footnote below Table 1.

In contrast to the clear statement of duration in the preamble, “Note 2” on Table 1 is ambiguous. This footnote is easily misconstrued as stating that where a worker performs

certain operations for more than four hours each day, use of a respirator is required only during those work hours in excess of four hours in a shift or workday (*Id.* at 56499):

Where an employee performs more than one operation during the course of a day, and the total duration of all operations combined is > 4 hr/day, the required air-purifying respirator for each operation is the respirator specified for > 4 hr/day. If the total duration of all operations combined is ≤ 4 hr/day, the required air-purifying respirator for each operation is the respirator specified for ≤ 4 hr/day.

The IUOE further notes that the four-hour demarcation would be ineffective in protecting employees if employers do not accurately estimate the amount of time that a silica-generating task will require. To prevent poor prediction of the duration of jobs and an ongoing failure to provide respirators for activity that require four or more hours, the employer would need to be proactive in determining what would otherwise be unforeseen circumstances that may require additional time.

## **VII. THE IUOE RECOMMENDS MORE DETAILED GUIDANCE ON THE “CHARACTERISTICS” OF “ENCLOSED CABS”**

The IUOE endorses the use of enclosed cabs as an effective engineering control that isolates operators from the source during rock crushing, rock and concrete drilling, and earthmoving that abrades or fractures silica-containing materials.<sup>18</sup>

Enclosed cabs not only protect operators from silica exposure, but provide the additional benefits of protecting workers from noise exposure and exposure to diesel particulates and other respirable contaminants, such as lead. *See Diesel Particulate Matter Exposure of Underground Metal and Nonmetal Miners*, 66 *Fed.Reg.* 5706-01, 5869 (Jan. 19, 2001)(“It also reflects MSHA's awareness that enclosed cabs may provide many other important health and safety benefits, such as reducing noise exposure and reducing exposure to silica bearing respirable dust.”) *See also*, 54 *Fed Reg.* 29142-01, 29272 (Occupational Exposure to Lead)(emphasis added)(OSHA's conclusion is also predicated upon its determination that for those operations where exposure levels are above 50 g/m<sup>3</sup>, exposure levels can be controlled consistently to or below 50 g/m<sup>3</sup> by modest improvements in engineering or work practice controls. These readily available controls include **installing enclosed cabs on mobile equipment**; supplying these cabs with filtered air, HEPA filters and communication systems; wetting down the ore and spillages; using automated conveyor and chute systems; and replacing bulk cargo handling with FIBCs.”)

However, since enclosed cabs isolate the operator from the silica source and do not control exposure at its source, cab integrity is essential to reduction of silica exposure to

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<sup>18</sup> Since milling operators do not operate the machines from within enclosed cabs, only two of the recommended modifications to the characteristics of enclosed cabs are applicable to milling machines: 1) engineering controls are inspected and maintained in accordance with manufacturers' recommendations; and 2) the availability of respirators when engineering controls are temporarily unavailable.

operators of enclosed cabs. *See* 78 *Fed.Reg.* at 56454: “The Agency recognizes that although enclosed cabs have been proven to be an effective control method, they do not control exposures at the source.” The IUOE submits that greater specificity is needed so that employers have a clear understanding of the likely pitfalls identified by NIOSH. Without greater specificity, there is a grave danger that intended safeguards become counterproductive as dust is re-circulated within the enclosures. Consistent with MSHA recommendations concerning enclosed cabs, the IUOE also endorses inspection checklists to ensure that the engineering controls are functional. 78 *Fed.Reg.* at 56454.

### **A. Greater Specificity on Table 1 is Needed**

OSHA has requested comments on the “degree of specificity used for engineering and work practice controls for tasks identified in Table 1, including maintenance requirements.” 78 *Fed.Reg.* 56457. OSHA further asks (*Id.*):

Should OSHA require an evaluation or inspection checklist for controls? If so, how frequently should evaluations or inspections be conducted? Provide any examples of such checklists, along with information regarding their frequency of use and effectiveness.

OSHA also stated that it should require “additional specifications to ensure that the strategies are effective.” *Id.*

The IUOE recommends that OSHA require regular inspection of engineering controls in enclosed cabs; the IUOE also addresses inspection checklists in its discussion of the “competent person” below. The IUOE notes that NIOSH recommends in its comments that OSHA “require an evaluation of the engineering controls” on Table 1 and endorses inspection checklists to “help ensure that the control is functioning as designed and that the worker has the necessary supplies to do the job.” NIOSH Comments at 21.

The IUOE also agrees that greater specificity is needed concerning the engineering and work controls and respirator use in Table 1 as it relates to the work of operating engineers on the Table 1 for three reasons: 1) since the proposed rule provides employers with an exemption from the exposure assessment requirements in (f)(1) if the employer “fully” implements the engineering controls, work practice, and respiratory protection in Table 1, sufficient specificity is needed to ensure that operators receive adequate protection from silica exposure; 2) enclosed cabs without proper ventilation and seals make operators “more vulnerable” to silica exposure; and 3) the studies cited in the preamble demonstrate that there are many variables that must function properly for exposure levels to be at or below the PEL.

The IUOE supports the required characteristics of enclosed cabs on Table 1 but submits that specifying additional characteristics would ensure that the integrity of enclosed cabs is maintained. The IUOE recommends that OSHA address also the following issues, and supplement Table 1 accordingly, so that operators receive adequate protection: 1) specification by task of the workers whom each control or work practice is intended to protect (*see* Section X); 2) proper functioning of environmental controls – both heating and

air conditioning - in enclosed cabs; 3) training of operators and competent persons on conduct to ensure cab integrity and effective communication with doors and windows closed; 4) warning labels to reinforce such training; 5) inspection and maintenance of engineering controls in accordance with manufacturers recommendations; 6) proper hygiene and daily housekeeping of cabs to minimize the likelihood that dust is trapped within the enclosure; and 7) supplemental respiratory protection when the required characteristics, such as air conditioning, are temporarily non-functional or unavailable.

Table 1 would read as follows:

For equipment operator working within an enclosed cab having the following characteristics:

Environmental controls, including air conditioning and heating are properly functioning, and positive pressure is maintained.

