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Too Little Too Late: The Infeasibility of OSHA's Silica Standards in the Oil Industry

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RECENT DEVELOPMENT

TOO LITTLE TOO LATE: THE INFEASIBILITY OF OSHA'S SILICA STANDARDS IN THE OIL INDUSTRY

CALI M. FRANKS*

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* St. Mary's University School of Law, J.D., 2018. This Recent Development is dedicated to the author's grandmother, Alma Marie Cartwright (1923–2015), whose passion for writing, reading, and advocacy inspired the author to write this piece. The author would also like to express her gratitude for the unwavering support of her parents, Randy and Andra, for without their sacrifices, selflessness, and love, none of her successes in life would have come to fruition. The author also expresses her sincere thanks to Professor David Grenardo, for his mentorship throughout the author's time in law school; Professor T.K. Floyd Foutz, for her guidance and edits; and Meredith McDonald, for her edits and support. The author is also deeply appreciative of the many hours spent by the members of the *St. Mary's Law Journal*, Volume 49, in preparing this Recent Development for publication.

I. SILICA IN THE OIL INDUSTRY

Silica, used in fracking, has been the technological key to unlocking the shale boom since 2008. Its dominating use in the oil field spans to nearly every well, both new and old. This Recent Development focuses on the silica standards applicable to general industry and such standards' applicability, or lack thereof, to the oil industry.

Silica, also known as quartz, is a mineral found in many industrial applications.¹ It can be used in construction sites for a variety of applications, including masonry, landscaping, and granite.² Dust from the process of grinding, cutting, or drilling silica can create crystalline silica particles.³ Exposure to these particles can be harmful to the health of those exposed, resulting in a diminished quality of life, and can even cause death in certain cases.⁴ The consequences of exposure to silica, combined with silica's wide use in industrial applications, indicated that something needed to be done to promote human safety.

Several court cases across various industries have highlighted the need for stricter regulations of silica, and in 2016, the Occupational Safety and Health Administration (OSHA) finally set out new guidelines for permissible exposure limits (PEL).⁵ OSHA issued two standards: one for

1. U.S. DEP'T OF LABOR, OSHA FACT SHEET, CRYSTALLINE SILICA EXPOSURE HEALTH HAZARD INFORMATION (2002), https://www.osha.gov/OshDoc/data_General_Facts/crystalline-factsheet.pdf [<https://perma.cc/QGZ3-WMBC>] [hereinafter OSHA FACT SHEET].

2. OSHA Silica Dust Standard, YOUTUBE (Jun. 9, 2016), <https://www.youtube.com/watch?v=7gGlXwRKH7E> [<https://perma.cc/CK48-5VA2>].

3. Silica sand is all around us, including beach sand, but because people "do not enjoy going to the beach during a wind/sand storm[.]" exposures are usually minimal. Lara Miosha, *Respirable Crystalline Silica*, MICHIGAN.GOV, www.michigan.gov/documents/lara [<https://perma.cc/J7FK-5MPN>].

4. There are significant studies addressing the increase in mortality attributed to silica. *E.g.*, Ki Moon Bang et al., *Silicosis Mortality Trends and New Exposures to Respirable Crystalline Silica—United States, 2001–2010*, CTRS. FOR DISEASE CONTROL & PREVENTION (Feb. 13, 2015), <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6405a1.htm> [<https://perma.cc/S2X9-FNFZ>] (analyzing deaths where the underlying cause was "pneumoconiosis due to dust containing silica").

5. There are a number of cases across many occupations and nations telling the same story and pleading for silica regulation to prevent silicosis, the disease that can result from exposure to silica particles. *See Silicosis Court Case*, GROUNDUP, <https://www.groundup.org.za/silicosis-court-case/> [<https://perma.cc/HUK8-2NPY>] ("In October 2015, former workers on South Africa's gold mines took more than 30 companies to court. The mine workers asked the South Gauteng High Court for permission to bring a class action against the companies, on behalf of all miners who have silicosis and tuberculosis (TB) as a result of their exposure to silica dust since 1965, and of the families of all miners who have died of silicosis and TB."); *see also In re Silic Prods. Liab. Litig.*, 398 F. Supp. 2d 563, 567 (S.D. Tex. 2005) (combining 10,000 individual plaintiffs who filed more

the construction industry and the other for standard uses such as general industry and maritime use.⁶ The oil and gas industry is included under the general industry regulations.⁷ The number of construction workers exposed to respirable crystalline silica is approximately two million.⁸ This prevalence makes OSHA's establishment of separate regulations understandable. What is unclear, however, is the reason the oil and gas industry—with the highest percentage of workers above the new PEL regulations—is covered by the general industry regulations without specific industry requirements.⁹ These general guidelines provide an important first step in the right direction, but without industry-specific regulations, workers in the oil industry will likely continue to suffer from the dangerous effects of silica.

than ninety cases involving the defendants' contribution to the plaintiffs' silicosis); *Young v. Logue*, 660 So. 2d 32, 38–39, 55 (La. Ct. App. 1995) (affirming a trial court finding sandblasting hood was inadequate to protect plaintiff from silica dust that led to eventual silicosis); David McKenzie & Ingrid Formanek, *Dying for Gold: South Africa's Biggest Ever Class Action Lawsuit Gets Go Ahead*, CNN (May 13, 2016, 10:36 AM), <http://www.cnn.com/2016/05/13/africa/south-africa-gold-miners-silicosis/index.html> [<https://perma.cc/GDH3-NUN5>] (“Several studies estimate that there are at least two hundred thousand current and former miners in the region suffering from [silicosis].”). While there has never been a successful class action or “toxic tort” action involving silicosis, one expert says it is just a matter of time. Philip R. Stein, *Silica Exposure Lawsuits: The Next Toxic Tort?*, LAW 360 (Feb. 21, 2014, 3:40 PM), <https://www.law360.com/articles/512002> [<https://perma.cc/4G9V-72E3>] (investigating the “potential rising tide of ‘silica exposure’ lawsuits” against occupations using silica).

