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INITIAL STATEMENT OF REASONS

CALIFORNIA CODE OF REGULATIONS

TITLE 8, GENERAL INDUSTRY SAFETY ORDERS
SECTION 5204

OCCUPATIONAL EXPOSURES TO RESPIRABLE CRYSTALLINE SILICA

GENERAL PURPOSE OF PROPOSED REGULATION

Pursuant to California Labor Code (LC) section 142.3, the Occupational Safety and Health Standards Board (Board) may adopt, amend, or repeal occupational safety and health standards or orders. LC section 142.3 permits the Board to prescribe suitable protective equipment and control or technological procedures to be used in connection with occupational hazards and to provide for monitoring or measuring employee exposure for the protection of employees.

LC section 144.6 requires the Board to adopt regulations dealing with toxic materials or harmful physical agents that most adequately assure, to the extent feasible, that no employee will suffer material impairment of health or functional capacity even if the employee has regular exposure to the hazard for the period of their working life.

EMERGENCY TEMPORARY STANDARD

Most of the proposed changes to section 5204 originated in response to a request for an emergency temporary standard (ETS), from Western Occupational and Environmental Medicine Association (WOEMA), which the Board received in April 2023. In that petition (File No.: 597), WOEMA pointed to four problems that called for immediate action: (1) at the time the petition was filed, about 50 workers in the industry had been diagnosed with advanced silicosis, some of whom had died; (2) these workers were exposed to respirable crystalline silica (RCS) while working with artificial stone; (3) artificial stone contains up to 95% silica; and (4) section 5204 is not well-suited to protecting workers in this industry.

WOEMA recommended that the ETS require (1) greater control over regulated areas where fabrication work is conducted; (2) prohibition of dry fabrication processes; (3) use of supplied air or powered air purifying respirators (PAPRs); (4) annual reporting to Cal/OSHA; and (5) classification of all citations as serious.

In response to the WOEMA petition, the California Division of Occupational Safety and Health (Cal/OSHA) drafted an ETS that recommended changes to strengthen section 5204. The Board approved those changes unanimously in December 2023, and the ETS went into effect on December 29, 2023.

In the current proposal for section 5204, the Board proposes to continue the changes introduced through the ETS, while also updating the medical surveillance subsection, adding a new medical removal subsection, and amending other subsections to improve their effectiveness in protecting workers from exposure to RCS.

A copy of the original WOEMA petition, Cal/OSHA's evaluation, and the Board's petition decision are included as Documents Relied Upon.

SPECIFIC PURPOSE AND FACTUAL BASIS OF PROPOSED ACTION

What is the problem this rulemaking intends to address? [Government Code (GC) §11346.2(b)(1)].

The proposed amendments to section 5204 are intended to protect workers in the stone fabrication industry from exposure to respirable crystalline silica (RCS). In addition, changes to renumbered subsection l (Communication of respirable crystalline silica hazards to employees) and proposed subsection m (Reporting of silicosis) apply to all general industry facilities where silica exposures are likely to occur, including but not limited to fabricated stone.

When inhaled, RCS can result in silicosis, lung cancer, and other serious diseases. Silicosis is an incurable, progressive lung disease that causes pulmonary fibrosis, respiratory failure, and in many cases death.

RCS exposure from working with artificial stone produces an aggressive form of silicosis, with rapid disease progression, accelerated decline in lung function, and high mortality, typically at a young age.

The number of silicosis cases in the artificial stone fabrication industry began increasing in 2019, and the California Department of Health (CDPH) Occupational Health Branch (OHB) has described silicosis as an epidemic.

In July 2023, OHB investigators reported a total of 52 workers with silicosis who were exposed to RCS while fabricating countertops from artificial stone. The median age of these workers was 45 years at diagnosis; 51 (98%) were Latino men. Ten of these patients (19%) died by the time investigators reported their findings. The median age at death was 46 years, with a median work tenure of 15 years. Three individuals underwent lung transplantation, which has a five-year survival rate of 59%.

As noted above, the Board adopted changes to section 5204 under an Emergency Temporary Standard (ETS) in December 2023. At that time, OHB reported that the total number of known silicosis cases in the artificial stone industry had increased 92% in a period of five months, from 52 workers in July, to a total of 100 by December, including the ten fatalities. OHB reported that one worker with severe silicosis was 27 years of age, was on continual oxygen, and had worked for a period of only 10 years in the industry.

In April 2024, OHB reported to Cal/OSHA that the number of known silicosis cases among workers in this industry had increased from 100 in December 2023 to 127 in April, a 27% increase over a period of four months. OHB also reported that three additional deaths had occurred from silicosis, for a total of 13, and that 16 workers had received lung transplants to date.

About 4,040 workers are employed in California's stone fabrication shops. Based on a silicosis prevalence rate of 12% to 21% and a fatality rate of 19%, Cal/OSHA estimates that between 500 and 850 cases of silicosis will occur among these workers, and between 90 and 160 will likely die of silicosis.

Cal/OSHA's existing silica standard, California Code of Regulations (CCR) title 8, section 5204, was promulgated based on the experience of silicosis in traditional industries such as mining, quarrying, and sandblasting; it is not well calibrated to the small businesses and working conditions of the stone fabrication industry. In 2019, Cal/OSHA found that 72% of shops in this industry were out of compliance with section 5204.

Section 5204 also contains three key loopholes, described below, that allow employers to easily exempt themselves from key requirements of the regulation. The regulation makes enforcement by Cal/OSHA time-consuming and expensive.

In light of these factors, changes are needed in section 5204 to ensure safer conditions for workers who handle both artificial stone (containing >0.1% silica) and natural stone (containing >10% silica). The proposed changes will be clearer for employers to implement and more efficient for Cal/OSHA to enforce. The proposed changes meet these objectives with new requirements pertaining to engineering controls, safe work practices, respiratory protection, signage, housekeeping, training, reporting, medical examination procedures, medical surveillance, and medical removal.

The proposed changes also provide a means for Cal/OSHA to quickly identify RCS hazards and efficiently stop certain operations in a shop, or shut down the shop itself, pending abatement of those hazards.

The proposed changes to section 5204 have been in effect in the artificial stone industry since December 29, 2023, when Cal/OSHA began enforcing the silica Emergency Temporary Standard

(ETS). Cal/OSHA's experience enforcing the ETS since then indicates that (1) conditions in many shops are extremely hazardous, with dry cutting and uncontrolled dust emissions occurring, sometimes from multiple workstations; and that (2) the ETS has provided Cal/OSHA with an essential new tool to effectively enforce section 5204, stop unsafe operations, and require protections for workers in this industry.

Under the ETS, Cal/OSHA has conducted 29 inspections of artificial stone fabrication shops and issued 13 Orders Prohibiting Use (OPUs) under subsection (g), Imminent Hazards, closing shops until employers are able to demonstrate that they have effectively mitigated RCS exposures. Where it previously took Cal/OSHA several months to open an inspection and issue citations before an employer would be required to reduce RCS exposures, under the ETS Cal/OSHA has been able to move quickly and efficiently to require measures that protect workers from RCS exposure. These measures are more comprehensive and more effective than those previously required under section 5204. In this way, the ETS has provided Cal/OSHA with new tools to immediately protect workers in the artificial stone fabrication industry.

In short, the experience to date with the ETS indicates that the proposed improvements to section 5204 will be effective in improving workplace conditions and streamlining Cal/OSHA's enforcement efforts. The Board is proposing to continue these improvements beyond the timeframe of the ETS by adopting them permanently into section 5204. The Board expects that, over time, these improvements will steadily reduce the number of silicosis cases and deaths in California.

What is the purpose of this rulemaking? [GC §11346.2(b)(1)]

In the short term, the purpose of this rulemaking is to facilitate employer compliance with section 5204 and improve employee safety by requiring new, more prescriptive protections to substantially reduce or eliminate employee exposure to RCS.

In the longer term, the purpose is to substantially reduce and then stop the suffering and death associated with silicosis that is occurring among workers in the artificial stone fabrication industry because of occupational exposure to RCS.

Silicosis is an incurable, progressive lung disease that can, and usually does, lead to pulmonary fibrosis, respiratory failure, and eventually death. Its primary cause is occupational exposure to RCS. RCS exposure is also associated with other diseases, including autoimmune disorders, chronic renal disease, lung cancer, pulmonary tuberculosis, and chronic obstructive pulmonary disease (COPD).¹

¹ National Institute for Occupational Safety and Health (NIOSH) (2002). Health effects of occupational exposure to respirable crystalline silica (publication no. 2002-129); 2002. <https://www.cdc.gov/niosh/docs/2002-129/default.html>. Accessed April 26, 2023.

An epidemic of silicosis has emerged among workers in the artificial stone fabrication industry. To date, all of the affected workers have been exposed occupationally to RCS while fabricating countertops from artificial stone. Thirteen of the 127 cases identified to date have died of their disease. Relative to the typical experience with silicosis, these workers' cases of silicosis have been particularly aggressive, characterized by rapid disease progression, accelerated decline in lung function, and high mortality, typically at a young age.²

The proposed changes to section 5204 will require employers in the artificial stone fabrication industry to implement safeguards to prevent RCS exposure among employees. The proposal will also apply to other industries where workers cut, grind, or polish natural stone materials with a silica content of 10% or greater.

Why is this rulemaking necessary? [GC §§11346.2(b)(1) and 11349(a)]

1) Exposure to RCS can result in silicosis.

Inhalation of RCS is associated with the development of silicosis, an incurable, progressive lung disease that can lead to pulmonary fibrosis, respiratory failure, and eventually death.³ RCS exposure is also associated with other diseases, including autoimmune disorders, chronic renal disease, lung cancer, pulmonary tuberculosis, and COPD.⁴ All persons with high exposures to RCS develop silicosis within a few years.⁵

2) Silicosis is an incurable disease.

The diameter of RCS particles is smaller than 10 micrometers (μm), which is about 100 times smaller than ordinary sand.^{6, 7} When inhaled, RCS particles are carried deeply into the lungs, creating fibrotic areas that are unable to exchange oxygen. This scarring process continues even

² Fazio J, et al. Silicosis Among Immigrant Engineered Stone (Quartz) Countertop Fabrication Workers in California. *JAMA Internal Medicine*. 183(9): 991-998. Published online July 24, 2023.

<https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2807615>. Accessed August 16, 2023.

³ Krefft S, Wolff J, Rose C. Silicosis: an update and guide for clinicians. *Clin Chest Med*. 2020 Dec;41(4):709-722.

<https://pubmed.ncbi.nlm.nih.gov/33153689/>. Accessed August 16, 2023

⁴ NIOSH (2002). Health effects. op. cit. <https://www.cdc.gov/niosh/docs/2002-129/default.html>.

⁵ Akgun M, et al. Silicosis Appears Inevitable Among Former Denim Sandblasters: A 4-Year Follow-up Study. *Chest*. 2015 Sep;148(3):647-654. <https://pubmed.ncbi.nlm.nih.gov/25654743/>. Accessed on August 21, 2023.

⁶ U.S. Department of Labor. Occupational Safety and Health Administration. Overview: Silica, Crystalline.