Incoming air is filtered through a prefilter and mechanical filter media with greater than or equal to 95 percent efficiency on respirable dust

Cab is maintained as free as practicable from settled dust through housekeeping at the end of each shift, or more frequently, if needed

Door seals and closing mechanisms are working properly

Warning labels are affixed to the interior of the cab

Training of operators and competent persons on activity required to maintain cab integrity

Boot brushes are provided to operators to minimize dust brought into the cab

Engineering controls are inspected and maintained in accordance with manufacturers recommendations

Cabs are equipped with dust-resistant materials

### **B. Enclosed Cabs Without Proper Ventilation and Seals Make Operators “More Vulnerable” to Silica Exposure**

Poor implementation of enclosed cabs as an engineering control can be more injurious to the health of operators than no implementation of this control. A NIOSH study in the mining industry states that use of an enclosed cab may be more injurious to the health and safety of operators if the enclosures do not have the **at least** characteristics identified in Table 1 (emphasis added):<sup>19</sup>

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<sup>19</sup> *Dust Control Handbook for Industrial Minerals Mining and Processing*, (NIOSH RI 9689, 2012), Chapter 9, “Operator Booths, Control Rooms, and Enclosed Cabs,” at 225.

Workers in operator booths, control rooms, and enclosed cabs at mining operators are surrounded by dynamic working conditions that have highly variable dust sources. These enclosures create a microenvironment for the workers where they can be either more protected or **more vulnerable** to respirable dusts. Workers can be **more vulnerable** to in-cab dust sources (floor heaters, dirt on floors/walls, or on operator's clothing, etc.) that are trapped within the enclosure. Enclosed are actually harder to control and maintain than enclosed stationary areas (operator booths and control rooms) since the moving of the equipment constantly stresses and can compromise the integrity of the enclosure.

NIOSH and MSHA both report that the prevailing practice in the industry is that where enclosed cabs are used, they do not meet the requirements set forth in Table 1. As stated in the PEA, "NIOSH and the Mine Safety Health Administration (MSHA) report that, in general, heavy equipment cabs are poorly sealed and that original-equipment ventilation design does not necessarily provide positive pressure or appropriately filter air (NIOSH 2009-123, 2009; NIOSH Mobile Cab Web site, no date; MSHA 2000a, 2000b, 2000c). To effectively reduce the silica exposure of loader operators, cabs will need to be modified." PEA, IV-54, Asphalt Paving Products.

### **C. Exposure Studies Demonstrate That There Are Many Variables That Must Function Properly For Enclosed Cabs to be Effective in Reducing Exposures**

The need for greater specificity is well-supported by exposure studies cited in the preamble. The studies demonstrate that there are many variables that must function adequately for exposure levels to be at or below the PEL. As stated in OSHA's discussion of isolation as an engineering control, the safety and health benefits are achieved only when at least four variables are in place (*Id.* at 56454)(emphasis added):

Direct reading instruments show that fine particle (0.3 micron (mm) in size) concentrations inside operator cabs can be reduced by an average of 96 percent **when cabs are clean, sealed, and have a functionally adequate filtration and pressurization system.**

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The study found that effective filtration and cab integrity (*e.g.*, new gaskets, sealed cracks to maintain a positive-pressure environment) are the two key components necessary for dust control in an enclosed cab.

In the *Dust Control Handbook for Industrial Minerals Mining and Processing*, cited above, NIOSH analyzed the elements of effective control booths and cabs, reporting that the level of dust protection depends on the adequacy of the following factors: enclosure integrity (well sealed), filtration (sufficiently efficient for respirable particles), pressurization (positive pressure inside to keep dusty outside air from leaking in), work practices to keep doors and

windows closed, climate control (so doors and windows can be kept closed), housekeeping in the enclosure (remove any dust that gets inside), and maintenance (including changing outside air filters as necessary).<sup>20</sup> The NIOSH handbook includes a table summarizing NIOSH studies on personnel enclosures (cabs) associated with mining equipment (routinely used with massive quantities of dusty, silica-containing mineral materials), which shows dust reduced 63 to 98.8 percent by the cabs. PEA, A-41.

#### **D. Mechanical Filter Media With Specified Efficiency on Respirable Dust**

The IUOE recommends that OSHA modify “incoming air is filtered through a prefilter and HEPA filter” on Table 1 to “incoming air is filtered through a prefilter and mechanical filter media with greater than or equal to 95 percent efficiency on respirable dust.” The IUOE supports NIOSH’s recommendation that rather than specifying a particular filter, Table 1 should identify the goal – *i.e.*, 95 percent efficiency on respirable dust – since MERV 16 filters are currently a cost-effective option and other options may become available in the future.<sup>21</sup>

#### **E. Climate Control in Enclosed Cabs**

A very common type of heater used in enclosed cabs is a radiator heater located near the floor. Floor heaters are popular with equipment operators working in cold climates because these heaters keep their feet warm.

NIOSH studies have found that use of floor heaters greatly increase an operator’s exposure to respirable dust.<sup>22</sup> One field study showed a significant increase in dust levels (0.03 to 0.26 mg/m<sup>3</sup>) when a floor heater was used. The fan from the floor heater stirred up dust lying on the cab floor. *Id.* According to the NIOSH studies,<sup>23</sup> the use of floor heaters presents a serious problem because the operator brings a significant amount of dirt into the cab floor on his work boots, and the floor is, thus, the dirtiest part of the cab. As the operator moves his or her feet in the cab, dust is created and then blown throughout the enclosure by the fan or the floor heater. The fan also tends to stir up dust that may be on the operator’s clothes.

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<sup>20</sup> Chapter 9, “Operator Booths, Control Rooms, and Enclosed Cabs,” at 225-240.

<sup>21</sup> See NIOSH Comments at 47-48.

<sup>22</sup> “Reducing Enclosed Cab Drill Operator’s Respirable Dust Exposure with Effective Filtration and Pressurization Techniques,” Andrew B. Cecala, John A. Organiscak, Jeanne A. Zimmer, et al.; 486 *National Institute for Occupational Safety & Health*, 2001.

<sup>23</sup> [NIOSH 486] National Institute for Occupational Safety and Health, 2001. “Floor Heaters Can Increase Operator’s Dust Exposure in Enclosed Cabs,” *Technology News* 486:1-2. OSHA- 2010-0034-0842; NIOSH 487 *National Institute for Occupational Safety & Health*, 2001; “Sweeping Compound Application Reduces Dust from Soiled Floors Within Enclosed Operator Cabs.”