6. Compare Safety and Health Regulations for Construction, 29 C.F.R. § 1926.1153 (2016) (“This section applies to all occupational exposures to respirable crystalline silica in construction work . . .”), with Occupational Safety and Health Standards, 29 C.F.R. § 1910.1053 (2016) (“This section applies to all occupational exposures to respirable crystalline silica, except: (i) Construction work . . .”).

7. Cf. 29 C.F.R. § 1910.1053(a) (stating the regulation applies to all occupational exposures except those enumerated and not excepting oil and gas).

8. U.S. DEP'T OF LABOR, OSHA'S RESPIRABLE CRYSTALLINE SILICA STANDARD FOR CONSTRUCTION (2017), <https://www.osha.gov/Publications/OSHA3681.pdf> [<https://perma.cc/69ZZ-TUNR>].

9. See, e.g., U.S. DEP'T OF LABOR, OSHA'S RESPIRABLE CRYSTALLINE SILICA STANDARD FOR GENERAL INDUSTRY AND MARITIME (2018), <https://www.osha.gov/Publications/OSHA3682.pdf> [<https://perma.cc/S8C9-LXGH>] (“Hydraulic fracturing operations in the oil and gas industry must implement dust controls to limit exposures to the new PEL by June 23, 2021.”).

A. *Silica*

The popularity of modern-day hydraulic fracturing has been on the rise since the 1990s.¹⁰ This highly controversial process involves pumping large amounts of hydraulic fluid several hundred feet below the earth's surface to allow for maximum retrieval of natural gas or oil.¹¹ Thanks to fracking, coupled with horizontal drilling, production of oil and gas has increased production rates, "in some cases by many hundreds of percent."¹² The contents of the hydraulic fluid vary greatly and can depend on the oil well itself, the characteristics of the water being used, and the shale formation that is being fractured, and, generally, hydraulic fluids require "frack sand."¹³ The frack sand is a proppant and is used to prop open the fractures created by the blasts, thus increasing production rates by allowing "fluids to flow more freely" to the well.¹⁴ Silica, also known as quartz, is a crush-resistant material.¹⁵ Quartz allows immense amounts of compressive pressure to be used to cut through rocks, leaving behind the quartz to resist the closing of the well after fracturing is over.¹⁶ "Silica-based sand is a key ingredient to the whole fracking process" and, because of its importance, the oil and gas industry requires millions of tons of silica sand per year.¹⁷

10. Cf. John Manfreda, *The Real History of Fracking*, OILPRICE.COM (Apr. 13, 2015, 4:10 PM), <https://oilprice.com/Energy/Crude-Oil/The-Real-History-Of-Fracking.html> [<https://perma.cc/6Z4Y-69CG>] (noting modern-day fracking began in the 1990s).

11. *The Process of Hydraulic Fracturing*, U.S. ENVTL. PROTECTION AGENCY, <https://www.epa.gov/uog/process-unconventional-natural-gas-production> [<https://perma.cc/5CAN-96PF>].

12. See *Hydraulic Fracturing: The Process*, FRAC FOCUS, <https://fracfocus.org/hydraulic-fracturing-how-it-works/hydraulic-fracturing-process> [<https://perma.cc/E74B-ATC4>] (explaining that hydraulic fracturing stimulates natural gas and oil flows and increases the volumes recovered).

13. See *Chemical Use in Hydraulic Fracturing*, FRAC FOCUS, <https://fracfocus.org/water-protection/drilling-usage> [<https://perma.cc/96B9-UPFP>] (stating the typical propping agent used in hydraulic fluid is silica sand).

14. *Hydraulic Fracturing 101*, EARTHWORKS, https://www.earthworksaction.org/issues/detail/hydraulic_fracturing_101#PROPPANT [<https://perma.cc/NR3G-YUDX>].

15. *What Is Frac Sand?*, GEOLOGY.COM, <http://geology.com/articles/frac-sand/> [<https://perma.cc/G5UU-7J8N>].

16. WIS. DEP'T OF NAT. RES., *SILICA SAND MINING IN WISCONSIN* 1, 3 (2012), <http://dnr.wi.gov/topic/mines/documents/silicasandminingfinal.pdf> [<https://perma.cc/SS8L-4ML8>].

17. OGIB Research Team, *US Silica: The First IPO in the "Fracking Sand" Industry*, OIL & GAS INV. BULL. (Feb. 17, 2012), <https://oilandgas-investments.com/2012/stock-market/us-silica-ipo-fracking-sand/> [<https://perma.cc/C3TD-PYHZ>] (reporting the major silica industry player, US Silica, "control[led] 283 million tons of reserves" of silica sand in 2012). The amount of frack sand

Silica becomes dangerous when the sand is forced into the well, creating dust in respirable-size particles.¹⁸ When workers inhale the respirable-size particles of silica, they are inhaling a “human lung carcinogen.”¹⁹ Breathing even small amounts of silica has been shown to cause silicosis—the formation of scar tissue in the lungs—which greatly limits lung function and, in extreme cases, leads to suffocation.²⁰ A 2003 study found an estimated 3,600 to 7,300 cases of silicosis diagnosed each year.²¹ In addition to silicosis, prolonged exposure to silica can also cause tuberculosis, autoimmune disease, and other acute and chronic diseases.²²

II. REGULATING SILICA

A. *The 1971 Regulation*

Prior to OSHA’s new 2016 standards, the PEL of respirable silica for general industry was 100 micrograms, which is double the amount now allowed by the regulations.²³ The exposure limits were measured using dust samplers, but those samplers soon became obsolete when new and improved methods of sample collection were created.²⁴ Furthermore, the 1971 standards merely required employers to limit exposure, but did not

required in hydraulic fracturing varies, but “[f]racking an average well . . . uses about 7 million pounds of sand[.]” *Id.*

18. OSHA FACT SHEET, *supra* note 1.

19. *Id.*

20. *Id.*

21. Kenneth D. Rosenman et al., *Estimating the Total Number of Newly-Recognized Silicosis Cases in the United States*, 44 AM. J. INDUST. MED. 141, 141 (2003) (using data from New Jersey and Michigan, the only states to track new cases of silicosis).