<https://www.osha.gov/silica-crystalline>. Accessed August 16, 2023.

⁷ Carrieri M, et al. Characterization of Silica Exposure during Manufacturing of Artificial Stone Countertops. *Int J Environ Res Public Health*. 2020 Jun; 17(12): 4489. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7345731/>. Accessed August 16, 2023.

after exposure to RCS stops, producing the progressive respiratory insufficiency of silicosis that has been described as akin to suffocating.^{8, 9}

3) Silicosis primarily affects workers.

Workers in the occupations of mining, quarrying, and sandblasting have long been recognized to be at risk of exposure to RCS, and of developing—and dying from—silicosis.¹⁰ For example, a four-year follow-up study of 83 former sandblasters, from an initial worker population of 145, found that about 6% had died in the intervening four-year period, at an average age of 24 years. Among the 74 former sandblasters still alive and available for reexamination, the prevalence of silicosis had increased from 55% to 96%, despite short-term exposures and a disease latency of only four years.¹¹

Investigators in the United States (U.S.) and worldwide have identified RCS exposures and silicosis among workers in the artificial stone industry more recently. To date, the disease profile among these workers has proved to be particularly aggressive.

4) Artificial stone contains more than 93% crystalline silica.

Artificial stone contains more than 93% crystalline silica, in combination with adhesives and pigments (Figure 1).¹² In contrast, other stone materials used in countertops contain between 10% and 45% crystalline silica (granite) or little to no silica (marble). An analysis of silica dust generated from cutting and grinding artificial stone found that about 54% of the dust particles were in the respirable range of $\leq 10 \mu\text{m}$.¹³

Figure 1. Silica Content of Artificial Stone Compared to Natural Stone.

⁸ Morris J, Rojas LB (December 2, 2022). Ancient Lung Disease Strikes Countertop Cutters in Southern California. *Public Health Watch*. <https://publichealthwatch.org/2022/12/02/lung-disease-silica-countertops-southern-california/>. Accessed August 16, 2023

⁹ Blackley DJ, et al. Transplantation for work-related lung disease in the USA. *Occup Environ Med*. 2020;77(11):790-794. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7702182/> Accessed August 16, 2023.

¹⁰ NIOSH (2002). Health effects. op. cit. <https://www.cdc.gov/niosh/docs/2002-129/default.html>.

¹¹ Akgun M, et al. Silicosis Appears Inevitable. op. cit. <https://pubmed.ncbi.nlm.nih.gov/25654743/>.

¹² Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH) (2015). *Hazard Alert: Worker Exposure to Silica during Countertop Manufacturing, Finishing and Installation*. Publication number 2015-106. <https://www.osha.gov/sites/default/files/publications/OSHA3768.pdf>. Accessed May 2, 2023.

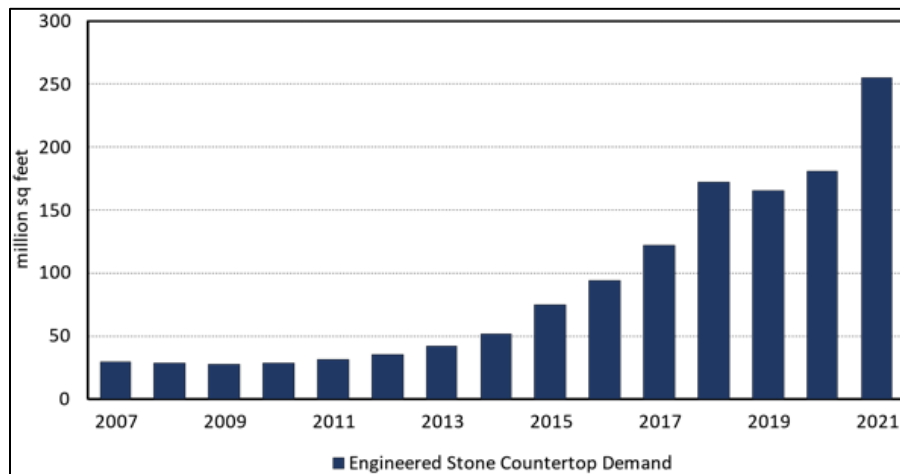
¹³ Carrieri M, et al (2020). Characterization of Silica Exposure. op. cit. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7345731/>.

| Stone | Average % Silica |
|----------------------|------------------|
| Artificial stone | ≥93 |
| Quartzite | 95 |
| Quartzitic sandstone | 90 |
| Sandstone | 60 |
| Granite | 10 to 45 |
| Slate | Varies |
| Soapstone | Varies |

5) Artificial stone now dominates the U.S. market for stone countertops.

Over the last decade, artificial stone has emerged as the predominant material used in fabricating countertops in the U.S. (Figure 2). It is marketed on the basis of its longevity, its low maintenance, and its high resistance to scratches, stains, and heat, while offering a variety of colors and patterns. In 2021, it surpassed all other materials to become the predominant countertop product in the U.S. for residential and commercial applications, with a market size of \$17.7 billion.¹⁴ U.S. demand for artificial stone countertops is expected to continue growing at 9.6% annually through 2026, solidifying the material's position as the most popular type of countertop material used in the U.S.¹⁵

Figure 2. U.S. Artificial Stone Countertop Demand, 2007-2021 (million square feet).¹⁶



¹⁴ Freedonia Group (Sept 2022). Industry Reports, United States. U.S. Engineered Stone Countertops. <https://www.freedoniagroup.com/industry-study/engineered-stone-countertops-4395.htm>. Accessed August 16, 2023

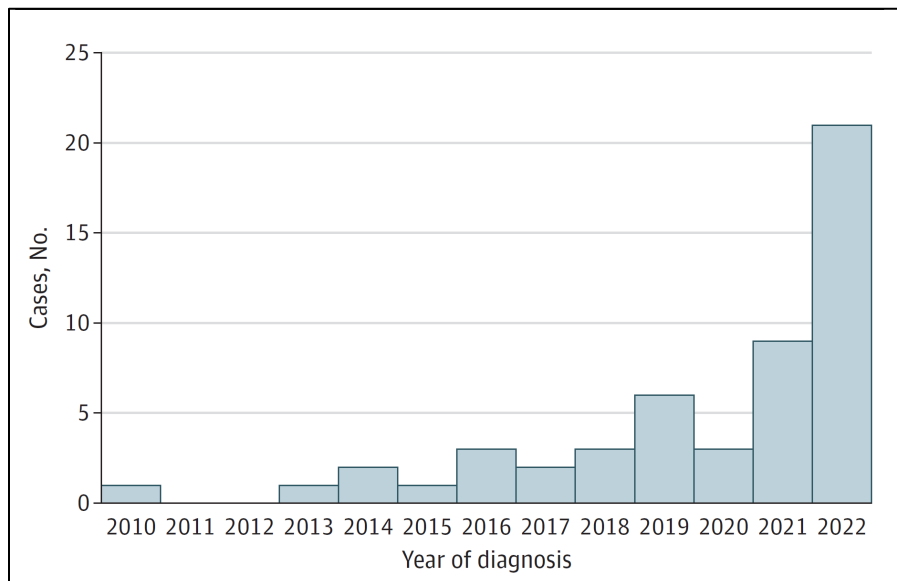
¹⁵ Freedonia Group (Sept 2022), *ibid.* <https://www.freedoniagroup.com/industry-study/engineered-stone-countertops-4395.htm>.

¹⁶ Freedonia Group (Sept 2022), *ibid.* <https://www.freedoniagroup.com/industry-study/engineered-stone-countertops-4395.htm>.

6) There is an epidemic of silicosis occurring in California’s artificial stone fabrication industry.

In July 2023, physicians and investigators with the University of California Los Angeles (UCLA) Olive View Medical Center and the CDPH OHB reported that between 2010 and 2022, they had identified 52 California workers with silicosis, all of whom worked in shops that fabricated countertops from artificial stone. The majority of these cases were identified in 2019 or later (Figure 3).¹⁷

Figure 3. Yearly Case Counts for 52 Patients with Artificial Stone-Associated Silicosis in California, 2010-2022.¹⁸



Investigators determined that these individuals developed silicosis because of exposure to RCS in the artificial stone fabrication shops where they worked.¹⁹ In July 2023, OHB reported that there were no reported cases of silicosis associated with artificial stone prior to 2010. On July 25, CDPH issued a Health Advisory to healthcare providers and local health departments, entitled *Global Epidemic Comes to California: Silicosis in Countertop Workers*.²⁰ The Board adopted the silica ETS in December 2023. At that time, OHB reported that the total number of known silicosis cases in the artificial stone industry had increased 92% in a period of

¹⁷ Fazio J, et al. (2023) Silicosis Among Immigrant. op. cit.

<https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2807615>.

¹⁸ Fazio J, et. al. (2023), *ibid.* <https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2807615>.

¹⁹ Fazio J, et. al. (2023), *ibid.* <https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2807615>.

²⁰ California Department of Public Health. Health Advisory. Global Epidemic Comes to California: Silicosis in Countertop Workers (July 25, 2023). [Global Epidemic Comes to California: Silicosis in Countertop Workers](#). Accessed Nov 2, 2023.

five months, from 52 workers in July to a total of 100 by December, including the ten fatalities. OHB reported that one worker with severe silicosis was just 27 years of age, was on continual oxygen, and had worked for a period of only 10 years in the industry.

In April 2024, OHB reported to Cal/OSHA that the number of known silicosis cases among workers in this industry had increased from 100 in December 2023 to 127 in April 2024, a 27% increase over a period of four months. OHB also reported that three additional deaths had occurred from silicosis, for a total of 13, and that 16 workers had received lung transplants.

7) The silicosis cases occurring in this industry are particularly aggressive and deadly.

The median age of the 52 patients with silicosis identified by UCLA and CDPH was 45 years at diagnosis; 51 (98%) were Latino men. Twenty of the patients (38%) presented with advanced disease, characterized by massive pulmonary fibrosis, which caused a severe or very severe reduction in respiratory capacity. Ten of these patients (19%) died by the time investigators had collected and reported their findings. The median age at death was 46 years (interquartile range [IQR] of 38-51). The median work tenure was 15 years (IQR of 10-20). In addition, three patients underwent lung transplantation, which has a five-year survival rate of 59%.²¹ Twenty-three patients (45%) reported that their shops had used water to suppress dust in an effort to prevent employee exposure to RCS.²²

8) Similar cases of silicosis in this industry are occurring worldwide.

In addition to California, silicosis cases have appeared in other U.S. states and other nations among workers in the artificial stone fabrication industry.^{23, 24, 25, 26, 27} Many of the affected workers were young and experienced a rapid onset of severe silicosis. The silicosis prevalence

²¹ Bos S, et al. Survival in adult lung transplantation: where are we in 2020? *Curr Opin Organ Transplant*. 2020; 25(3):268-273. <https://pubmed.ncbi.nlm.nih.gov/32332197/>. Accessed Nov 2, 2023.

²² Fazio J, et. al. (2023), *ibid*. <https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2807615>.

²³ Heinzerling A, et al. Radiographic screening reveals high burden of silicosis among workers at an engineered stone countertop fabrication facility in California. *Am J Respir Crit Care Med*. 2021;203(6):764-766. <https://pubmed.ncbi.nlm.nih.gov/33207123/>. Accessed May 8, 2023.