Any discharge of clean air low in the cab entrains dust from the floor and dirty work clothes before entering the worker's breathing zone. PEA, IV-399, "Heavy Equipment Operators," *citing* Cecala et al., 2005; NIOSH 486, 2001). Ideally, air flow would circulate from the top of the cab to the bottom, and recirculation pick-up would occur low in the cab. *Id.*

In light of these hazards, NIOSH states that the best solution for providing warmth in an enclosed cab is implementation of a heating and air-conditioning unit into the clean air and pressurization system. To address the potential hazard posed by floor heaters, the IUOE proposes that OSHA add to the "characteristics" of enclosed cabs in Table 1 that: "Environmental controls, including air conditioning and heating are properly functioning, and positive pressure is maintained."

#### **F. Regular Inspection and Maintenance to Ensure Proper Function of Engineering Controls**

NIOSH studies emphasize that regular maintenance of engineering controls is essential to exposure reduction. PEA, IV-54 and IV-79 (NIOSH 2009-123, 2009). OSHA states in the preamble that MSHA recommends "inspecting door seals and closing mechanisms to ensure they work properly." 78 *Fed.Reg.* at 56454.

There is a clear need for inspection and inspection of enclosed cabs to ensure that the engineering controls in Table 1 are functioning. Thus, the IUOE proposes that Table 1 require that: "engineering controls are inspected and maintained in accordance with manufacturers recommendations."

#### **G. Cab is Equipped With Materials That Do Not Retain Dust**

The IUOE recommends that OSHA add "cabs are equipped with dust-resistant materials" to the characteristics of enclosed cabs. Carpeting on the floor of cabs and cloth seats retain dust and make housekeeping more difficult. Rubber mats and vinyl seats are appropriate substitutes.

#### **H. "Cab is Maintained as Free as Practicable From Dust"**

NIOSH recommends "good housekeeping" by keeping the floor and other internal cab surfaces clean and the operator's clothing and boots clean to avoid the re-circulation of dust within the enclosed cab.<sup>24</sup>

Table 1 states that the employer shall ensure that the "cab is maintained as free as practicable from dust." The IUOE recommends that OSHA include the following language in Table 1 specifying the frequency of "housekeeping" since a dust-filled enclosed cab will not protect operators from exposure: "Cab is maintained as free as practicable from settled dust through housekeeping at the end of each shift, or more frequently, if needed."

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<sup>24</sup> "Key Components for an Effective Filtration and Pressurization System for Mobile Mining Equipment," A.B. Cecala, J.A. Organiscak, J.D. Noll, and J.P. Rider, *Mining Engineering*, 2014, Vol. 66, No.1

## **I. Availability of Respirators When Engineering Controls Are Temporarily Non-Functional**

As proposed, Table 1 provides no direction to employers on the temporary use of respirators when the required characteristics for enclosed cabs on Table 1 are temporarily non-functional. However, personal protective equipment may be necessary until feasible engineering and administrative controls are installed, and during maintenance, repair, and other unusual operating conditions.

In the preamble, OSHA states that use of enclosed cabs during earthmoving will “effectively protect workers,” and that respiratory protection “will not be needed.” 78 *Fed.Reg.* at 56465. While Table 1 does not “require” respirator use to supplement an enclosed cab as an engineering control during rock and concrete drilling, earthmoving, and rock crushing, there may be circumstances under which supplemental use would be necessary to avoid exposures above the PEL. On warm days, for example, operators will inevitably work with the cab window open if air conditioning is broken.

## **J. Warning Labels in Cabs to Alert Operators to the Hazards Caused by Opening Windows of Cabs During Table 1 Operations**

In light of the pervasive practice among operating engineers of working with cab windows open, the IUOE proposes that OSHA include a requirement that employers affix warning labels in cabs that working with open window may expose the worker to unhealthy levels of silica dust, which could cause silicosis, lung disease, kidney damage, and other serious diseases. The display of a warning label in enclosed cabs would reinforce the lessons learned in task-specific training,<sup>25</sup> and would serve as a reminder of the health impact of: 1) working with the windows open on a warm day, 2) keeping the door open during nonproduction times, 3) repeatedly exiting and entering the cabs during the shift, and 4) opening windows to communicate with other workers on the jobsite. *See Cranes and Derricks in Construction*, 75 *Fed.Reg.* 47906, 47912 (Aug. 10, 2010)(emphasis added): “The required **training is reinforced** by the electrocution warnings that must be posted in the cab and on the outside of the equipment.”

OSHA has the authority under 29 U.S.C. 655(b)(7) to promulgate standards that require warning labels as necessary to ensure that workers are aware of potential hazards:<sup>26</sup>

(7) Any standard promulgated under this subsection shall prescribe the use of labels or other appropriate forms of warning as are necessary to insure that employees are

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<sup>25</sup> *See also, Powered Industrial Trucks Standard*, 76 *Fed.Reg.* 22154-01 (Apr. 20, 2011)(“Requiring labels (markings) of modified equipment notifies employees of the conditions under which they can safely operate powered industrial trucks, thereby preventing such hazards as fires and explosions caused by poorly designed electrical systems, rollovers/tipovers that result from exceeding a truck's stability characteristics, and falling loads that occur when loads exceed the lifting capacities of attachments.”)

<sup>26</sup> *See 75 Fed.Reg.* 47906, 47934 (Aug. 9, 2010), *citing American Petroleum Institute v. OSHA*, 581 F.2d 493, 510 (5th Cir. 1978) in recognition of OSHA’s “broad authority to prescribe warning labels under 29 U.S.C. 655(b)(7).”

apprised of all hazards to which they are exposed, relevant symptoms and appropriate emergency treatment, and proper conditions and precautions of safe use or exposure.

In requiring warning labels both inside and outside of cabs alerting workers of the dangers of electrocution, OSHA stated that “electrocution warnings are necessary to protect the operator as well as any employees working in the area around the crane by increasing their awareness of the hazard.” 75 *Fed.Reg.* at 47951. The electrocution warning, 29 C.F.R. § 1926.1407(g) provides that:

*g) Posting of electrocution warnings.*

There must be at least one electrocution hazard warning conspicuously posted in the cab so that it is in view of the operator and (except for overhead gantry and tower cranes) at least two on the outside of the equipment.