22. D. Rees & J. Murray, *Silica, Silicosis and Tuberculosis*, 11 INT. J. TUBERCULOSIS & LUNG DISEASE 474, 474, 475 tbl.1 (2007); *see generally* Kenneth Michael Pollard, *Silica, Silicosis, and Autoimmunity*, 7 FRONTIERS IMMUNOLOGY 97 (2016), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4786551/pdf/fimmu-07-00097.pdf> [<https://perma.cc/E4EF-2DPN>].

23. *See* SCOTT D. SZYMENDERA, CONG. RESEARCH SERV., R44476, RESPIRABLE CRYSTALLINE SILICA IN THE WORKPLACE: NEW OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) STANDARDS 1 (May 31, 2017) (describing a key feature of the new silica standards as protecting workers when silica exposure exceeds the new PEL of “50 µg/m³ (micrograms per cubic meter of air)”).

24. *See* ROBERT J. DEMALO, ENVTL. INFO. ASS’N, OVERVIEW OF THE OSHA SILICA RULE: WHAT YOU NEED TO KNOW—SAMPLING & ANALYSIS SESSION 2 PART 2, at 28–30 (2017), http://eia-usa.org/images/downloads/EIA_2017_Presentations/eia_silica_overview_3.24.17.pptx_pdf.pdf [<https://perma.cc/R7BB-BBNV>] (describing the sampling and analytical standards currently used).

require them to be proactive in reducing respirable silica.²⁵ The 1971 half-page set of standards did little more than pay lip service to silica regulations, and left employers with little to no guidance from OSHA.²⁶

B. *The New 2016 Regulations*

The new OSHA respirable silica standards, released March 24, 2016, were considered “a long time in the making,” and the U.S. Labor Department boasted that the OSHA regulations would “protect workers from hazards of silica exposure” which was ultimately preventable.²⁷ While the depth and breadth of the standards provide improvement over the 1971 standards, the new regulations do little more than previous regulations in terms of preventing silicosis in the oil and gas industry.

The new OSHA standards implement lower limits to workers' exposure to respirable silica and require employers to limit workers' access to high silica exposures by reducing exposure, providing medical exams to employees exposed to high levels of silica, and requiring employee training on the dangers of silica-related hazards.²⁸

Exposure can be determined by collecting objective data or monitoring a specific employee.²⁹ The first method, called the “performance option,” can use “objective data sufficient to accurately characterize employee exposure to respirable crystalline silica.”³⁰ The data can be based on the composition of the substance being used, or on the “specific process, task, or activity” in which an employee engages.³¹ In contrast, if an employer

25. *Respirable Crystalline Silica Safety*, OPTIMUM SAFETY MGMT., <https://www.oshasafetymanagement.com/silica/> [https://perma.cc/9AVA-Y8EP].

26. *Id.*

27. Ginger Christ, *OSHA Issues Final Rule on Silica*, EHSTODAY (Mar. 24, 2016), <http://www.ehstoday.com/osha/osha-issues-final-rule-silica> [https://perma.cc/NH47-FBKQ].

28. *OSHA's Proposed Crystalline Silica Rule: Overview*, OSHA, https://www.osha.gov/silica/factsheets/OSHA_FS-3683_Silica_Overview.html [https://perma.cc/2A8L-DGVQ].

29. OCCUPATIONAL SAFETY & HEALTH ADMIN., OSHA'S FINAL RULE ON OCCUPATIONAL EXPOSURE TO RESPIRABLE CRYSTALLINE SILICA 14, <https://energy.gov/sites/prod/files/2016/05/f31/Silica%20Final%20Rule%20DoE%20PowerPoint%202016-5-12%20clean.pptx> [https://perma.cc/E9R4-EKAX].

30. *Id.* at 15.

31. *Id.* at 16; Occupational Exposure to Respirable Crystalline Silica, 81 Fed. Reg. 16,285, 16,697 (Mar. 25, 2016) (codified at 29 C.F.R. §§ 1910, 1915, 1926 (2016)). One consulting firm suggests objective data used by general industry must include:

The crystalline silica material in question. The source of the objective data. The testing protocol and results of the testing. Description of the process, task, or activity on which the

elects to pursue the monitoring option, monitoring must take place both at the beginning of the activity as well as periodically throughout.³² Depending on the results of the initial testing of the silica sample, employers are required to repeat testing of silica levels within three to six months.³³ If results show exposure below the limit, no follow-up testing for silica exposure is necessary.³⁴ Regardless of initial monitoring indicating an employee's exposure is below the threshold, the new standards require employers to reassess exposure when there is a change in the job or process, or when the employer has reason to believe exposure levels have changed.³⁵ Employers also must ensure the method of collection, integrity of each sample, and lab selected for testing all meet the standards' strict requirements.³⁶

Once an air sample has been taken from an employee, the employer is required, within fifteen working days of the sampling, to notify the affected employees, either by individual written notification or by posting the results in a location available to all affected employees.³⁷ If results show exposure over the PEL, the employer is required to provide written

objective data were based. Other data relevant to the process, task, activity, material, or exposures on which the objective data is based.

GREGG GRUBB, LICENSING AND REG. AFF., KEEP YOUR HEAD OUT OF THE CLOUDS! SILICA IN GENERAL INDUSTRY AND CONSTRUCTION 15, http://www.michigan.gov/documents/lara/lara_miosha_silica_msc17_557185_7.pdf [<https://perma.cc/W3FD-LGJC>].

32. See Occupational Safety and Health Standards, 29 C.F.R. § 1910.1053(d)(3) (explaining the requirements for a scheduled monitoring option).

33. *Id.* §§ 1910.1053(d)(3)(iii)–(iv).