²⁴ Leso V, et al. Artificial stone associated silicosis: a systematic review. *Int J Environ Res Public Health*. 2019;16(4):568. <https://pubmed.ncbi.nlm.nih.gov/30781462/>. Accessed May 8, 2023.

²⁵ Rose C, Heinzerling A, Patel K, et al. Severe silicosis in engineered stone fabrication workers—California, Colorado, Texas, and Washington, 2017–2019. *MMWR* 2019;68(38):813-818. <https://www.cdc.gov/mmwr/volumes/68/wr/mm6838a1.htm>. Accessed May 9, 2023.

²⁶ Tustin AW, et al. An outbreak of work-related asthma and silicosis at a US countertop manufacturing and fabrication facility. *Am J Ind Med*. 2021;65(1):12-19. <https://pubmed.ncbi.nlm.nih.gov/34671999/>. Accessed May 8, 2023.

²⁷ Paolucci V, et al. Silicosis in workers exposed to artificial quartz conglomerates: does it differ from chronic simple silicosis? *Arch Bronconeumol*. 2015;51(12):e57-e60 <https://archbronconeumol.org/en-silicosis-trabajadores-expuestos-conglomerados-artificiales-articulo-S1579212915001883>. Accessed May 9, 2023.

rate among artificial stone fabrication workers in California and worldwide is between 12% and 21%.^{28, 29, 30}

9) Workers in this industry are uniquely vulnerable.

The evidence to date suggests that in California, 98% of the workers with silicosis in this industry are Latino men; most are foreign-born and speak Spanish or an indigenous language as their primary language. About 20% are uninsured, and 40% are covered under restricted-scope Medi-Cal, meaning they are only able to access emergency medical care.³¹ Nearly half of UCLA's Olive View Medical Center's 52 patients (48%) presented initially to an emergency department. A delay in diagnosing silicosis occurred in 58% of the 52 patients, who were mistakenly diagnosed with bacterial pneumonia or tuberculosis. Only 7% of workers with silicosis in the artificial stone countertop industry received workers' compensation.

These workers live with significant economic insecurity; there is no evidence to suggest that they are represented by a labor union. They face the possibility of retaliation if they report workplace hazards to Cal/OSHA or file workers' compensation claims.^{32, 33} They have little ability to advocate with their employer for workplace improvements, including in preventing exposure to RCS.

10) The dust from artificial stone dust is uniquely hazardous compared to natural stone.

A 2023 epidemiological study by Hoy et al. reported exposure and disease outcomes for 544 stone fabrication workers.³⁴ Four hundred ninety-three (91%) of these workers reported that they worked with both natural and artificial stone. Four hundred two workers reported using artificial stone for over 50% of work time. Workers reported that dry processing of stone was very common. Of the 544 workers in this study, only 70 (14%) indicated that they never had personal or bystander exposure to dry processing. Four hundred fourteen workers (76%) of the

²⁸ Heinzerling A, et al (2021). Radiographic screening. op. cit. <https://pubmed.ncbi.nlm.nih.gov/33207123/>.

²⁹ Hoy RF, et al. Identification of early-stage silicosis through health screening of stone benchtop industry workers in Victoria, Australia. *Occup Environ Med*. 2021;78(4):296-302. <https://pubmed.ncbi.nlm.nih.gov/33115923/>. Accessed May 10, 2023.

³⁰ Newbiggin K, et al. Stonemasons with silicosis: preliminary findings and a warning message from Australia. *Respirology*. 2019;24(12):1220-1221. <https://pubmed.ncbi.nlm.nih.gov/31407419/>. Accessed May 9, 2023.

³¹ Fazio J, et. al. (2023). Silicosis Among Immigrant. op. cit. <https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2807615>.

³² Moyce SC, Schenker M. Occupational exposures and health outcomes among immigrants in the USA. *Curr Environ Health Rep* (2017);4:349-54. <https://pubmed.ncbi.nlm.nih.gov/28812286/>. Accessed May 8, 2023.

³³ Rose C, et al (2019). Severe silicosis in engineered stone. op. cit. <https://www.cdc.gov/mmwr/volumes/68/wr/mm6838a1.htm>.

³⁴ Hoy RF, et al. Prevalence and risk factors for silicosis among a large cohort of stone benchtop industry workers. *Occup Environ Med* (2023) 1-8. <https://oem.bmj.com/content/oemed/80/8/439.full.pdf>. Accessed January 25, 2023.

cohort met the pre-specified criteria for secondary screening based on having “high” or “very high” estimated silica exposure based on the presence of symptoms or signs, or on the results of various tests. One hundred seventeen of these workers (28%) were diagnosed with confirmed silicosis. The median duration of time from first silica exposure to silicosis diagnosis was 12 years. This is substantially shorter than the typical latency of silicosis associated with natural sources of silica, such as those found in mining. It is also shorter than the latency period reported in cohorts of artificial stone fabrication workers from Israel (21.3 years) and the U.S. (17.3 years), but is comparable with those reported in regions that have instituted active screening, including Australia (10.6 years) and Spain (12 years). The study suggests that medical surveillance screening in this industry can detect disease earlier, which would likely result in efforts by workers and employers to reduce subsequent exposures and the associated risk of severe disease. Most workers with silicosis in this cohort did not experience any shortness of breath with physical activity; as such, the study recommends that symptoms among workers (such as coughing or shortness of breath) should not be used as a marker of possible disease.

A 2020 epidemiological study by Na Wu, et al. reported on 18 patients with artificial stone-associated silicosis and 63 with natural stone-associated silicosis.³⁵ The median duration of exposure prior to the onset of symptoms of silicosis was about six years for patients who had been exposed to artificial stone dust versus about 30 years for onset of symptoms for patients who had been exposed to natural stone, a five-fold difference. Four of the 18 patients (22%) exposed to artificial stone experienced rapid deterioration in lung function over the follow-up period of just six to 12 months. About 40% of the patients with artificial stone-associated silicosis needed lung transplants, and 28% died, whereas about 3% of natural stone-associated silicosis cases needed lung transplants, and none died. The investigators concluded that, compared to natural stone-associated silicosis, artificial stone-associated silicosis was characterized by short disease latency, rapid radiological progression, accelerated decline in lung function, and high mortality.

In a 2020 epidemiological study by Antonio León-Jiménez, et al., investigators followed 106 workers with advanced silicosis that had resulted from exposure to dust generated during the manufacture and installation of artificial stone countertops.³⁶ All patients were removed from exposure; however, one-third of workers with simple pneumoconiosis advanced to progressive massive fibrosis after an average of only four years. The proportion of workers with abnormal spirometry also increased from one-quarter to nearly one-half of all workers over the same period. These high rates of disease progression are in contrast to the lower rate seen in granite workers or in former coal miners where, in one study, 10% advanced to progressive massive fibrosis over an average of 22 years. The investigators concluded that silicosis from exposure to

³⁵ Wu N, et al. Artificial stone-associated silicosis in China: A prospective comparison with natural stone-associated silicosis. *Respirology* (2020) 25, 518–524. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7187561/>. Accessed August 16, 2023.

³⁶ León-Jiménez A, et al. Artificial stone silicosis: rapid progression after exposure cessation. *Chest* (2020);158(3):1060-1068. <https://pubmed.ncbi.nlm.nih.gov/32563682/>. Accessed August 16, 2023.

artificial stone RCS is aggressive and exhibits rapid disease progression in a high proportion of affected individuals.

A 2023 toxicological study by Chandnee Ramkissoon, et al. reported that the hazardous volatile organic compounds (VOCs) phthalic anhydride, styrene, benzene, ethylbenzene, and toluene are released during cutting, grinding, polishing and other tasks required during fabrication of artificial stone products.³⁷ Phthalic anhydride made up 26%–85% of the total VOC content of artificial stone emissions. Phthalic anhydride and styrene are respiratory irritants. These VOCs are released from the resins that make up the binding agent in artificial stone.

A 2022 toxicological study by Chandnee Ramkissoon, et al. found that 80% of the mass of dust produced from dry-machining artificial stone under controlled conditions consisted of RCS, whereas cutting natural stone (granite) produced RCS concentrations ranging from 4% to 30% of the dust mass.³⁸ Both artificial stone and granite produced high concentrations of very fine particles (<1 µm). More than 90% of the dust particles had diameters ranging from 0.19 to 0.83 µm, making them uniquely able to reach the deep lung. In this same study, researchers found that artificial stone particles showed more irregular shapes compared to natural stone dust particles, with sharp edges and fractures along the surfaces (see Figure 2 in Ramkissoon, 2022). This could increase the rate at which artificial stone RCS particles cause cell damage in the lungs, which produces scarring and, eventually, silicosis.

A 2020 toxicological study by Mariella Carrieri, et al. evaluated the RCS content of bulk dust in artificial stone compared to granite.³⁹ The percent RCS in the dust was 53% for artificial stone and only 8% for granite, indicating that a greater percentage of particles generated by artificial stone would penetrate much more readily into the lungs, compared to dust generated from granite.

A 2016 toxicological study by Cristina Pavan, et al. found that RCS particles generated from artificial stone were more reactive and fibrogenic (likely to break into fibers, which are more harmful to the lungs than other shapes), compared to reference quartz.⁴⁰ Artificial stone particles contained higher levels of metal transition ions (primarily iron, copper, and titanium),

³⁷ Ramkissoon C, et al. Engineered Stone Fabrication Work Releases Volatile Organic Compounds Classified as Lung Irritants. *Annals of Work Exposures and Health* (2023); 67(2) 288–293.

<https://pubmed.ncbi.nlm.nih.gov/36239208/>. Accessed August 16, 2023.

³⁸ Ramkissoon C, et al. Characterisation of dust emissions from machined engineered stones to understand the hazard for accelerated silicosis. *Nature Portfolio* 12:42351 (2022). <https://www.nature.com/articles/s41598-022-08378-8>. Accessed August 16, 2022.

³⁹ Carrieri M, et al (2020)., Characterization of Silica Exposure. op. cit.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7345731/>.

⁴⁰ Pavan C, et al. Abrasion of Artificial Stones as a New Cause of an Ancient Disease. Physicochemical Features and Cellular Responses. *Toxicological Sciences*. (2016) 153(1), 4–17.

<https://academic.oup.com/toxsci/article/153/1/4/2223603?login=false>. Accessed August 16, 2023.

which could explain the higher reactivity of artificial stone RCS. Dry cutting of artificial stone produced carboxyl radicals in dusts that were up to 10 times more reactive than the dust produced from dry cutting reference quartz; wet processing suppressed this activity.

11) There is evidence of widespread non-compliance with title 8 standards in the artificial stone fabrication industry.