The IUOE recommends that OSHA add a requirement on Table 1, which would be modeled after 29 C.F.R. § 1926.1407(g), that employers post a warning label on silica exposure in enclosed cabs:

There must be at least one silica exposure warning conspicuously posted in the cab so that it is in view of the operator.

**K. Training of Operators and Competent Persons on Activity Required to Maintain Cab Integrity**

1. Operators Play an Essential Role in Maintaining Cab Integrity

Since effective functioning of enclosed cabs as an engineering control requires action on the part of operators, training operators on maintenance of cab integrity is essential.

The engineering and work practice controls designed to protect operators will be rendered ineffective if operating engineers do not receive task-specific training on protocols needed to maintain cab integrity, including the following topics: 1) the necessity of keeping windows and doors closed to the extent practicable; 2) the importance of good housekeeping within the cab; 3) the use boot brushes to reduce the amount of dust brought into the cab; 4) reporting to the competent person when door seals and closing mechanisms are not working properly or air conditioning is temporarily not functioning; and 5) the need to wear respirators when one or more of the characteristics identified on Table 1 is not functioning or the functions performed require working with the window open to communicate with other crew members.

In the preamble, OSHA repeatedly states that certain engineering controls require action on the part of workers to function effectively (78 *Fed.Reg.* at 56283):

Finally, OSHA believes that worker training is necessary to inform employees of the hazards to which they are exposed, along with

associated protective measures, so that employees understand how they can minimize potential health hazards. Worker training on silica-related work practices is particularly important in controlling silica exposures because engineering controls frequently require action on the part of workers to function effectively.

“Enclosed cabs” protect operators by isolating them from the source, but such control is rendered ineffective if employees engage in activities, such as working with the cab windows open, repeatedly opening and closing the cab door during a shift, or tracking dusty boots into cabs, which breach the physical barrier between the operator and the source. While the effectiveness of engineering controls does not generally depend on human behavior to the same extent as personal protective equipment does, the effectiveness of an enclosed cab depends upon proper training of operators and diligent implementation of protocols designed to ensure cab integrity is maintained.

Some of NIOSH’s findings are counterintuitive, and education is needed so that operators understand the hazards to which they are exposed. Without training, an operator would not know, for example, that the “highest respirable dust levels recorded inside the cab were recorded during the nonproduction time periods.”<sup>27</sup>

#### 1. Training on Impact of Open Doors on Exposures

NIOSH studies demonstrate that “In order to achieve and maintain enclosed cab pressurization, doors and windows must be closed at all times except while the operator is entering or exiting the cab.”<sup>28</sup> NIOSH noted this hazard during a filed study on a surface drill, when the operator repeatedly opened the cab door to manually guide the drill steel in place each time an additional section was needed. The cab door usually remained open between 20 and 45 seconds each time this process took place. Because no drilling occurred and no dust cloud was visible the cab door was open, NIOSH initially thought that the exposure was insignificant. However, when NIOSH analyzed the dust data from inside the enclosed cab, a substantial increase in respirable dust concentrations was noted during the periods when the door was open. NIOSH did not expect this significant increase since drilling has ceased approximately two minutes before the door was opened. Despite the fact that there was no visible dust cloud during the time that the door was open, respirable dust concentrations were nine times higher than when the door was closed and drilling was being performed.

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<sup>27</sup> A.B., Cecala, J.A. Organiscak, J.A. Zimmer, W.A. Heitbrink, E.S. Moyer, M. Schmitz, E. Ahrenholtz, C.C. Coppock, and E.A. Andrews, 2005. “Reducing Enclosed Cab Drill Operator's Respirable Dust Exposure With Effective Filtration and Pressurization Techniques.” *Journal of Occupational and Environmental Hygiene* 2:54-63.

<sup>28</sup> A.B. Cecala, J.A. Organiscak, J.D. Noll, and J.P. Rider, “Key Components for an Effective Filtration and Pressurization System for Mobile Mining Equipment,” *Mining Engineering*, Vol 66, No. 1.

## 2. Training on Impact on Exposures of Working With Open Windows

As observed in NIOSH studies, operating engineers often choose to work with windows open. See PEA, IV-54 (Asphalt Paving Products): “Operators frequently open the windows and cab interiors can contain a notable amount of silica-containing dust.” The IUOE has observed that operators often prefer to work with windows open even when cabs are equipped with properly functioning air conditioning.

A review of OSHA, NIOSH, and other published reports conducted by ERG (ERG-C, 2008) indicates that construction workers who drive or otherwise operate tractors or other heavy construction equipment typically work outdoors without using engineering controls or specific work practice controls. When workers operate equipment from inside cabs, windows are typically open, diminishing the effectiveness of the isolation provided by the cabs. PEA, IV-398.

The ERG determined that this typical situation represented the baseline condition for heavy equipment operators. OSHA, however, notes that the exposure profile shows some heavy equipment operators do keep windows closed under dusty conditions and that the range of conditions represented in the exposure profile also represent the baseline conditions for all heavy equipment operators in the United States. Consistent with the methods OSHA is using to calculate baseline exposure levels for other construction tasks, OSHA has preliminarily determined that the median exposure level presented in Table IV.C-54 also represents the baseline exposure level for heavy equipment operators. IV-398 (Heavy Equipment Operators)

## 3. Training on Effect Communication With Door and Windows Closed

Training operators in effective communication while working with doors and windows closed is needed to provide operators with the skills to communicate while maintaining cab integrity.

To enable operators to keep cab doors and windows closed, employers should be required to train operators in effective communicate through hand signaling or use of a radio. Effective communication is essential to safety.