34. *Id.* § 1910.1053(d)(3)(ii).

35. *Id.* § 1910.1053(d)(4).

The employer shall reassess exposures whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the action level, or when the employer has any reason to believe that new or additional exposures at or above the action level have occurred.

Id.

36. See *id.* § 1910.1053(d)(5) (providing the standards for the methods of sample analysis); see also *id.* § 1910.1053 app. A (appending “procedures for analyzing air samples” and enumerating six different methods of collection requiring analysis of the sample be conducted by an accredited laboratory adhering to the quality control procedures listed).

37. *Id.* § 1910.1053(d)(6)(i). An employer is required to allow affected employees (or their designated representative(s)) to observe any monitoring. *Id.* § 1910.1053(d)(7)(i). An employer is further required to provide and ensure usage of any necessary protective clothing and equipment, should the observation of the monitoring require entry into a hazardous area, without cost to the employee or their designated representative(s). *Id.* § 1910.1053(d)(7)(ii).

notice listing corrective action(s) presently taken to lower the exposure of respirable silica to comport with the PEL.³⁸ If lab results show employees will be exposed to silica at or above the PEL for thirty or more days per year, the employer must provide medical monitoring for the employees, free of charge.³⁹

Aside from the personalized, individual employee exposure testing and medical examinations, an employer is also required to establish and implement a written exposure control plan.⁴⁰ This plan must contain descriptions of methods being used to control silica exposure, be readily accessible, and be reviewed annually for necessary updates.⁴¹ On top of requiring an exposure control plan, the standards also mandate employers use engineering and work practice controls to maintain or reduce employee exposure to crystalline silica at or below the PEL.⁴² If, however, an employer can demonstrate there are no feasible controls available to reduce silica exposure, this measure of silica need not be taken.⁴³

38. *Id.* § 1910.1053(d)(6)(ii).

39. *Id.* § 1910.1053(i)(1)(i). The required medical services must take place at a reasonable time and place and be performed by a physician or other licensed health care professional (PLHCP). *Id.* §§ 1910.1053(i)(1)(i)–(ii). The initial examination must include a full medical check (emphasizing the employees' respiratory system), chest X-ray, pulmonary function test, testing for latent tuberculosis infection, and any other tests requested by the PLHCP. *Id.* §§ 1910.1053(i)(2)(ii)–(vi). After an initial examination, periodic examinations must be made available to the employee "at least every three years, or more frequently if recommended by the PLHCP." *Id.* § 1910.1053(i)(3).

40. *Id.* § 1910.1053(f)(2)(i).

41. *Id.* §§ 1910.1053(f)(2)(i)–(iii).

42. *Id.* § 1910.1053(f)(1).

43. *See id.* ("The employer shall use engineering and work practice controls . . . unless the employer can demonstrate that such controls are not feasible."). For a discussion on the feasibility or "infeasibility" requirement in OSHA's regulations, see Note, *OSHA's Feasibility Policy: The Implications of the "Infeasibility" of Respirators*, 129 HARV. L. REV. 2235, 2235–36, 2255–56 (2016) (characterizing the feasibility issue as a guise and arguing for a defined rule). If engineering and work practice controls show a reduction in silica exposure, but not enough to bring them to or below the PEL, the employer is still required to use the controls as a way to limit exposure to the lowest feasible level and provide employees with sufficient protection. 29 C.F.R. § 1910.1053(f)(1). Furthermore, the supplemental respiratory protection is only required (1) when the PEL is exceeded during engineering and work practice control implementation, (2) when the PEL is exceeded during a task in which it is infeasible to implement work practice and engineering controls, (3) when feasible work practice and engineering controls are nonetheless insufficient, and (4) if an employee works in a regulated area. *Id.* §§ 1910.1053(g)(1)(i)–(iv). Basic canons of statutory construction would indicate the *and* between requirements suggests all are necessary before an employee is required to wear respiratory protection. *Compare* *Nationwide Mut. Ins. Co. v. Shaw*, 491 Fed. App'x 353, 358 (3d Cir. 2012) ("Based on general principles of statutory interpretation, the connector 'and' in a statute signifies conjunctive standard." (citing *Rivera v. Phila. Theological Seminary of St. Charles*

Finally, the standards require employees be provided information and made aware of the dangers of silica.⁴⁴ Specifically, the employer must train and make each employee aware of the health hazards associated with silica, the specific tasks leading to silica exposure, the measures taken by the employer to protect against exposure, and a purpose and description of the medical monitoring program.⁴⁵ The employer must also ensure labels are placed on containers of silica, and provide easily accessible safety data sheets for the material.⁴⁶ Signs must also be posted “at all entrances to regulated areas” with the following statement:

DANGER
 RESPIRABLE CRYSTALLINE SILICA
 MAY CAUSE CANCER
 CAUSES DAMAGE TO LUNGS
 WEAR RESPIRATORY PROTECTION IN THIS AREA
 AUTHORIZED PERSONNEL ONLY⁴⁷

With bold letters warning of dangers of silica exposure, the standards protect upwards of two-million workers and save an estimated 600 lives annually, as reported by OSHA.⁴⁸ These numbers, however, do not include the oil industry, as the general industry standards are insufficient for application in the oil field. The above-described standards give shallow hope to employees and their families worried about the fatal diseases associated with silica exposure.

Borromeo, Inc., 510 Pa. 1 (1985)), *with* United States v. O’Driscoll, 761 F.2d 589, 597 (10th Cir. 1985) (“When the term ‘or’ is used, it is presumed to be used in the *disjunctive* sense” (citing *Azure v. Morton*, 514 F.2d 897, 900 (9th Cir. 1975))). Rationally, however, this is an example of one of the inconsistencies that plague this regulation. The first enumeration, where the PEL is exceeded *during control implementation*, is likely not intended as a contemporaneous requirement with, for example, a determination that *existing* implementations are insufficient. Controls must be implemented before they can be assessed for sufficiency. The author believes the list is disjunctive; the use of *and* notwithstanding.