In January 2019, Cal/OSHA initiated a Special Emphasis Program (SEP) in the artificial stone fabrication industry to enforce compliance with CCR title 8, section 5204, Occupational Exposures to Respirable Crystalline Silica.⁴¹ Cal/OSHA identified 281 active artificial stone fabrication sites; of these, Cal/OSHA opened inspections at 106 sites (38%) and conducted personal air sampling of workers at 47 of the sites where inspections were opened (44%). A CDPH analysis of Cal/OSHA's findings for 152 employees at these 47 sites showed "widespread RCS overexposure among workers and numerous Cal/OSHA standard violation citations".⁴²

- 34 of 47 (72%) workplaces were cited for one or more violation(s) of the silica standard, section 5204.
- 27 workplaces (57%) were cited for one or more violations of the respiratory protection standard, section 5144.
- 24 workplaces (51%) had one or more exposures above the permissible exposure limit (PEL).
- 7 workplaces (15%) had one or more exposures between the action level (AL) and PEL.

Among results for individual workers:

- 38 of 152 workers (25%) had exposures well above the PEL of 50 $\mu\text{g}/\text{m}^3$ (median = 90 $\mu\text{g}/\text{m}^3$; range = 50–670 $\mu\text{g}/\text{m}^3$).
- 17 workers (11%) had exposures between the AL of 25 $\mu\text{g}/\text{m}^3$ and the PEL.

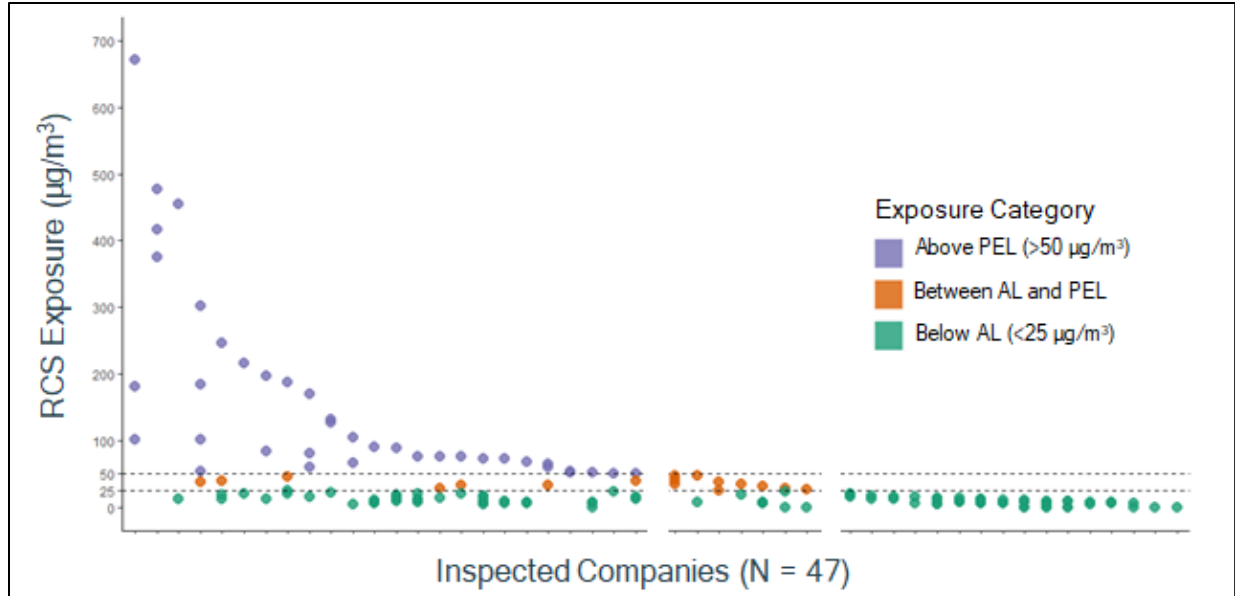
These findings are illustrated in Figure 4.

*FIGURE 4. RCS personal air sampling measurements of workers at artificial stone fabrication workplaces inspected by Cal/OSHA, January 2019–February 2020. Dashed lines represent the RCS AL (25 $\mu\text{g}/\text{m}^3$) and PEL (50 $\mu\text{g}/\text{m}^3$).*⁴³

⁴¹ California Division of Occupational Safety and Health (Cal/OSHA). Special emphasis program—occupational exposure to Respirable crystalline silica cut stone and stone product manufacturing. <https://www.dir.ca.gov/DOSHPol/DOSH-PP-SEP-on-Silica.pdf>. Accessed April 27, 2023.

⁴² Surasi K, et al. Elevated exposures to respirable crystalline silica among engineered stone fabrication workers in California, January 2019–February 2020. *Am J Ind Med*. 2022;65:701-707. <https://pubmed.ncbi.nlm.nih.gov/35899403/>. Accessed April 24, 2023.

⁴³ Surasi K, et al (2022). Elevated exposures. *ibid*. <https://pubmed.ncbi.nlm.nih.gov/35899403/>.



Each dash on the horizontal axis represents an individual company where a Cal/OSHA inspection took place. The horizontal axis represents RCS exposure levels, ranging from 0 to 700 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). Each data point represents an 8-hour, time-weighted average sample taken by Cal/OSHA at each of the 47 shops, in $\mu\text{g}/\text{m}^3$. The top dotted line represents the PEL of $50 \mu\text{g}/\text{m}^3$. The lower dotted line represents the Action Level of $25 \mu\text{g}/\text{m}^3$.

12) Individual workers in this industry report high levels of employer non-compliance with title 8 requirements.

As part of the SEP, Cal/OSHA interviewed and administered a questionnaire in both English and Spanish to a subset of workers at each worksite. Cal/OSHA provided CDPH with completed questionnaires from 92 workers at 33 inspected shops (70% of 47 shops inspected). CDPH reported the following findings:⁴⁴

- Eighty-four of 92 workers (91%) reported performing tasks with artificial stone that generate RCS, including cutting, grinding, laminating, and polishing.
- Twenty-two workers (26%) reported sometimes using dry methods to perform those tasks.
- Sixty-nine workers (75%) reported wearing disposable, filtering facepiece respirators and/or half-face elastomeric respirators for more than 30 days within the past year.
- Sixty-three workers (68%) reported that their employer had not informed them of the results of silica air monitoring performed at their workplace.
- Eighteen workers (20%) reported completing a respirator fit test within the previous 12 months.

⁴⁴ Spiegel A, et al. Self-reported silica exposures and workplace protections among engineered stone fabrication workers in California. *Am J Ind Med.* 2022;65:1022-1024. <https://pubmed.ncbi.nlm.nih.gov/36214615/>. Accessed May 8, 2023.

- Five workers (5%) reported that their employers had sent them or their co-workers for required silica medical examinations.

These findings are consistent with Cal/OSHA's citations issued under the 2019 SEP, which found 72% of employers in violation of the silica standard, as described above.

13) The existing silica standard is not well suited to the artificial stone fabrication industry.

The evidence of widespread non-compliance identified by Cal/OSHA in the 2019 SEP, combined with the emergence of serious silicosis cases and deaths among workers in this industry, suggests that section 5204 is not well-calibrated to the needs of the artificial stone fabrication industry.

This industry is made up primarily of small shops: it consists of about 808 fabrication shops, each of which operates with a median of five employees (range 1 to 30).^{45, 46} Section 5204 is primarily a performance-based standard that relies on the employer to conduct relatively sophisticated exposure assessments to determine required silica exposure controls. This approach is best suited to well-resourced, large employers; it is less effective for small businesses, which typically do not have the capacity (and may lack the willingness) to conduct technically sound assessments.

Sixty-eight percent of artificial stone fabrication employers inspected in the 2019 SEP did not conduct a silica exposure assessment.⁴⁷ Where the employer has not conducted an exposure assessment, Cal/OSHA must conduct its own full-shift exposure assessments, which is time-consuming, highly variable and easily manipulated by employers. For example, in Cal/OSHA's experience, employers have reduced production or reassigned workers on days when sampling by Cal/OSHA will be conducted. This requires Cal/OSHA to reschedule sampling, or it leads to low sampling results that do not reflect the normal conditions in the shop; in either case, Cal/OSHA is prevented from enforcing the silica standard and requiring exposure prevention measures.

In addition, section 5204 contains three loopholes that limit its effectiveness:

- *Feasibility*: section 5204 allows employers to avoid implementing key protections in the standard by claiming that those protections are infeasible [see subsections (f)(1), and renumbered subsections (h)(1)(A), (h)(1)(B), (h)(1)(C), (i)(1) and (i)(2)(B)].

⁴⁵ Surasi K, et al (2022), Elevated exposures. op. cit. <https://pubmed.ncbi.nlm.nih.gov/35899403/>

⁴⁶ An August 2023 internal CDPH Occupational Health Branch (OHB) analysis of the OHB dataset on artificial stone fabrication shops confirmed that the median number of employees is 5, based on a sample of 653 shops evaluated.

⁴⁷ August 2023 CDPH OHB analysis, *ibid*.

- *Objective data:* section 5204 allows employers to exempt themselves from the standard in its entirety by claiming that RCS exposures are likely below the AL, without actually having to conduct exposure monitoring [see subsection (a)(2)].
- *Monitoring:* section 5204 allows employers to conduct air monitoring on a single day and exempt themselves from the standard for that task, from that point onward, if the results show exposures are below the AL [see subsection (d)(3)(B)].

14) On the current trajectory, many workers in this industry will develop silicosis and die.

To support a new Cal/OSHA SEP in 2023, the CDPH OHB identified all artificial stone fabrication shops in the state; within this dataset, Cal/OSHA confirmed the identity of 841 shops, which together employ 4,955 shop-floor workers, not including managers and clerical staff. Assuming that the prevalence rate for silicosis among these workers is 12% to 21%, and that the silicosis fatality rate among these cases is 19%, Cal/OSHA estimates that:

- About 600 to 1000 cases of silicosis will likely occur among these 4,955 workers.⁴⁸
- About 100 to 200 of these workers will likely die of silicosis.⁴⁹

Based on the experience of the 2019 SEP, Cal/OSHA expects that hundreds of shops are likely out of compliance with the title 8 standards. Applying the 2019 SEP findings to the 841 shops and 4,955 workers in the industry shows that:

- Six hundred shops (72%) are likely in violation of the silica standard.⁵⁰
- Five hundred shops (57%) are likely in violation of one or more respiratory protection requirements.⁵¹
- Four hundred shops (51%) likely have one or more silica exposures above the PEL.⁵²
- Twelve hundred workers (25%) likely have silica exposures above the PEL of 50 $\mu\text{g}/\text{m}^3$.⁵³

15) The proposed changes to section 5204 are necessary to protect workers in this industry.

Workers exposed to RCS in the artificial stone fabrication industry are developing silicosis more often and with much more rapid disease progression compared to workers in the industries

⁴⁸ A 12-21% silicosis prevalence rate = 595 to 1041 workers with silicosis from a population of ~ 600 to 1000 with rounding.

⁴⁹ A 19% fatality rate = 113 to 198 silicosis deaths ~ 100 to 200 with rounding.

⁵⁰ $0.72 * 841$ workplaces = 606 workplaces ~ 600 with rounding.

⁵¹ $0.57 * 808$ workplaces = 479 workplaces ~ 500 with rounding.

⁵² $0.51 * 841$ workplaces = 429 workplaces ~ 400 with rounding.