The need for providing a safe and effective means through which the operator and other crafts communicate is well supported by a study of crane accidents in the late 1990’s, *Crane Accidents 1997-1999: A Report of the Crane Unit of the Division of Occupational Safety and Health, May 23, 2000, California Department of Industrial Relations*. According to the study, “lack of communication” was a “major cause of accidents because the point of operation is usually some distance from the crane’s operator station or not in full and direct

view of the operator in operations involving mobile cranes.”<sup>29</sup> The study presents the following statistics on crane accidents:<sup>30</sup>

#### **All Crane Types Mobile Cranes**

1. Instability	67	49
a. Unsecured Load	34	6
b. Load Capacity	0	2
c. Ground not level/too soft	0	4
2. Lack of Communication	32	24
3. Electrical Contact	13	10
4. Misc. in 14 Categories	46	32

#### 4. Training of the Competent Person to Fulfill Oversight of Cab Integrity and Other Controls to Protect Operators

The competent person cannot fulfill his or her responsibilities unless the employer provides the competent person with the requisite training on proper implementation of the various functions that impact cab integrity. The following is a checklist of the items for which the competent person should have responsibility to ensure that operators working in enclosed cabs are not exposed to respirable silica above the PEL:

- Inspection of all enclosed cabs to verify that the cabs initially meet and continue to meet the requirements in Table 1
- Implementation of protection of the workers assigned to change dust-laden filters
- Promptly making the necessary corrections to ensure that enclosed cabs are in compliance with specifications in Table 1
- Replacement of filters on a fixed schedule
- Monitoring and replacement of door and window gaskets to dust-laden air to be drawn into the unit, bypass the filtration component and be blown directly into the cab
- Sealing and plugging cracks and holes in the shell to maintain cab integrity

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<sup>29</sup> According to the California study, seventy-five percent of accidents caused by both “lack of communication” and “electrical contact” involved mobile cranes.

<sup>30</sup> In issuing proposed rules concerning signaling, 29 CFR §§1926.1419 to 1926.1422, OSHA has recognized the need for clarity and precision in communications between the operator and the signal person. As stated in the preamble, C-DAC's goal in recommending the proposed rules is to “reduce the potential for miscommunication, which can lead to injuries and fatalities, particularly from ‘struck-by’ and ‘crushed-by’ incidents.” 73 *Fed.Reg.* 59713, 59796 (Oct. 9, 2008).

- Maintenance of a dust-free cab by cleaning walls and floor of the cab, as needed, but at least daily
- Environmental systems in the cab are properly functioning
- Providing workers with temporary use of respirators when needed to supplement controls
- Operators receive training in effective communication while working with doors and windows closed
- Promptly responding to employee reports or inquiries concerning silica exposure
- If the competent person is not the administrator of the respiratory protection program, he or she should act as point of contact in providing respiratory protection to supplement engineering and work practice controls
- Training workers on appropriate hygiene and ensuring that boot brushes are available
- Proper training on behavior that may breach the integrity of an enclosed cab.

**VIII. TASK-SPECIFIC TRAINING FOR OPERATORS IS NEEDED SINCE THEIR ACTIONS ARE CRITICAL TO THE EFFECTIVE FUNCTIONING OF ENGINEERING CONTROLS**

The IUOE endorses the BCTD’s recommendations concerning task-specific training. Task-specific training of operating engineers is particularly important because operator conduct is integral to the effective functioning of engineering controls designed to minimize potential health hazards. The addition of the language in bold will require that employers tailor training to the engineering controls applicable to the specific construction activity performed by the trainee:

The employer shall also ensure that each worker directly engaged in dust producing tasks and that each competent person will also receive **specific hands on training on the engineering controls** and work practices associated with the employee’s tasks, including the applicable work practices.

Task-specific training would facilitate OSHA’s goal of creating a standard for training, which is “meant to ensure that employees are made aware of the hazards associated with respirable crystalline silica in their workplace and how they can help to protect themselves.” 78 *Fed.Reg.* at 56474. As discussed above, since the operator plays an essential role in the effective functioning of enclosed cabs as an engineering control, training operators on maintenance of cab integrity is essential.

Likewise, the function of the milling operators to ensure effective operation of a dust suppression system is another example of the indispensable role played by operators in promoting their own safety and health. The IUOE endorses the recommendation of the Asphalt Partnership in its comments that a milling machine operator must demonstrate a “thorough understanding of the dust suppression systems on the machine.” The Asphalt Partnership recommends that operator receive training to visually inspect seals, flashing, and enclosures, to ensure minimal dust leakage, and on the water system operation, including (Asphalt Partnership’s Comments at 52):

- Water application locations within the machine
- Flow rates
- Spray patterns
- Anticipate water usage per unit time or per unit square yard
- Maintenance – ensure correct nozzles per manufacturer’s specifications
- Troubleshooting
- Check in-line water filter

The IUOE intends to address at the public hearing task-specific training for workers engaged in rock and concrete drilling, rock crushing, and driveable masonry saws.

#### **IX. THE IUOE ENDORSES THE BCTD’S “COMPETENT PERSON” RECOMMENDATIONS**

The IUOE endorses the definition of “competent person” proposed by the BCTD and the addition of “specific competent person duties” in paragraph 1926.1053(e)(3)(ii)(A).

The BCTD’s recommendation that OSHA add “the proper methods to control [hazards] to protect workers” to the definition of competent person is essential,<sup>31</sup> since the environmental factors that impact exposure and the effectiveness of exposure controls change throughout the workday. There are a myriad of factors – ranging from environmental conditions to local topography - that influence an operator’s exposure during operations involving the use of heavy equipment. In a 2009 publication,<sup>32</sup> OSHA recognized that the level of an employee’s silica exposure depends upon the following factors in the work environment:

- The percentage of silica found in the material,
- Environmental conditions such as wind direction and speed,

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<sup>31</sup> The BCTD’s proposed definition is: “Competent person means an individual designated by the employer to act on the employer’s behalf, one who is capable of identifying existing and predictable respirable crystalline silica hazards in the surroundings or working conditions and the proper methods to control them to protect workers, and who has authorization to take prompt corrective measures to eliminate them.”

<sup>32</sup> *Controlling Silica Exposure in Construction*, OSHA 3362-05 (2009), at 49.



- Enclosed, semi-enclosed, or open spaces, and
- Multiple operations generating silica dust

The competent person must have the requisite training to make the necessary adjustments to the work process or exposure controls to protect workers from the impact of changing environment conditions, such as wind, humidity, and temperature, on exposure and engineering controls. Sub-freezing temperatures, for example, preclude the use of wet suppression as an engineering control.<sup>33</sup> High summer temperatures cause asphalt to become sticky, which helps to limit dust emissions. PEA, IV-456.