44. 29 C.F.R. § 1910.1053(j).

45. *Id.* § 1910.1053(j)(3)(i).

46. *Id.* § 1910.1053(j)(1).

47. *Id.* § 1910.1053(j)(2).

48. *Workers’ Exposure to Respirable Crystalline Silica: Final Rule Overview*, OSHA (Mar. 2016), <https://www.osha.gov/Publications/OSHA3683.pdf> [<https://perma.cc/TK88-LZXU>].

III. OSHA'S REGULATIONS IN THE OIL INDUSTRY

There are three reasons why the 2016 OSHA standards for silica in general industry are not feasible for, and will not protect employees in, the oil industry: (1) the environment of the oil industry is not suitable for the use of objective data in a practical sense, (2) the logistical means by which exposure results are given to employers are too slow to be meaningful in limiting exposure, and (3) the frequency of monitoring employees can create a loophole in which employees can continue to be exposed to harmful material without being monitored.

A. *The Environment Is Not Suitable for Objective Data*

OSHA would like employees affected by silica to rest easy now that standards are in place to protect against harmful exposure; however, before employees can take a breath of fresh air, they must first understand the air they are breathing. When dealing with dangerous silica, their air can be measured and compared to an environment nothing like their current environment. In other words, employers can utilize OSHA loopholes to provide inaccurate measures of exposure. This is the effect of OSHA allowing "objective data demonstrating that employee exposure to respirable crystalline silica will remain below [the PEL] . . . under any foreseeable conditions."⁴⁹ This means, as a logistical matter, that an employer can collect data showing an acceptable PEL exposure from an employee using similar frack sand for a similar job but in a completely different location than a current employee, then pass that data off as an accurate representation.

While objective data of certain similar circumstances sounds like a good and cost-effective method for enforcing standards, OSHA fails to account

49. 29 C.F.R. § 1910.1053(a)(2). It appears OSHA included the "objective data" criteria to help smaller construction companies lower costs of compliance, but then transferred the standard into the general industry regulation. *See Occupational Exposure to Respirable Crystalline Silica*, 81 Fed. Reg. 16,285, 16,527 (Mar. 25, 2016) (codified at 29 C.F.R. §§ 1910, 1915, 1926 (2016)) (discussing costs associated with compliance while focusing on construction).

Objective data means information, such as air monitoring data from industry-wide surveys or calculations based on the composition of a substance, demonstrating employee exposure to respirable crystalline silica associated with a particular product or material or a specific process, task, or activity. The data must reflect workplace conditions closely resembling or with a higher exposure potential than the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations.

29 C.F.R. § 1910.1053(b).

for the multitude of variables that occur on a pad site—the temporary drilling site where hydraulic fracturing occurs.⁵⁰ Variables on a pad site, where drilling and hydraulic fracturing takes place, make the use of objective data untenable. To build a pad site for hydraulic fracturing, many steps have to occur, including excavating and leveling the site, using perforating guns to create the well, and using various amounts of explosives, to name a few.⁵¹ Furthermore, there must be consideration of the drilling direction, earth composition, and permeability of the material being drilled.⁵² Perhaps the most astonishing fact is that OSHA seemingly did not consider a requirement for objective data to be based on similar material.⁵³ There is significant variability in the amounts and types of materials used in retrieving oil and gas. One source states that anywhere from “4–5 million gallons of fracking fluid can be used at a single well location[,]” containing between 60% and 100% silica.⁵⁴ Under the

50. *Pad*, SCHLUMBERGER, <http://www.glossary.oilfield.slb.com/Terms/p/pad.aspx> [https://perma.cc/99NR-KT8J]; see generally *Pad Drilling and Rig Mobility Lead to More Efficient Drilling*, U.S. ENERGY INFO. ADMIN. (Sept. 11, 2012), <https://www.eia.gov/todayinenergy/detail.php?id=7910> [https://perma.cc/2G4C-P8CV] (explaining the benefits of pad drilling).

51. See CANADIAN SOC'Y FOR UNCONVENTIONAL RES., UNDERSTANDING WELL CONSTRUCTION AND SURFACE FOOTPRINT 2–3, https://www.csur.com/sites/default/files/Understanding_Well_Construction_final.pdf [https://perma.cc/8JXT-2Q84] (constructing a timeline for well construction). Companies use many types of both explosives and perforating guns, requiring different types of frack sand and varying amounts of silica. OCCUPATIONAL SAFETY & HEALTH ADMIN., HYDRAULIC FRACTURING AND FLOWBACK HAZARDS OTHER THAN RESPIRABLE SILICA 10–11 (2014), <https://www.osha.gov/Publications/OSHA3763.pdf> [https://perma.cc/K9LC-Z5X9] (warning there are explosive and harmful chemicals used in perforating guns, including agents that can lead to silicosis). The use of explosives and perforating guns involves an expansive industry with a multitude of different models and types specific to the job at hand. See, e.g., *Engineered Perforating Solutions*, GEODYNAMICS, <http://www.perf.com/engineered-perforating-solutions.html> [https://perma.cc/CRP2-ND3S] (marketing seven different perforating guns).

52. See *Dip*, SCHLUMBERGER, <http://www.glossary.oilfield.slb.com/Terms/d/dip.aspx> [https://perma.cc/7YLJ-3ZZU] (defining *dip* as the “magnitude of the inclination of a plane from horizontal”). *Strike* is the horizontal intersection of the dip. *Strike*, SCHLUMBERGER, <http://www.glossary.oilfield.slb.com/Terms/s/strike.aspx> [https://perma.cc/MDK6-GKX5]. To drill properly, the composition of the material under the surface must be known to accurately determine tools and methods to be used. *Pad Drilling and Rig Mobility Lead to More Efficient Drilling*, U.S. ENERGY INFO. ADMIN. (Sept. 11, 2012), <https://www.eia.gov/todayinenergy/detail.php?id=7910> [https://perma.cc/EJG3-3AFP]. On that same note, there must be consideration of permeability affecting the efficacy of certain drilling methods. See *Permeability*, SCHLUMBERGER, <http://www.glossary.oilfield.slb.com/Terms/p/permeability.aspx> [https://perma.cc/SQ7Q-LAQU] (defining *permeability* as “[t]he ability, or measurement of rock’s ability, to transmit fluids . . .”).