⁵³ $0.25 * 4,955$ workers = 1,238 workers ~ 1,200 with rounding.

where silica exposure has traditionally occurred, and for whose protection the updated silica standards were promulgated in 2016.

This is occurring because workers in this industry are facing a unique RCS hazard in artificial stone, due to its very high silica content, and because the majority of employers in the industry are unable or unwilling to comply with title 8 requirements to prevent RCS exposures in the workplace.

In addition, the great majority of workers in this industry have very little ability to affect their working conditions, due to their immigration status, limited alternative employment opportunities, language barriers, lack of union representation, and other challenges. The result is that California is facing a statewide epidemic of silicosis among artificial stone fabrication workers.

Because the existing section 5204 was promulgated based on the experience of silicosis in traditional industries such as mining, quarrying, and sandblasting, it is not well calibrated to the small businesses and working conditions that characterize California's artificial stone fabrication industry today. Section 5204 was designed as a performance-based standard that is most applicable to large, well-resourced employers who are able to conduct relatively sophisticated exposure assessments and implement protective measures based on the findings of those assessments. In Cal/OSHA's experience, the current regulation is inefficient and difficult to enforce, and in many cases has resulted in Cal/OSHA being unable to require appropriate silica controls.

Accordingly, the proposal adopts the principles of section 5204 but applies them more prescriptively in today's artificial stone fabrication industry. A proactive approach that requires safety measures when highly hazardous work is performed, regardless of an exposure assessment, will more effectively protect workers in the industry; will be simpler for employers to implement; and will be more efficient for Cal/OSHA to enforce. At its most basic, this approach will make it clear to employers that providing effective RCS exposure controls is integral to the business of operating an artificial stone fabrication shop.

In addition, in order to prevent the potential substitution of artificial stone with natural stone that might contain hazardous levels of silica, the standard proposes to include natural stone with a silica content of 10% or more under the new protections proposed for employees who handle artificial stone. This action is based on evidence demonstrating that under certain conditions, silica exposures from natural stone can result in the rapid onset of silicosis that appears to match that of silicosis that results from exposures to artificial stone. For example, as noted above, a four-year follow-up study of 83 former sandblasters, from an initial worker population of 145, found that about 6% had died in the intervening four-year period, at an average age of 24 years. Among the 74 former sandblasters still alive and available for

reexamination, the prevalence of silicosis had increased from 55% to 96%, despite short-term exposures and a disease latency of only four years.⁵⁴

As noted above, Cal/OSHA's experience enforcing the silica ETS since December 29, 2023 indicates that (1) conditions in many shops are extremely hazardous, with dry cutting and uncontrolled dust emissions occurring, sometimes from multiple workstations; and that (2) the ETS has provided Cal/OSHA with essential new tools, including the use of OPU's, to rapidly and effectively enforce new requirements to protect workers who cut, grind, and polish artificial stone. The Board is proposing to make permanent the changes to section 5204 that the Board implemented in December 2024 with the silica ETS as well as adding, updating and amending subsections to improve their effectiveness in protecting workers from exposure to RCS.

What are the proposed changes to section 5204?

The proposed changes to section 5204 are as follows:

Subsection (a) Scope and application.

- Numbering has been modified for consistency with current formatting.
- The proposed regulation would add a new "Exception" to subsection (a)(2), as follows: "EXCEPTION: Subsection (a)(2) does not apply to high-exposure trigger tasks, as defined in subsection (b)."
 - The existing subsection (a)(2) allows employers to avoid complying with section 5204 by using "objective data" to demonstrate that "employee exposure to respirable crystalline silica will remain below 25 micrograms per cubic meter of air (25 µg/m³) as an 8-hour time-weighted average (TWA) under any foreseeable conditions."
 - "Objective data" is defined in subsection (b)(9) as information, such as "industry-wide surveys or calculations," that the employer can use to characterize employee exposure to RCS during a specific process, task, or activity. For example, the employer could show that industrial hygiene studies for a specific task in the same industry do not result in RCS exposures above the AL. If the employer's operation uses those same tasks, the employer could claim that their employee exposures will be below the AL, and therefore section 5204 does not apply.
 - The proposed "Exception" to subsection (a)(2) is necessary to remove this regulatory gap from section 5204 for "high-exposure trigger tasks," as defined in the proposal. The effect of this proposed addition is to prevent employers from using subsection (a)(2) as a way to avoid complying with section 5204.

⁵⁴ Akgun M, et al. Silicosis Appears Inevitable. op. cit. <https://pubmed.ncbi.nlm.nih.gov/25654743/>.

- The proposed regulation would add a new subsection (a)(3), as follows: “High-exposure trigger tasks are covered by this section regardless of employee exposures, exposure assessments, or objective data.”
 - This addition is necessary to ensure that employers whose employees perform any “high-exposure trigger tasks” with artificial stone (>0.1% silica) or natural stone (>10% silica) are expressly covered by section 5204. This addition prevents the employer from using “objective data” or their own exposure assessments to claim that “high-exposure trigger tasks,” as defined, do not expose employees to RCS above the AL or PEL.

Subsection (b) Definitions.

- Numbering and quotes around defined terms have been added to all definitions for consistency with current formatting.
- New subsection (b)(2), definition for “artificial stone.”
 - This new definition is necessary to clarify the meaning of the term “artificial stone,” for which the proposed amendments to section 5204 apply.
- Revised subsection (b)(3), definition for “chief.”
 - This change is necessary to clarify that the term “Division,” as used throughout the proposed regulation, refers to the Division of Occupational Safety and Health.
- New subsection (b)(4), definition for “confirmed silicosis.”
 - This new definition states that a confirmed case of silicosis is established by meeting any one of the following three criteria: (A) a written diagnosis by a licensed physician, with specific clinical findings; (B) a death certificate listing silicosis or pneumoconiosis as an underlying or contributing cause of death; or (C) exposure to airborne RCS, accompanied by a chest radiograph or lung histopathology, with certain clinical findings.
 - The proposed addition is necessary to clarify the meaning of “confirmed silicosis” as used in the proposed amendments to section 5204.
- Addition to subsection (b)(6), the definition of “employee exposure.” The following was added to the definition: “For high-exposure trigger tasks, employee exposure includes employees performing these tasks and employees working in the regulated area where the high-exposure trigger task is performed.” This change is necessary to clarify that employees who do not perform high-exposure trigger task, but who work in the regulated area where high-exposure trigger tasks occur are also exposed.
- New subsection (b)(8), definition for “high-exposure trigger tasks.”
 - High-exposure trigger tasks are those in which employees work with artificial stone that contains more than 0.1% silica, or with natural stone that contains more than 10% silica. The proposed addition is necessary to establish that these tasks present unique health risks to employees and therefore require specific workplace protections described throughout the proposed changes, irrespective

of monitoring data obtained by the employer, or “objective data” claimed by the employer, or feasibility considerations, all of which give employers the ability to avoid implementing certain workplace protections under the existing language of section 5204.

- An exception is made for geologic field research, where employees might handle natural stone that contains more than 10% silica for less than 30 days in a 12-month period. This exception is necessary because employees working in geologic field research are not able to install many of the protections required under the proposed revisions to section 5204.
- Revised subsection (b)(10), definition of “Physician or Other Licensed Health Care Professional (PLHCP)”.
 - This change is necessary because the phrase “him or her” has generally been replaced with the term “them” in modern phraseology.
- New subsection (b)(11), definition for “qualified person.”
 - This new definition states that a qualified person is one who, by extensive instruction, knowledge, training, and experience, has demonstrated their ability to effectively perform representative air monitoring and risk analysis for occupational exposure to respirable crystalline silica. The proposed change is necessary to help ensure that air monitoring for RCS is performed properly, which helps ensure the veracity of the results. In part due to the inherent conflict of interest associated with employers conducting their own air sampling, Cal/OSHA is not often confident in the results of employers’ air monitoring results. Air monitoring results play an important role in employee safety because the employer can reduce certain RCS protections (such as annual medical exams and use of powered air purifying respirators) if the monitoring results show that exposures are continually below the action level.
- Revised subsection (b)(12), definition of “Regulated Area.”
 - This change is necessary to clarify that the term “PEL” refers to “permissible exposure limit,” which is further defined in subsection (c).
- New subsection (b)(15), definition for “suspected silicosis.”
 - This new definition includes three possible classifications of silicosis based on signs and symptoms, radiological findings, or abnormal spirometry.
 - This definition is necessary to clarify the meaning of “suspected silicosis” as it applies to the proposed amendments to section 5204. Suspected silicosis can be identified in each of these three ways; it is not necessary, for example, to await radiological confirmation. This definition allows for early action to protect an employee from continued exposure, and to ensure proper medical support, rather than waiting for radiological confirmation of disease, at which point serious damage to the lungs has likely already taken place.
- New subsection (b)(17), definition for “wet methods.”

- This new definition describes three wet methods for effectively suppressing dust: (A) Applying water directly onto the work object; (B) submersing the work object under water; or (C) using a water jet cutting tool.
- Wet methods must be sufficient to reduce exposures below the action level (25 $\mu\text{g}/\text{m}^3$), rather than the PEL (50 $\mu\text{g}/\text{m}^3$). This is necessary because RCS exposures that exceed the action level do not effectively protect employees from serious occupational diseases. Among 1000 workers exposed over a 45-year career to RCS at an 8-hour TWA exposure level of 184 $\mu\text{g}/\text{m}^3$ or higher, 940 (94%) would be expected to develop silicosis, 38 of whom would die of the disease). At this same exposure concentration, 62 workers would die of lung cancer, 60 would die of end-stage renal disease, and 153 would die of lung diseases other than cancer. At the AL, 21 of 1000 workers would develop silicosis, 6 of whom would die of the disease, while 12 would die of lung cancer, 32 would die of end-stage renal disease, and 25 would die of lung diseases other than cancer, including the 6 deaths from silicosis.^{55, 56, 57, 58}
- These estimates likely underestimate the true disease and death rates from artificial stone RCS because (1) they do not include health risks for all silica-related diseases, and (2) the available dose-response models use exposure information based on cutting of natural stone rather than artificial stone, which has a much higher silica concentration. Artificial stone contains more than 93% crystalline silica, in combination with adhesives and pigments.⁵⁹ In contrast, other stone materials used in countertops contain between 10% and 45% crystalline silica (granite) or little to no silica (marble). An analysis of silica dust generated from cutting and grinding engineered stone found that about 54% of

⁵⁵ Attfield, M. D., and J. Costello, "Quantitative Exposure-Response for Silica Dust and Lung Cancer in Vermont Granite Workers," *American J of Industrial Med*, Vol. 45, No. 2, February 2004, pp. 129–138 and Steenland, N. Kyle, and Scott Michael Bartell, *Silica Exposure: Risk Assessment for Lung Cancer, Silicosis, and Other Diseases*, Washington, D.C.: U.S. Department of Labor, Directorate of Standards and Guidance, Occupational Safety and Health Administration, OSHA-2010-0034-0469, December 7, 2004.

⁵⁶ Steenland K., M. Attfield, and A. Mannejte, 2002. Pooled analyses of renal disease mortality and occupational crystalline silica exposure in three cohorts. *Annals of Occ Hygiene*. Vol 46, Supplement 1, pp. 4-9.