The BCTD's recommended duties of the competent person are essential to the protection of operating engineers. The IUOE endorses the BCTD's recommendations on competent person in their entirety but focuses on three issues critical to reduction of silica exposure during construction activities performed by operating engineers: 1) use of the written exposure control plan to identify locations where silica is present or is reasonably expected to be present; 2) task-specific training of operators on required actions on their part for engineering controls to function effectively; and 3) proper oversight by the competent person to ensure that good housekeeping in cabs, regular inspection and maintenance of cabs, and effective work practices to protect the integrity of enclosed cabs. As discussed below, the BCTD's recommendations would require that the competent person be responsible for duties essential to the protection of operating engineers, such as task-specific training and cab integrity, and have the ability to determine when a geotechnical profile for silica content is needed (emphasis added):

Specific competent person duties: Every employer performing work covered by this section shall designate a competent person who shall be on site at all times that work covered by this section is being performed, to ensure that the employer's silica exposure assessment and control plan is properly implemented. The competent person shall **use the written exposure control plan to identify locations where silica is present or is reasonably expected to be present in the workplace prior to the performance of work.** In addition, the competent person's duties shall include ensuring that 1) where necessary, regulated areas are established and access to and from those areas is limited to authorized persons; 2) the adequacy of all employee exposure monitoring required by this section; 3) **the engineering controls required by this standard, including all elements of Table 1 (if it is being used), are implemented, maintained in proper operating condition, and functioning properly;** and 4) that all employees exposed to silica have received the **appropriate silica training, as required under paragraph [X] of this section, including the appropriate respiratory protection (if required).**

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<sup>33</sup> *The Technological Feasibility Study of Regulatory Alternatives for a Proposed Crystalline Silica Standard for Construction*, April 2008 draft (ERG), at 1-7.

Unlike the definition proposed by the BCTD, OSHA's proposed definition of competent person is far too limited to encompass the breadth of responsibilities that a competent person must undertake to ensure that protections are properly implemented. Sections A through C below explain the reasons that a broader definition of competent person is needed for the protection of operating engineers.

The safety & health directors and other contractor representatives who attended meetings hosted by the IUOE in Nevada, Illinois, and Connecticut agree that the role of the competent person is critical to determining when there is a reasonable expectation that operators will be exposed to respirable silica above the PEL. They further agree that competent person be responsible for taking whatever action, including geotechnical testing for silica content, is needed to negate the expectation that silica is present in the workplace.

**A. "Use of the Written Exposure Control Plan to Identify Locations Where Silica is Present or is Reasonably Expected to be Present"**

The preamble states that "the competent person must have the knowledge and experience necessary to identify in **advance** tasks or operations during which exposures are reasonably expected to exceed the PEL, so that affected employees can be notified of the presence and location of areas where such exposures may occur, and the employer can take steps to limit access to these areas and provide appropriate respiratory protection." 78 *Fed.Reg.* at 56443; emphasis added. Proposed rule 1926.1053(e) states that "Whenever an employee's exposure to airborne concentrations of respirable crystalline silica is, or can **reasonably be expected** to be, in excess of the PEL, each employer shall establish and implement either a regulated area in accordance with paragraph (e)(2) of this section or an access plan in accordance with paragraph (e)(3) of this section." Emphasis added.

The BCTD's proposal that the competent person have responsibility for using the "written exposure control plan to identify locations where silica is present or is reasonably expected to be present in the workplace **prior** to the performance of work" will facilitate the goal expressed in the preamble and codified in the proposed rule. Indeed, OSHA contemplates that the competent person is responsible for identifying "in advance" of the performance of work the tasks and operations during which exposures are expected to exceed the PEL. Proposed rule 1926.1053(b) simply states that the competent person must be "capable of identifying existing and predictable respirable crystalline silica hazards in the surroundings or working conditions ..." The BCTD's requirement that the employer have a written exposure plan and that the competent person use the plan "prior to" the performance of work to determine whether silica is or is reasonably expected to be present in the workplace obligates the competent person to take whatever steps are necessary to negate the expectation that silica is present in the workplace.

To make an informed judgment as to whether there is a reasonable expectation that workers may be exposed to silica at or above the action level, the competent persons must know the local topography and understand which types of earth – sandy loam, stable rock, clay, sand, or cohesive soil – are expected to have higher concentrations of silica content. He

or she must also understand the differences in expected exposure when an operator is moving virgin earth versus moving backfill.

In functions not included on Table 1, a competent person would not be able to make a “reasonable” judgment as to whether its employees would be exposed to silica concentrations above the PEL if no arrangement is made for testing the materials involved in the construction activity. Competent persons must have the necessary training to determine when there is a “reasonable expectation” that operators will be exposed to high concentrations of silica.

### **B. Ensuring That “All Employees Exposed to Silica Have Received The Appropriate Silica Training”**

Proposed rule 1926.1053(b) is deficient because it does not “does not specify particular training requirements for competent persons.” 78 *Fed.Reg.* at 56443. In light of OSHA’s recognition that “engineering controls frequently require action on the part of workers to function effectively,” the competent person must be trained to understand the breadth of task-specific training to provide to operators. Without adequate task-specific training, workers would lack the requisite knowledge to participate in ensuring that engineering controls function effectively.

### **C. Ensuring That the “Engineering Controls” Required by This Standard Are “Implemented, Maintained in Proper Operating Condition, and Functioning Properly”**

The engineering controls needed for the protection of operating engineers require the ongoing vigilance of both the operator and the competent person. The controls used to protect milling operators, for example, require an understanding of flow rates when water suppression is used to reduce exposures. Likewise, there are great number of variables that must function adequately for enclosed cabs to lower exposure levels to at or below the PEL.

The competent person must be responsible for oversight of the engineering and work practice controls to ensure the continuing adequacy of the controls. The BCTD’s recommended language is broad enough to require that the competent person be responsible for and have the ability to undertake the measures necessary to protect operators.

## **X. IDENTIFICATION OF THE PROTECTIONS DESIGNED TO PROTECT EACH WORKER PERFORMING A JOB TASK ON A TABLE 1 ACTIVITY**

The IUOE recommends clarification of Table 1 to provide employers with improved guidance on all steps required to **fully** implement the exposure controls on Table 1, and to ensure that no worker is left unprotected by the standard. As proposed, Table 1 lists a number of engineering controls and work practices but does not identify the workers in the regulated area that each control is intended to protect.

Identification of the engineering controls, work practices, and respirator use designed to protect each worker performing a task involved in Table 1 construction activities would

provide clear guidance on the protections afforded each worker in the regulated area. In so doing, OSHA would need to first identify all workers performing a task in the regulated area for all Table 1 activities and state which protections are required for each worker. This approach would ensure that employers do not incorrectly assume that they are provided with both discretion in devising protections for workers who perform a Table 1 task **and** exemption from exposure assessments.