53. See 29 C.F.R. § 1910.1053(b) (providing the definition for *objective data*).

54. *The Risk of Silica Exposure to Oil & Gas Workers During Hydraulic Fracturing Activities*, METROPOLITAN ENGINEERING CONSULTING & FORENSIC SERVS.,

definition of *objective data*, the OSHA standards require data calculations be based on “a particular product or material or a specific process, task, or activity.”⁵⁵ Herein lies the problem—the employers choose which of the requirements it will follow when it uses objective data.

1. The Loop Hole Created by “Objective Data” Rules

While the regulation makes clear that objective data should be used for assessing exposure of employees under similar conditions, no further guidance is given.⁵⁶ Because the legislation lacks guidance, employers could be off the hook for considering the amount of silica in the frack sand, or anything else specific to a particular employee, when determining an employee is under the PEL using objective data.⁵⁷ Under current OSHA standards, it is possible that an employee, engaging in transporting frack sand containing 100% silica, could have exposure levels assessed using the objective criteria of a different employee transporting frack sand containing only 60% silica. A difference of 40% would clearly increase the amount of respirable silica to which an employee is exposed. This example demonstrates how employees could be exposed to higher amounts of silica without knowledge because of the objective-data rules. By allowing an employer to choose between basing objective data on product, material, process, task, or activity, OSHA unwittingly allows employers to pick the “objective data” that will portray them as compliant under OSHA standards.

If enough objective data is obtained by employers in the oil industry, no monitoring will ever be necessary under the regulations, as employers can cherry-pick data from a job assessment reflecting silica levels below the PEL. No monitoring means employers will not evolve or improve methods to reduce silica levels. Rather, they could actually be increasing levels of silica without employees knowing. Objective data for a particular job could reflect levels below the PEL, even if it is contrary to the actual

<https://sites.google.com/site/metropolitanenvironmental/the-risk-of-silica-exposure-to-oil-gas-workers-during-hydraulic-fracturing-activities> [<https://perma.cc/5B3M-X8U7>].

55. 29 C.F.R. § 1910.1053(b).

56. *See id.* (“The data must reflect workplace conditions closely resembling or with a higher exposure potential than the processes, types of material, control methods, work practices, and environmental conditions in the employer’s current operations.”).

57. *Id.* §§ 1910.1053(b), (d)(2), (k)(2) (discussing *objective data* with no regard to specific items that must be considered when collecting the data).

working environment, due to outdated or inaccurate data and the lack of requirement to reassess or change the data.

B. *Lack of Specification*

Logically, the objective-data option is unsuitable for the oil industry and timeframes in which oil field workers are exposed to silica; therefore, reassessing the exposure requirements will again not help to reduce oil workers' respirable silica exposure. Under the current OSHA regulations, in cases involving employees whose exposure was at or below the PEL, employers are required to test employees every six months, or in three months if employees were shown to have been exposed to levels above the PEL.⁵⁸ However, because of the fast pace of production in the oil and gas industry, the longest an employee will likely be exposed to respirable silica on a pad site is four days.⁵⁹ In other words, an employer could test an employee, receive results on a particular pad site showing exposure over the PEL, and not have to take corrective action because the employee is no longer doing that task. The employer would then test the employee again in three months. However, under the regulations, the three months between testing do not have to be accounted for, unless there is "a change in the production, process, control equipment, personnel, or work practices" that may affect the employee's exposure limits.⁶⁰ Furthermore, once the three months are over, the employer could theoretically ensure the employee is not working on or commencing an activity known to be low in exposure, or simply use objective data to do away with the requirement completely. Because hydraulic fracturing takes

58. *Id.* § 1910.1053(d)(3).

59. Compare Sharon Dunn, *Fracking 101: Breaking Down the Most Important Part of Today's Oil, Gas Drilling*, GREELEY TRIBUNE (Oct. 14, 2016), <https://www.greeleytribune.com/news/local/fracking-101-breaking-down-the-most-important-part-of-todays-oil-gas-drilling/> [https://perma.cc/EU8U-RZSV] (claiming hydraulic fracturing can take place in two to three days), with *How Long Does Fracking Take?*, OILANDGASINFO.CA, <https://oilandgasinfo.ca/know-fracking/how-long-does-fracking-take/> [https://perma.cc/G3CC-GU2R] (asserting hydraulic fracturing can take place in three to four days).

60. 29 C.F.R. § 1910.1053(d)(4). An employer may reasonably conclude that simply moving an employee to a different pad site—while maintaining the same production, same process, same equipment, same personnel, and same work practices—would not require reassessing the employee's exposure to silica. *See id.* (providing reassessment take place whenever there is a *change* in "production, process, control equipment, personnel, or work practices" that could be reasonably expected to present new or increased exposure). Also, as explained above, there are many factors contributing to the malleable environment of a pad site that can lead to changes in respirable silica exposure. *See supra* Part III.A.

four days at most, an employee could work at twenty different pad sites with twenty different exposure levels all above the PEL by the time the three-month period ends. This employee may, at the three-month mark, be at a pad site conducting a particular activity or fracturing with a material low in respirable silica and have test results showing exposure levels below the PEL. Subsequently, they could have silicosis continuously progressing in their lungs due to the high levels of silica exposure from previous pad sites. The required retesting, though seemingly reasonable, is not suitable for the oil industry and will reduce little, if any, employee exposure to respirable silica.