⁵⁷ Park, R., F. Rice, L. Stayner, R. Smith, S. Gilbert, and H. Checkoway, "Exposure to Crystalline Silica, Silicosis, and Lung Disease Other Than Cancer in Diatomaceous Earth Industry Workers: A Quantitative Risk Assessment," *Occupational and Environmental Medicine*, Vol. 59, No. 1, January 2002, pp. 36–43.

⁵⁸ Buchanan, D., B. G. Miller, and C. A. Soutar, "Quantitative Relations Between Exposure to Respirable Quartz and Risk of Silicosis," *Occ and Envir Med*, Vol. 60, 2003, pp. 159–164.

⁵⁹ Occupational Safety and Health Administration (OHSA) and National Institute for Occupational Safety and Health (NIOSH) (2015). *Hazard Alert: Worker Exposure to Silica during Countertop Manufacturing, Finishing and Installation*. Publication number 2015-106. Accessed at <https://www.osha.gov/sites/default/files/publications/OSHA3768.pdf> on May 2, 2023.

the dust particles were in the respirable range of $\leq 10 \mu\text{m}$.⁶⁰ The silicosis that results from exposure to RCS in engineered stone occurs much more quickly and aggressively compared to silicosis resulting from exposure to RCS in natural stone.⁶¹

- This proposed addition is necessary to clarify that only certain types of wet methods qualify as such under the proposed amendments to section 5204. Ineffective wet methods that rely on an inadequate volume of water, for example, would be prohibited under the revised section 5204.

Subsection (d) Exposure assessment.

- Subsection (d)(1). The proposed regulation would add a new sentence to existing subsection (d)(1), which would require employers to assess employee exposures to RCS, as described in (d)(3), regardless of exposures or expected exposures, if employees perform high-exposure trigger tasks. The proposed addition is necessary to ensure that employers conduct regular monitoring to assess the effectiveness of engineering controls in eliminating or greatly reducing employee exposures to RCS. This monitoring will inform whether engineering controls or work practices should be improved to reduce exposure levels. Monitoring must be conducted irrespective of previous monitoring data obtained by the employer, or “objective data” claimed by the employer, or whether the employer anticipates that employees might or might not be exposed above the AL, each of which give employers the ability to avoid implementing certain workplace protections under the existing language of section 5204.
- Subsection (d)(2). The proposed regulation would add a new sentence to existing subsection (d)(2), which prohibits employers from using the performance option set out in subsection (d)(2) for high-exposure trigger tasks. This exemption is necessary because the full complement of workplace protections required under the proposed changes to section 5204 must be implemented when employees are engaged in high-exposure trigger tasks, as defined, irrespective of monitoring data obtained by the employer, or “objective data” claimed by the employer, or feasibility considerations, all of which give employers the ability to avoid implementing certain workplace protections under the existing language of section 5204.
- Subsection (d)(3)(A). The proposed regulation would add the phrase in existing subsection (d)(3)(A) “...on the same material...” This addition is necessary because the silica content can vary greatly between different materials handled by employees covered by this section. This subsection pertains to exposure monitoring conducted by

⁶⁰ Carrieri M, Guzzardo C, Farcas D, Cena L. Characterization of Silica Exposure during Manufacturing of Artificial Stone Countertops. *Int J Environ Res Public Health* (2020) 17(12), 4489. Accessed at <https://pubmed.ncbi.nlm.nih.gov/32580452/> on August 16, 2023.

⁶¹ Wu N, Xue C, Yu S, Ye Q. Artificial stone-associated silicosis in China: A prospective comparison with natural stone-associated silicosis. *Respirology* (2020) 25, 518–524. Accessed at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7187561> on August 16, 2023.

the employer to determine whether ongoing monitoring is needed. This addition helps ensure the veracity of these assessments.

- Subsection (d)(3)(B). Existing subsection (d)(3)(B) allows employers to discontinue air monitoring if the results of initial air monitoring are below the action level. The proposed regulation would add a new sentence within existing subsection (d)(3)(B) which requires the employer to continue conducting exposure monitoring every 12 months when employees are engaged in high-exposure trigger tasks. This proposed addition is necessary to prevent employers from discontinuing monitoring when employees are engaged in high-exposure trigger tasks. This will ensure that the employer conducts air monitoring to determine if the protections required during high-exposure trigger tasks are actually maintaining exposure levels below the AL. This addition is also needed because monitoring results can vary based on minor changes in work practices, tools, and materials, so more frequent monitoring helps improve the reliability of the results.
- Subsection (d)(3)(E). Existing subsection (d)(3)(E) allows the employer to discontinue monitoring if the results of the most recent (non-initial) monitoring are below the action level. The proposed regulation would add a new sentence to existing subsection (d)(3)(E), which requires the employer to continue conducting exposure monitoring every 12 months, or more frequently, whenever employees engage in high-exposure trigger tasks, regardless of the findings of the employer's exposure monitoring. This proposed addition is necessary to prevent employers from discontinuing monitoring when employees are engaged in high-exposure trigger tasks. This will ensure that the employer conducts air monitoring to determine if the protections required during high-exposure trigger tasks are actually maintaining exposure levels below the AL. This addition is also needed because monitoring results can vary based on minor changes in work practices and materials, so more frequent monitoring helps improve the reliability of the results.

Subsection (e) Regulated areas.

- Subsection (e)(1). The proposed regulation would add a new sentence to existing subsection (e)(1) that requires all high-exposure trigger tasks to be conducted in a "regulated area," regardless of the employer's measured exposure levels or objective data. The existing regulation requires the employer to establish "regulated areas" whenever an employee's exposure to RCS is likely to exceed the PEL, based on the findings of the employer's exposure assessments; therefore, under the existing regulation, the use of regulated areas depends on the employer's exposure assessments, which are highly variable, difficult to perform properly, and easily manipulated. The addition is necessary to ensure that all high-exposure trigger tasks will be conducted inside a "regulated area," regardless of the employer's exposure monitoring findings. This approach assumes that high-exposure trigger tasks will

produce RCS exposure levels over the PEL and should therefore always be performed in the facility's "regulated area," as defined.

- Subsection (e)(2)(B). The proposal changes reference of "subsection (j)(2)" to "subsection (l)(3)" because a new subsection (g), Imminent Hazards, has been added, which requires renumbering.
- Subsection (e)(4). The proposal changes reference of "subsection (g)" to "subsection (h)" because a new subsection (g), Imminent Hazards, has been added, which requires renumbering.

Subsection (f) Methods of compliance.

- Numbering has been modified for consistency with current formatting.
- The proposed regulation would add several new provisions in lieu of existing subsection (f)(1) and instead require that certain tasks be performed with specific protections, as established by new subsection (f)(2).
- Subsection (f)(1). The following sentence was added to subsection (f)(1) "Subsection (f)(1) does not apply to high-exposure trigger tasks. High-exposure trigger tasks are covered by subsection (f)(2)." This is necessary to ensure that employers do not avoid using "engineering and work practice controls to reduce and maintain employee exposure to respirable crystalline silica to or below the PEL by claiming they are not feasible. It is necessary to remove this feasibility exception for high-exposure trigger tasks because it weakens existing section 5204, and it limits its effectiveness in protecting workers from RCS.
- Subsection (f)(1). The proposal changes reference of "subsection (g)" to "subsection (h)" because a new subsection (g), Imminent Hazards, has been added, which requires renumbering.
- Subsection (f)(2). The proposed regulation would add a new subsection (f)(2) requiring specific "engineering controls and work practices for all high-exposure trigger tasks, regardless of employee exposures, exposure assessments, or objective data." This addition is necessary to ensure that the employer implements the proper protections, as required, when employees engage in high-exposure trigger tasks.
- Subsection (f)(2)(A). The proposed regulation would add a new subsection (f)(2)(A) entitled "Engineering Controls" that would require effective wet methods be used pursuant to subsection (f)(2)(A)1., as defined in subsection (b), and would require wet methods to reduce exposure levels below the action level. This provision is necessary because wet methods are the most effective means of protecting employees and capturing silica dust that is generated during high-exposure trigger tasks.
- Subsection (f)(2)(B). The proposed regulation would add a new subsection (f)(2)(B) entitled "Housekeeping and Hygiene."
 - New subsection (f)(2)(B)1. would require that dust and other materials generated from high-exposure trigger tasks be promptly cleaned up and placed

into leak-tight containers to ensure there is no visible dust build-up in the workplace.

- New subsection (f)(2)(B)2. would require that wet methods or vacuum cleaners equipped with HEPA filters be used to clean up dust and other materials to ensure airborne silica is not generated during housekeeping activities.
- New subsection (f)(2)(B)3. would require that employees involved in housekeeping tasks be provided with appropriate respiratory protection, in accordance with subsection (h).
- New subsection (f)(2)(B)4. would require employers to provide washing facilities in accordance with existing title 8, section 3366.
- These provisions are necessary because silica dust on work surfaces is an important source of cross contamination and secondary exposure to RCS if it is not properly cleaned up and contained. Respiratory protection is necessary because cleaning surfaces and handling debris that contains silica dust can expose employees to RCS. Washing facilities are necessary to allow employees to clean silica dust from their hands.
- Subsection (f)(2)(C). The proposed regulation would add a new subsection (f)(2)(C) that clarifies Cal/OSHA's authority to protect employees by issuing an Order to Take Special Action.
 - This addition is necessary to facilitate Cal/OSHA's ability to efficiently mitigate a unique hazardous condition, on a case-by-case basis, that is not specifically addressed in the text of the proposed standard.
- Subsection (f)(2)(D). The proposed regulation would add a new subsection (f)(2)(D) entitled "Prohibitions" that describes specific work practices that are expressly prohibited for high-exposure trigger tasks, regardless of measured employee exposure levels.
 - These prohibitions include the following:
 - New subsection (f)(2)(D)1., use of compressed air on surfaces, clothing, or to backflush filters;
 - New subsection (f)(2)(D)2., activities that involve handling dry dust that is likely to contain crystalline silica;
 - New subsection (f)(2)(D)3., relying on employee rotation to reduce employee exposure to RCS; and
 - New subsection (f)(2)(D)4., walking or moving equipment through any material that may contain crystalline silica.
 - These additions are necessary because the dust generated during fabrication of artificial stone and certain natural stones is uniquely hazardous, and the activities listed are likely to result in significant employee exposures to RCS. Providing the express prohibitions listed here will improve understanding among employers and employees regarding the risks associated with these tasks.