Proposed rule 1926.1053(b) defines “regulated area” to include an “area, demarcated by the employer, where an employee’s exposure to airborne concentrations of respirable crystalline silica exceeds, or can reasonably be expected to exceed, the PEL.” Since employers implementing Table 1 activities are exempt from undertaking exposure monitoring to determine the scope of the area in which workers performing Table 1 activities may be exposed to silica above the PEL, guidance to employers on the “regulated area” would further assist employers in identifying which workers performing tasks outside of cabs are exposed to significant levels of silica.

OSHA recognizes that regulated areas and access control are important because they serve to limit exposure to respirable crystalline silica to as few employees as possible. *Id.* at 56283. As OSHA stated in the preamble, the Agency “expects that the benefits estimated under the proposed rule will not be fully achieved if employers do not implement the ancillary provisions of the proposed rule. *Id.* OSHA further stated that the “effectiveness of the proposed rule depends on regulated areas or access control to further limit exposures and on medical surveillance to identify disease cases when they do occur.” *Id.*

The IUOE will present testimony at the hearing identifying the Table 1 tasks performed by operators, employees performing Table 1 tasks in the vicinity of operators, and other bystanders. The IUOE’s testimony will also include identification of operator work commonly performed outside of enclosed cabs in various construction activities, such as operation of the conveyor belts in rock crushing.

#### **A. Exposure Monitoring of Employees in the Regulated Who Are Not Identified on Table 1**

The IUOE reads Table 1 as requiring that where there is insufficient data to identify the exposure controls applicable to workers performing certain tasks that are part of Table 1 activities, employers would be required to implement the 1026.1053(d) exposure assessments for those workers. However, based upon the IUOE’s discussion of the proposed rule, the IUOE recognizes that there is a misconception that employers are exempt from exposure monitoring of all employees when Table 1 controls are implemented.

OSHA recognizes that isolation from the silica source does not protect all operators involved in construction activities requiring the use of heavy equipment since operators often work outside of enclosed cabs, and leaves it to the discretion of employers to “apply all other feasible controls to protect those employees” (78 *Fed.Reg.* at 56454):

The Agency recognizes that although enclosed cabs have been proven to be an effective control method, they do not control exposures at the source. In many circumstances, machine operators work alongside employees who are outside the enclosed cabs and are not protected by them. As such, OSHA expects employers to apply all other feasible controls to protect those employees.

While a performance-based approach is appropriate when employers are required to assess exposures and/or have objective data demonstrating that there “respirable crystalline silica is not capable of being released in airborne concentrations at or above the action level ...” (1926.1053(d)(2)(ii)(B)), it would be antithetical to the very purpose of Table 1 to allow employers to devise their own controls without performing exposure assessments or obtaining objective data.

Indeed, in light of the fact that an employer is not required to perform exposure assessments “when employees perform an operation listed in Table 1 and the employer fully implements the engineering controls, work practices, and respiratory protection described in Table 1 for that operation” (1926.1053(d)(8)(i)), better guidance is needed. The IUOE recommends that OSHA identify tasks to which each engineering control, work practice, and respiratory protection applies. In so doing, the employer would have explicit notice that it must implement the 1926.1053(d) exposure assessments for all those workers performing tasks that are not specifically identified on Table 1. This approach would minimize the likelihood that workers performing unidentified tasks would be deprived of the benefits of feasible engineering controls and required to wear respirators for many hours each day.

#### **B. The IUOE Urges OSHA to Explore Additional Options for Exposure Controls to Protect Operators Working Outside the Cab in Drilling and Rock Crushing**

Table 1 does not address protection of operators who perform construction activities outside the cab with or without remote controls. For operators who operate conveyor belts by remote control in rock crushing, for example, isolation would not be an applicable control, unless the worker operates the conveyor belt from an operator’s booth with the same characteristics as an enclosed cab.

OSHA recognizes in the PEA that cabs are currently unusual on rock crushing machines and that other controls are commonly used when cabs are unavailable (PEA, IV-494):

Although cabs are currently unusual on construction crushing machines, the protective enclosures can be located in a separate portable booth or in the cab of another vehicle (remote control operation). Remote control systems and water mist systems are either standard or optional equipment on some mobile rock crushers, and all crushers and associated machinery (conveyers, sizing screens, discharge points) can be retrofit with water spray and foam systems

(Midwest-Edwards, 2009; Komatsu America, 2007; Komatsu America, 2010; NESCO-dust-control, 2007).

The IUOE recommends that OSHA review PEA's analysis of the efficacy of using remote control as an engineering control and operator's booth as a means to isolating operators from the silica source and the feasibility of operator's booth of this potential control.<sup>34</sup> If OSHA determines that such controls are feasible and would eliminate the need for wearing respirators during rock crushing or operating vehicle-mounted drilling rigs for concrete, OSHA could then consider inclusion of operator's booths and operation by remote control on Table 1. If OSHA determines that one or more of these controls are not feasible at this time, the IUOE urges the OSHA to state in the preamble to the final rule that remote control and/or operator's booths will be included on Table 1 when this control becomes feasible.

The PEA endorses the use "operator's booths" to control exposure during rock crushing, but preamble is silent on the use of operator's booths as an engineering control during rock crushing or drilling rock and concrete (PEA, IV 494):

One of the most effective means of protecting a worker associated with a dust-generating operation can be the utilization of a booth/control room that provides filtered air inside the enclosure. Previous research has shown that properly operating filtration systems installed on enclosed compartments can provide over 90 percent reductions in respirable dust exposures [NIOSH 2008]. Another advantage of these booths is that they can be equipped with air-conditioning and heating systems to make the work environment more comfortable for the operator.

The PEA further states that the "silica exposure level of most workers who operate rock crushing machines primarily from a control panel can be reduced to a level of 50  $\mu\text{g}/\text{m}^3$  or less with the use of enclosed, air-conditioned, and properly ventilated operator's booths, in combination with water spray dust suppression." According to the PEA, OSHA "estimates that still lower results can be achieved by using a combination of controls: results of 50  $\mu\text{g}/\text{m}^3$  or less can be achieved for workers in booths/cabs operating rock crushers fitted with water sprays, which improve dust control around the crushers on the infrequent occasions when the operators do need to exit their booths to clear impacted material." PEA, IV-494.