C. *The Consequences to Hydraulic-Fracturing Employees*

Under the new OSHA guidelines, employers have the option to conduct testing of the employees' work environment to ensure the PEL levels are within safe bounds.⁶¹ Unfortunately, this option is unlikely to be used because, as explained above, the more malleable objective-data standard can stand in its place. Nonetheless, if an employer opts for testing, there are stringent requirements before results can be given, such as provisions that certain equipment must be used and strict compliance with the procedures for the required test run.⁶² Samples and laboratory testing results, if done correctly, will determine the silica exposure of an employee.⁶³ Although exposure to respirable silica will be known, the results will be too little and too late for exposed employees. Under OSHA standards, employers must return test results to the employee within fifteen working days.⁶⁴ There are two issues with the fifteen-day turnaround requirement: (1) it may not be feasible under some

61. 29 C.F.R. § 1910.1053(d)(1).

62. *Id.* § 1910.1053 app. A. Appendix A gives exact requirements for data testing, including the specific analytical methods to be used, the instrument standards for collecting the samples, and the requirement of accreditation of the laboratories that analyze the sample. *Id.* These requirements came in part from the testimony of doctors who concluded uncertain results could come from the multitude of different testing samples and analyses used by different laboratories. *See* Occupational Exposure to Respirable Crystalline Silica, 81 Fed. Reg. 16,285, 16,366–67 (Mar. 25, 2016) (codified at 29 C.F.R. §§ 1910, 1915, 1926) (analyzing conflicting testimonies of multiple doctors). This strict requirement likely stemmed from the previous 1971 regulations, where specifications for dust samples became obsolete, yielding no guidance and leaving dust samples unrequired or, at most, inadequate. *Cf.* DEMALO, *supra* note 24, at 33–37 (contrasting the 1971 regulations with the new 2016 regulations).

63. *See* DEMALO, *supra* note 24, at 56–59, 61–77 (providing a detailed explanation of the laboratory analysis used and how to interpret the results).

64. 29 C.F.R. § 1910.1053(d)(6)(i).

circumstances to receive the results and/or come up with a plan to reduce exposure within that time; and (2) even if results were ready within the timeframe, it would not change the employees' exposure during the fifteen-day period.

1. Timing Requirements

Concerns over the feasibility of the fifteen-day turnaround was voiced by the Newmont Mining Corporation (NMC), which stated, "Determination of controls to reduce exposures when exposure assessments exceed the PEL may take more than 15 days" ⁶⁵ NMC's concern was focused on the second part of the requirement. ⁶⁶ Not only do the results have to be within fifteen working days, but an employer must also come up with an action plan to reduce silica exposure levels within that same timeframe. ⁶⁷ OSHA responded by keeping the fifteen-day requirement and asserting that, at the very least, employers should provide exposed employees respiratory protection and take further corrective action if needed. ⁶⁸ It would seem OSHA's standard is satisfied if an employee whose test results show exposure levels over the PEL is given "appropriate respiratory protection," whether or not this type of protection addresses the issue or actually lowers silica exposure below the PEL. ⁶⁹

65. Occupational Exposure to Respirable Crystalline Silica, 81 Fed. Reg. at 16,770.

66. *See id.* (voicing concern over the fifteen-day requirement for providing corrective action and arguing it is unreasonable under some circumstances).

67. 29 C.F.R. § 1910.1053(d)(6)(ii); *see also* Occupational Exposure to Respirable Crystalline Silica, 81 Fed. Reg. at 16,770 (noting NMC's concern over the fifteen-day window and NMC's argument that notice to employees of corrective action(s) makes little sense where lowering exposure below the PEL is infeasible).

68. Occupational Exposure to Respirable Crystalline Silica, 81 Fed. Reg. at 16,770 (explaining corrective action is not exclusively limited to engineering controls and can include providing respiratory protection, especially "in situations where it is infeasible to limit exposures to the PEL"). OSHA, in effect, states that any corrective action, even if unrelated or with uncertainty of its effect on the exposure, satisfies the fifteen-workday requirement. *Cf. id.* (requiring employers take "appropriate" corrective action(s) where exposure levels are above the PEL; however, an employer needs longer than fifteen days "to identify the engineering controls that will be necessary to limit exposures to the PEL").

69. *See id.* (explaining that even where engineering controls addressing the exposure levels are infeasible, providing appropriate respiratory protection is sufficient corrective action). "A respirator is a personal protective device that is worn on the face . . . and is used to reduce the wearer's risk of inhaling hazardous airborne particles . . ." *Respirator Trusted-Source Information*, CTRS. FOR DISEASE CONTROL & PREVENTION, https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/respsource1quest1.html [<https://perma.cc/6ESU-45U4>] (last updated Aug. 18, 2016). If all PEL

Furthermore, the above discussion of the regulation's requirement of an action plan to lower silica exposure assumes exposure results will be received faster than the fifteen-workday standard. In the oil industry, multiple laboratories are offering between five- to fourteen-day turnarounds on samples tested and analyzed;⁷⁰ this realization shows the uncertainty in having the necessary information in time to take corrective action within the time limit. In practice, this uncertainty makes the use of a respirator as a corrective action a prudent requirement, regardless of its helpfulness in controlling the exposure at issue.

2. Corrective Action Issues

The timing requirements and corrective action mentioned above may be proper and acceptable in other industries, where employees work for months or years under the same conditions. These requirements, however, will not work in the fast-paced oil industry. Assuming the sampling, testing, and fifteen-workday requirements are met, there would likely still be no change in the employee's circumstances and in the consequences of silica exposure suffered due to hydraulic fracturing.

For a typical employee, there will be eight-hours of sampling the environment in which the employee operated, followed by seven to ten days to receive lab results, one day to make necessary changes, another eight-hour shift, and another seven to ten days waiting on lab results, hopefully verifying conditions have improved.⁷¹ The earliest an employer

problems of respirable silica could be solved simply by using a respirator, logic would dictate most employers would likely require their use; however, OSHA's standards fail to account for the limitations and restrictions accompanying respirators that could make them unworkable under certain circumstances. See *General Respiratory Protection Guidance for Employers and Workers*, OSHA, https://www.osha.gov/dts/shib/respiratory_protection_bulletin_2011.html [<https://perma.cc/5E8E-ZLMZ>] ("Each type of respirator can come in several varieties, each with its own set of cautions, limitations, and restrictions of use.").