- Subsection (f)(3). The proposed regulation would amend the existing subsection (f)(2), Written exposure control plan, to a renumbered (f)(3) that includes a new subsection (f)(3)(D) that requires additional elements in the written exposure control plan.
 - Subsection (f)(3)(D). These new elements include the following:
 - New subsection (f)(3)(D)1., a record of exposure measurements demonstrating that exposure levels are continuously below the AL. This is necessary to ensure that RCS exposure controls are working effectively.
 - New subsection (f)(3)(D)2., procedures for proper donning and doffing of work clothing and respiratory protection to prevent exposures to RCS above the action level and prevent take-home exposures. This is necessary because these activities can cause significant employee exposure to RCS if done improperly, and because bringing RCS outside the workplace can contaminate an employee's vehicle and home, or mass transit, resulting in exposures among family members or members of the public.
 - New subsection (f)(3)(D)3., documentation that the employer has registered their operations with Cal/OSHA in accordance with section 5203, Carcinogen Report of Use Requirements. This is necessary to allow Cal/OSHA to identify and track stone fabrication shops.
 - New subsection (f)(3)(D)4., procedures the employer will use to ensure that employees are properly trained to prevent silica exposures in accordance with subsection (l)(4). This is necessary to ensure that training procedures are formally adopted into the employer's written exposure control plan, which improves the effectiveness of the procedures.
 - New subsection (f)(3)(D)5., procedures the employer will use to provide medical surveillance and, if necessary, medical removal. This is necessary to ensure that employers have a plan in place to provide for initial and periodic medical exams and, if warranted by findings of medical tests, to remove employees from exposure to RCS who may be at risk of developing silicosis or who may have already developed silicosis.

New subsection (g) Imminent Hazards.

- The proposed regulation would add a new subsection (g) titled "Imminent Hazards" that lists specific activities associated with high-exposure trigger tasks. If observed by a Cal/OSHA Compliance Safety and Health Officer (CSHO), these activities would trigger either a mandatory Order Prohibiting Use (OPU), in the case of a violation of subsection (f)(2)(A) regarding wet methods, or an optional OPU, in the case of violations of subsection (f)(2)(D), Prohibitions and subsection (h), Respiratory Protection. The optional OPU list also includes violations of subsection (m) Reporting of silicosis and the Carcinogen Reporting requirements of section 5203.
- This provision is necessary because the dust generated by working with artificial stone and certain natural stones is uniquely hazardous; as such, it is essential that Cal/OSHA

be able to take immediate action when a violation is observed that is causing employee exposure to RCS. The OPU allows Cal/OSHA to take immediate steps to stop a hazardous process or close the facility itself until the hazardous condition is abated, without having to conduct air sampling for RCS, which is time and resource-intensive and can be performed by employers in such a way as to artificially reduce the exposure findings.

Amended subsection (h) Respiratory protection.

- Existing subsection (g) would be renumbered to (h).
- Numbering has been modified for consistency with current formatting.
- The proposed regulation would amend subsection (h) with several new provisions.
 - New subsection (h)(2) would establish that high-exposure trigger tasks must follow requirements in new subsection (h)(3) in lieu of following the less protective requirement in existing subsection (h)(1). This is necessary because existing subsection contains a feasibility exception that weakens the respiratory protection elements of section 5204 and severely limits its effectiveness in protecting employees from RCS.
 - New subsection (h)(3) would require employers to provide respiratory protection to employees who perform high-exposure trigger tasks or other work in regulated areas where high-exposure trigger tasks occur.
 - New subsection (h)(3)(A) would require that employers provide a full face, tight-fitting powered air purifying respirator (PAPR) with an Assigned Protection Factor (APF) of 1000 or a respirator providing equal or greater protection equipped with a HEPA, N100, R100, or P100 filter. An exception allows for the use of a loose-fitting PAPR, a half-mask PAPR, a full facepiece air purifying respirator (APR), or another respirator providing equal or greater protection with an APF of 25 or greater, where the employer demonstrates that employee exposures to RCS are continuously maintained below the AL through representative air sampling conducted at least once every six months by a qualified person, as defined under subsection (b), and in accordance with subsection (d)(3)(A). This exception does not apply if the PLHCP or specialist recommends use of a full face, tight-fitting PAPR, or another, more protective respirator.
- The respiratory protection requirements are necessary because engineering controls, even when properly implemented, are not always effective at protecting employees from exposure to RCS. For example, investigators at the Georgia Institute of Technology obtained 46 full-shift air samples for RCS during 10 visits to eight different companies. Even where workers used wet methods or local exhaust ventilation, or both, RCS exposures ranged from 10 $\mu\text{g}/\text{m}^3$ to 370 $\mu\text{g}/\text{m}^3$ and averaged 100 $\mu\text{g}/\text{m}^3$, twice the PEL. Without such controls, investigators found that dry cutting, polishing, and fabrication resulted in exposures 34 to 46 times the PEL and ranged from 1700-2300 $\mu\text{g}/\text{m}^3$. They concluded that the use of “water and ventilation did not reduce

exposures below the PEL when fabricating engineered stone (quartz) countertops due to the high silica content in this product.”⁶²

- Similarly, NIOSH investigators performed a Health Hazard Evaluation (HHE) in 2016 at a large stone counter fabrication plant in Texas that handled both natural and artificial stone and employed 38 production employees.⁶³ Over two days, NIOSH obtained 36 full-shift personal air samples and 28 task-based samples. There was no dry cutting in the facility. All hand tools were equipped with control knobs that allowed the user to adjust the amount of water flowing to the tool. For both sampling days, however, the full-shift exposures of employees using pneumatic wet grinders with diamond cup wheels during the final polishing stage of production were all at or above the OSHA PEL, the NIOSH recommended exposure limit (REL), and the ACGIH TLV for crystalline silica. None of the other production employees NIOSH sampled had exposures at or above the OSHA PEL, including the pneumatic polishers with a resin bonded disc. Other production employees had exposures above the ACGIH TLV of 25 µg/m³. NIOSH concluded that “although employees always used appropriate respirators and used a water spray on the grinders to suppress dust, during both days of full shift sampling, employees grinding stone with the diamond cup wheels were consistently overexposed to the ACGIH TLV, the NIOSH REL, and the OSHA PEL. The task-based samples reveal that wet grinding both types of stones and wet polishing the engineered quartz stone can result in high task-based exposures to silica that could lead to overexposures.”
- In a 2021 study, NIOSH investigators evaluated personal breathing zone exposure levels to RCS during stone counter fabrication tasks in which workers used tools that were equipped with a water spray from a nozzle on a grinder, a center-feed water feature built into a grinder, and a combination of water spray and a sheet-wetting method that involved flowing water over the surface of the stone slab using a hose.⁶⁴ Average short-term, task-based RCS samples were 190 ±105.4 µg/m³ with tools equipped with water spray, and 195 ±168 µg/m³ with tools equipped with the center-feed water feature. When combining water spray and sheet-wetting, exposures were 33.2 ± 11.4 µg/m³. Area samples showed high levels of RCS. NIOSH concluded that “both wetting methods of water spray and center-feed performed equally poor[ly] in

⁶² Georgia Institute of Technology. Georgia Tech Enterprise Innovation Institute. *Respirable Crystalline Silica Air Sampling Data From Cut Stone Industry in Georgia* ([Copy of Copy of SHES Flyer \(oshapptfiles.s3.amazonaws.com\)](https://www.gatech.edu/research/enterprise-innovation-institute/occupational-safety-and-health/flyer)). Accessed Feb 3, 2024.

⁶³ Zwack, Victory, Brueck, Qi. (March 2016). Evaluation of Crystalline Silica Exposure during Fabrication of Natural and Engineered Stone Countertops. HHE Report No. 2014-0215-3250. U.S. Dept of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health (NIOSH). (<https://www.cdc.gov/niosh/hhe/reports/pdfs/2014-0215-3250.pdf>). Accessed Feb 2, 2024.

⁶⁴ Chaolong Qi and Alan Echt (June 2021). Comprehensive Report: Engineering Control of Silica Dust from Stone Countertop Fabrication and Installation – Evaluation of Wetting Methods for Grinding. EPHB Report No. 2021-DFSE-710. U.S. Dept of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health (NIOSH). (<https://www.cdc.gov/niosh/surveyreports/pdfs/2021-DFSE-710.pdf>). Accessed Feb 2, 2024.

terms of wetting the grinding spot and reducing the worker's RCS exposure during grinding, despite having very different water flowrates."

- New subsection (h)(3)(B) would require employers to provide a supplied-air respirator to employees who have been diagnosed with silicosis or suspected silicosis, or as recommended by the PLHCP or specialist. The subsection would require the employer to locate the air source supplying this respirator in an area that is free of RCS and other airborne contaminants. This addition is necessary to ensure maximum protection for workers who are likely already on the path to silicosis.

Amended and renumbered subsection (i) Housekeeping.

- Existing subsection (h) would be renumbered to (i).
- New subsection (i)(3) would remove the feasibility exceptions in the existing 5204 for high-exposure trigger tasks, which prohibit dry sweeping/brushing and use of compressed air, and would clarify that high-exposure trigger tasks are covered by subsection (f)(2).
- This is necessary because the feasibility exceptions diminish employee protections and severely limit the effectiveness of the regulation in protecting workers from RCS. Dry sweeping/brushing and using compressed air to clean surfaces and clothing produce substantial RCS exposures.

Amended subsection (j) (formerly subsection (i)) Medical surveillance.

This subsection requires the employer to provide initial and periodic medical exams as part of a medical surveillance program. The subsection describes requirements based on whether the employee performs high-exposure trigger tasks. Medical surveillance is necessary because CDPH has identified about 100 workers from the artificial stone fabrication industry with silicosis, 10 of whom have now died. Medical exams are often able to detect silicosis at an early stage, when it may be possible to intervene and prevent further progression of the disease by eliminating further exposure to RCS. Silicosis can develop without the employee experiencing obvious symptoms, such as shortness of breath or cough. Because respiratory symptoms and other health effects are a late indicator of silicosis, ongoing medical surveillance is necessary.

Subsection (j)(1) General

- Subsection (j)(1)(A). The amendments to this existing subsection require the employer to make the initial and periodic medical examinations required under the subsection available to employees at no cost and at a reasonable time and place. This is necessary to facilitate employee participation in these exams, which are voluntary for the employee. Employees are unlikely to participate in periodic medical exams if they are required to pay for them out-of-pocket, or if the exams are only scheduled at inconvenient times or places. This would put employees at greater risk of silicosis because early signs of lung damage would go undetected.

Subsection (j)(1)(B) The amendments to this existing subsection make it clear that the initial and periodic exams required by the subsection must be performed by a physician or other licensed health care provider (PLHCP). This is necessary to ensure that these exams are performed by an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows them to independently provide, or be delegated the responsibility to provide, some or all of the particular health care services.