### **C. Table 1 Does Not Address Protection of Field Material Testers and Field Surveyors Who Work in Coordination With Operators During Earthmoving**

If OSHA decides to retain earthmoving on Table 1, the IUOE urges OSHA to identify the engineering and work practice controls needed to protect field surveyors and field material

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<sup>34</sup> See 78 *Fed.Reg.* at 56464 (emphasis added): "It is important to note that this machine operator spent much of the shift in a **poorly sealed booth** directly over the crusher, but left the booth frequently to tend to other activities. Due to the lack of information regarding the workshift, OSHA cannot assess the full extent of the impact that water dust control had on the worker exposure."

testers. Both field material testers and field surveyors work outside the cab in close coordination with the operator.

On a large highway project, for example, each “excavating crew” is assigned a soil tester who works with that particular crew, and each concrete setting crew is assigned a concrete tester. A field material tester performs “compaction” tests to ensure that the soil is stable enough to support the structure under construction. This on-site material tester informs the equipment operator of the results of the compaction test while the work is ongoing so that the operator can modify his or her work to ensure that the project is constructed in accordance with contract specifications and code requirements. If compaction is inadequate, the operator continues to compact the soil. While the soil tester does not physically operate the roller, backhoe or other heavy equipment, the tester is located in close proximity to the heavy equipment operator and the result of the soil tests cause an immediate adjustment in the manner in which the operator performs his or her work.

#### **XI. NO EXEMPTION FROM EXPOSURE ASSESSMENTS OF WORKERS PERFORMING A TASK WHEN THE EMPLOYER DOES NOT FULLY IMPLEMENT TABLE 1 EXPOSURE CONTROLS**

The IUOE recommends that Table 1 explicitly state that if an employer chooses not to implement an engineering control for a worker performing an identified task, the employer is not exempt from monitoring that worker or a worker with comparable exposures based upon location of the worker from the source of the silica. As a result, Table 1 could easily be misread as exempting an employer from assessing the exposure of operators in rock and concrete drilling and rock crushing even if the employer does not provide an enclosed cab with the specifications listed therein.<sup>35</sup> Such a reading would be inconsistent with (f)(2), which states that “For the operators listed in Table 1, if the employer **fully** implements the engineering controls, work practices, and respiratory protection described in Table 1, the employer shall be considered to be in compliance with paragraph (f)(1) of this section.” Emphasis added. Furthermore, the preamble states that “when employees perform an operation listed in Table 1 and the employer **fully** implements the engineering controls, work practices, and respiratory protection described in Table 1 for that operation, the employer is not required to assess the exposure of the employees performing such operations.” 78 *Fed.Reg.* at 56289 (emphasis added).

An employer would not “fully” implement the engineering controls designed to protect operating engineers engaged in rock and concrete drilling and rock crushing if the employer chose not to use an enclosed cab. Accordingly, the employer would be required to assess exposures of operators even if the employer fully implements the controls intended to protect other workers performing tasks involved in Table 1 activities. With the exception of “use of heavy equipment during earthmoving,” all the activities involving operation of heavy equipment contemplate that the operation will involve workers performing tasks outside enclosed cabs.

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<sup>35</sup> The only Table 1 engineering control for earthmoving is enclosed cabs with the specifications listed therein.

In the interests of clarity, the IUOE suggests that OSHA state on Table 1 that the employer does not have the option of respirator use as a means to controlling exposures during rock crushing or rock and concrete drilling if the employer chooses not to use enclosed cabs as an engineering control. Table 1 requires no respirator use by operators who work within an enclosed cab in rock crushing, rock and concrete drilling, and in earthmoving. Table 1 requires that operators working outside the cab in rock crushing operations and in concrete drilling wear a half-respirator if they perform these operators for more than four hours.

For further clarification, the IUOE suggests that Table 1 explicitly state that employers who use open cabs during rock crushing are not exempt from exposure assessments when the employer implements the other identified controls, *i.e.*, use wet methods or dust suppressants or local exhaust ventilation systems at fee hoppers and along conveyor belts and the worker using a respirator after four hours. Likewise, Table 1 would be clearer if it specified that employers who use open cabs during concrete drilling are not exempt from exposure assessment when employers implement the other controls listed for “operating vehicle-mounted drilling rigs for concrete.”

## **XII. TABLE 1 AS AN APPENDIX TO THE SILICA STANDARD**

OSHA asks for comments on how it should “update Table 1 in the future to account for development of new technologies.” 78 *Fed.Reg.* at 56289. OSHA stated that it has decided at this time not to create a “more dynamic and predictive analysis of possible cost-reducing technological advances or worker specialization because the technological and economic feasibility of the proposed rule can easily be demonstrated using existing technology and employment patterns.” *Id.* at 56357-56358.

In so stating, OSHA noted that “Probably the most pervasive and significant technological advances, however, will likely come from the integration of compliant control technology into production equipment as standard equipment.” *Id.* at 56357. One of the controls that OSHA anticipates will become standard equipment is “machine-integrated wet dust suppression systems used, for example, in road milling operations.” *Id.*

In recognition of the fact that control technology changes over time and that OSHA may not engage in another rulemaking on silica in the foreseeable future, the IUOE recommends that Table 1 be included as an appendix to the regulations, with the direction that OSHA review the appendix within specified time frames as additional engineering controls are developed and changes in construction techniques either increase or decrease silica exposures.

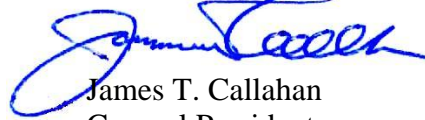
This approach would enable the OSHA standard to remain current with technological advances developed by NIOSH and others to better protect workers from silica exposure. The mining industry already uses instantaneous monitoring that informs the miner of overexposures to coal dust which enable the miner to immediately take the necessary actions needed for his or her protection. As end-of-shift monitoring and/or instantaneous monitoring for silica exposure is developed and becomes commercially available, OSHA can more



readily modify Table 1 to incorporate these engineering controls if Table 1 is an appendix to the silica standard.

Thank you for your attention to the IUOE's comments. Please contact Elizabeth Nadeau in the IUOE Legal Department at 202-778-2673 if you have any questions.

Respectfully submitted,



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General President

cc: IUOE Local Unions