70. *Compare Enhanced Respirable Crystalline Silica Analysis Surpasses Previous Reporting Limits*, RJ LEE GROUP (Apr. 18, 2017), <http://www.rjlg.com/2017/04/enhanced-respirable-crystalline-silica-analysis-surpasses-previous-reporting-limits/> [<https://perma.cc/QY97-SF8A>] [hereinafter *Silica Analysis Surpasses Previous Limits*] (offering a turnaround time of five working days for air sample results), and *Bulk Silica Analysis*, RJ LEE GROUP, <http://www.rjlg.com/laboratory-services/environmental-health-safety/bulk-silica-analysis/> [<https://perma.cc/4EPJ-Q8Z4>] (listing a ten-day turnaround for bulk sample analysis), with *Respirable Dust & Silica Sampling Video*, EMSL ANALYTICAL, INC., <https://emsl.com/Services.aspx?action=list&ServiceCategoryID=33> [<https://perma.cc/C4TJ-DE5X>] (estimating a standard turnaround time of two weeks).

71. See generally *Silica Exposure Measurement in Real-Time for Construction*, TSI (May 3, 2017), [<https://commons.stmarytx.edu/thestmaryslawjournal/vol49/iss4/3>](http://www.tsi.com/uploadedFiles/_Site_Root/Products/Literature/Application_Notes/EXPMN-</p>
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could take corrective action for exposure would be nine days from sampling, but it may take longer than twelve days.⁷² Hydraulic fracturing—the process through which employees are exposed to the highest volumes of respirable silica in the oil industry—can last from two to four days.⁷³ Consequently, an employee who is tested and determined to have been exposed to respirable silica over the PEL would finish the hydraulic fracturing job before analysis of data was complete, assuming a quick turnaround. The data collected from that analysis will no longer be relevant, and corrective action no longer necessary because the affected employee will have completed the job. The employer would only be required to notify the employee of his exposure.⁷⁴ That is all. At the point in which the employee has finished the job, nothing can be done and no measures can be taken to reverse the silicosis starting to form in the employee's lungs.⁷⁵

IV. THE OUTCOME

While the OSHA standards and regulations may work in some industries, those standards will likely not help employees in the oil industry where exposure to respirable silica is quick, voluminous, and constantly in flux. Furthermore, the requirements for monitoring exposure allow for the use of either objective data of similar activities—largely unsuitable for

023_Silca_Construction_FAQs-A4-web.pdf [https://perma.cc/QJ36-3BPU] (describing the sampling and testing process in FAQ format).

72. This estimate is based on the aforementioned steps required in the OSHA standards as well as averaging the number of days for the return of test results. These numbers may vary due to holidays, weekends, mail service use, and other factors.

73. Compare Dunn, *supra* note 59 (claiming hydraulic fracturing can take place in two to three days), with *How Long Does Fracking Take?*, *supra* note 59 (claiming hydraulic fracturing can take place in three to four days).

74. See Occupational Safety and Health Standards, 29 C.F.R. § 1910.1053(d)(6)(i) (2016) (providing notice requirements for assessment results). Corrective action would no longer need to be described, as the employee would no longer be working under the conditions giving rise to the exposure. Cf. *id.* § 1910.1053(d)(6)(ii) (requiring a description of corrective action(s) taken when an employee's silica exposure exceeds the PEL). Furthermore, the requirement of a medical exam is required only where an employee is shown to have an exposure above the PEL for thirty or more days of the year. *Id.* § 1910.1053(i)(1)(i). This may create a scenario where an employer finds loop holes in the monitoring requirements and exercises strategic control over the number of days employees work around respirable silica.

75. N.J. DEP'T OF HEALTH & SENIOR SERVS., WHAT PHYSICIANS NEED TO KNOW ABOUT OCCUPATIONAL SILICOSIS AND SILICA EXPOSURE SOURCES 5 (Aug. 1998), <http://www.nj.gov/health/workplacehealthandsafety/documents/silicosis/sili1web.pdf> [https://perma.cc/8RRX-RP9L] (“There is no known medical treatment to reverse silicosis . . .”).

the oil industry because of the ever-changing environment—or reassessments that leave room for loopholes and inconsistencies by not requiring consistent testing protocols. Companies have come up with solutions for faster testing,⁷⁶ better respirators,⁷⁷ or engineered products for controlling or completely reducing the respirable silica.⁷⁸ However, OSHA's standards and requirements do little to aid in the development of accurate and effective ways in which respirable silica exposure can be reduced in the oil industry. OSHA made a great step in the right direction and claims to save and extend the lives of thousands of employees; unfortunately, it seems as though those employees are not a part of the oil industry. Custom regulations and advanced engineering requirements are needed before the number of silicosis cases decrease in the oil industry.

76. E.g., *Silica Analysis Surpasses Previous Limits*, *supra* note 70 (marketing a quick turnaround of five days).

77. E.g., *Silica Dust Respiratory Protection*, INDUS. CONTRACTORS SUPPLIES, <http://www.icscompany.net/Respirators.htm> [<https://perma.cc/62RH-9QJU>] (designing high quality masks specifically suited for silica protection).

78. One of the best engineering advancements in silica dust control is the Airis Dust Vacuum, which boasts total dust control for complete OSHA compliance of wellsites. *See Our Solution—Proven Experts, Passionate About Protection*, AIRIS WELLSITE SERVS., <https://www.airiswellsite.com> [<https://perma.cc/8RUR-7AWE>] (“[W]orking for leading oil, E&P and oilfield service companies—we stand alone in the industry with hundreds of tests proving our customers are compliant with Occupational Safety and Health Administration (OSHA) exposure limits.”).