Subsection (j)(2) Initial medical examination

- Subsection (j)(2)(A). The amendments to this existing subsection require the employer to make an initial medical exam available within the first 30 days of employment to any employee who will perform high-exposure trigger tasks for at least 10 days each year, and to inform employees of this right. The employer is not required to make this exam available if the employee has had an exam that meets the requirements of (j)(4) within the last year. Information regarding the specific procedures that must be included in both initial and periodic medical examinations has been relocated and renumbered to new subsection (j)(4), Medical examination procedures.
 - This amendment is necessary to establish the employee's baseline medical status with regard to silicosis before the employee begins to work. PLHCPs can compare the results of baseline exams with subsequent periodic exams to assess changes that could suggest early signs of silicosis. This allows the PLHCP to recommend actions to eliminate or greatly reduce exposure to RCS in the workplace. Requiring the employer to inform employees of their right to the initial exam ensures that employees are aware of this opportunity to establish a baseline with regard to silicosis. Requiring an initial exam for employees who will perform high-exposure trigger tasks for a minimum of 10 days each year is necessary because the RCS generated from artificial stone is uniquely toxic, compared to the RCS generated from natural stone.
- Subsection (j)(2)(B). This new subsection is identical to (j)(2)(A) except that it pertains to employees who do not perform high-exposure trigger tasks but who are otherwise exposed to RCS at or above the action level for 30 or more days per year. The employer is not required to make this exam available if the employee has had an exam that meets the requirements of (j)(4) within the last three years. The period for exposure is longer (30 days) compared to the time period for high-exposure trigger tasks (10 days) because natural stone (with <10% silica) is inherently less hazardous than artificial stone. This change is necessary to establish the employee's baseline medical status with regard to silicosis, before the employee begins to work. PLHCPs can compare the results of baseline exams with subsequent periodic exams to assess changes that could suggest early signs of silicosis. This allows the PLHCP to recommend actions to eliminate or greatly reduce exposure to RCS in the workplace.

Subsection (j)(3) Periodic medical examinations

- Subsection (j)(3)(A). Changes to this existing subsection would require the employer to make annual medical exams available to employees who perform high-exposure trigger tasks for at least 10 days each year, and to inform employees of this right. Annual medical exams are necessary for these employees because the RCS particles generated from artificial stone are uniquely toxic. Compared to natural stone-associated silicosis, artificial stone-associated silicosis is characterized by short disease latency, rapid radiological progression, accelerated decline in lung function and high mortality. Detecting artificial stone-associated silicosis as early as possible is important for the employee's survival.
- EXCEPTION to subsection (j)(3)(A). A new exception has been added and would apply if the employer is able to demonstrate that employee exposures to RCS are continuously maintained below the action level through representative air sampling conducted by a qualified person at least once every six months. The exception does not apply if the PLHCP or specialist recommends periodic medical examinations. Employers who meet the requirements of the exception would be able to conduct periodic medical exams every three years, rather than every year, for all employees, including those who perform high-exposure trigger tasks. This exception is necessary to incentivize employers to reduce or eliminate RCS exposures among employees who perform high-exposure trigger tasks, because doing so allows the employer to avoid the costs of annual medical exams. It also protects the health of these employees. Requiring that a qualified person perform the air sampling is necessary to help ensure that the sampling is performed properly, such that employees and Cal/OSHA can be confident in the results.
- Subsection (j)(3)(B). This new subsection would require the employer to provide periodic medical exams at least every three years for employees who do not perform high-exposure trigger tasks but who are otherwise occupationally exposed to RCS. The requirement has the same effect as existing subsection (i)(3). The change is necessary as subsection (j) has been reorganized to improve clarity.

Subsection (j)(4) Medical examination procedures

- Subsection (j)(4)(A)1 to 6. Changes to these subsections require that the initial and periodic medical exams include specific assessments and tests, each of which is intended to assist the PLHCP in identifying early signs and symptoms of silicosis. This standardized set of requirements has been relocated and renumbered from existing subsection (i)(2) and is necessary to ensure the effectiveness of the medical surveillance program, whose purpose is the early detection of disease. Early detection of silicosis—followed by action to eliminate exposure to RCS—is necessary to prevent the

development of silicosis, which is irreversible and, at its more advanced stages, permanently disabling and often fatal.

- (j)(4)(A)(1)) Changes to this subsection require that the initial and periodic medical exams shall consist of specific assessments and tests, each of which is intended to assist the PLHCP in identifying early signs and symptoms of silicosis. Employees engaged in high-exposure trigger tasks are included in this subsection.
- (j)(4)(A)(2)) This subsection was relocated and renumbered but the text was unchanged.
- (j)(4)(A)(3) Changes to this subsection require that a chest computed tomography (CT) scan at the lowest possible dose may be substituted for the chest X-ray when deemed appropriate by the PLHCP or specialist. This change is intended to assist the PLHCP in identifying early signs and symptoms of silicosis to include a CT scan if deemed appropriate y the PLHCP or specialist.
- (j)(4)(A)(4)) This subsection was relocated and renumbered but the text was unchanged.
- (j)(4)(A)(5) Changes to this subsection require that testing for latent TB infection be included as part of the initial examination for early detection.
- (j)(4)(A)(6) Changes to this subsection require the addition of a Specialist.
- Subsections (j)(4)(B) 1 to 3. These new subsections require that a chest computerized tomography (CT) scan and other tests to assess signs of silicosis be used under the following conditions: 1) when it is deemed to be appropriate by the PLHCP; 2) for any employee with suspected silicosis, as defined; and 3) for any employee who has performed, or been exposed to, high-exposure trigger tasks for a specific period of time. This new requirement is necessary because these tests are more reliable in detecting early signs of silicosis, compared to the tests required under (j)(4)(A)1 to 6.
- EXCEPTION to subsection (j)(4)(B)3. A new exception applies if the employer can demonstrate that employee exposures to respirable crystalline silica are continuously maintained below the action level through representative air sampling conducted by a qualified person, at least once every six months. This exception is necessary to incentivize employers to reduce or eliminate RCS exposures among employees who perform high-exposure trigger tasks, because doing so allows the employer to avoid the costs of these specialized tests. It also protects the health of their employees. Requiring that a qualified person perform the air sampling is necessary to help ensure that the sampling is performed properly, such that employees and Cal/OSHA can be confident in the results.

Subsection (j)(5) Information provided to the PLHCP.

- Subsection (j)(5)(A). This existing subsection is changed to add new language requiring the employer to inform the PLHCP if the employee performs high-exposure trigger tasks. This is necessary because these tasks are associated with exposure to high levels of RCS from artificial stone, which is uniquely hazardous compared to RCS from natural stone.
- Subsection (j)(5)(C). The changes to this subsection replace “personal protective equipment” with “type of respiratory protection,” which the employer must communicate to the PLHCP. This is necessary because respiratory protection is the most relevant PPE with respect to silicosis. Information on the use of gloves or aprons, for example, is not relevant to silicosis.
- Subsection (j)(5)(E). This new subsection requires employers to provide contact information for previous PLHCPs or specialists to the current PLHCP. This information is necessary to allow the PLHCP to consult with previous providers on the employee’s health status, including signs and symptoms of silicosis, which is necessary to ensure continuity of care for the employee.
- Subsection (j)(5)(F). This new subsection requires employers to inform the PLHCP of the requirement under this section to report silicosis and lung cancer cases to Cal/OSHA, in addition to the silicosis reporting requirements under CCR title 17. These requirements are necessary to improve the flow of information about disease cases provided to these agencies, which enables the agencies to intervene at a scale commensurate with the problem. If the employer were not required to inform the PLHCP of these reporting requirements, it is likely that some PLHCPs would be unaware of their reporting responsibilities.

Subsection (j)(6) PLHCP’s written medical report for the employee.

- The addition of “initial and periodic” to this existing subsection is necessary to make clear which examinations are covered by the written reporting requirements of this subsection. This sentence also requires the employer to ensure that the PLHCP provides each employee with a written medical report within 14 calendar days. This change is necessary because the existing language gives the PLHCP 30 days to provide the report to the employee, which is too long: the information must be provided as soon as possible because employees must take immediate steps to protect themselves from exposure to RCS if they are at risk of silicosis. This is especially important for employees who perform high-exposure trigger tasks.
- Subsection (j)(6)(C). A new phrase, “including during high-exposure trigger tasks” was added to this subsection. This is necessary because these are the riskiest tasks that are most likely to result in silicosis among employees.

- Subsection (j)(6)(D). The term “if applicable” was added to the existing subsection because the subsection (j)(4)(A)3 allows PLHCPs to substitute a CT scan for the chest X-ray.
- Subsection (j)(6)(E). This new subsection requires reporting of CT scans, which are not required in existing section 5204. This is necessary because CT scans are more sensitive in detecting early signs of silicosis compared to chest X-rays. This addition is necessary to ensure that the results of these tests are reported to the affected employee.
- Subsection(j)(6)(F). This new subsection requires the PLHCP to advise the employee if they should be using a supplied-air respirator, based on the findings of the medical exam. This is necessary if an employee has early signs of silicosis because this type of respirator is able to substantially reduce exposure to RCS.

Subsection (j)(7) PLHCP’s written medical opinion for the employer.

- Subsection (j)(7)(A) renumbered as (j)(7). Existing subsections (i)(6)(A) 1, 2 and 3 have been renumbered as (j)(7)(A), (j)(7)(B) and (j)(7)(C). There are three changes to subsection (j)(7). The first change reduces from 30 days to 14 days the time period in which employers must obtain the written medical opinion from the PLHCP. This is necessary because employees who are at risk of silicosis, as identified by the PLHCP, must reduce their exposure to RCS as quickly as possible, rather than waiting for up to 30 days. This is especially important for employees who perform high-exposure trigger tasks. The second change is necessary to clarify that written opinions are required for both initial and periodic exams. The third change would require that the employer immediately provide the medical opinion to the affected employee. Existing subsection (i)(6)(C) gives the employer 30 days to provide the report to the employee, which is too long. This overlong time period unnecessarily delays essential information that employees need in order to take immediate steps to protect themselves from exposure to RCS if they are at risk of silicosis.
- Subsection (j)(7)(D). This new subsection requires the PLHCP to offer an opinion to the employer regarding the use of a supplied-air respirator (SAR) for an employee. This is necessary because a SAR is able to substantially reduce exposure to RCS and might be needed to protect an employee who is showing early signs of silicosis.
- Existing subsection (i)(6)(B). This sentence is removed because the recommendation by the PLHCP regarding the need to limit the employee’s exposure to RCS, including during high-exposure trigger tasks, does not constitute medical information; therefore, it does not require written authorization by the employee for release to the employer. In fact, it is essential that this information be communicated to the employer as efficiently as possible to protect the employee from continued exposure, without the need for written employee authorization.

- Subsection (j)(7)(E). Existing requirement (i)(6)(B)(1) has been renumbered as (j)(7)(E). A modification was made to include “during high-exposure trigger tasks.” This makes clear that the PLHCP must provide specific information on limiting exposure to RCS for employees who perform high-exposure trigger tasks. This is necessary because these tasks are uniquely hazardous and more likely to cause silicosis compared to other tasks.
- Former subsection (i)(6)(B)(2). The requirement to include a statement pertaining to the need for a referral to a specialist has been deleted. This information would be provided directly to the employee rather than to the employer pursuant to existing requirements. This protects the employee’s privacy.
- Former subsection (i)(6)(C). The requirement that the employer provide a written copy of the medical opinion to affected employees within 30 days has been deleted and replaced with amended subsection (j)(7), which requires the employer to provide the opinion “immediately.” This is necessary because employees at risk of silicosis should be protected immediately from further RCS exposure, rather than waiting 30 days.

Subsection (j)(8) Additional examinations.

Existing subsection (i)(7) has been renumbered as (j)(8). The modification to the existing subsections (i)(7)(C) and (D) requires the employer to obtain a written opinion from the specialist within 14 days instead of 30 days of the medical examination. The requirement to obtain a written opinion within 14 days, rather than 30 days, is necessary because employees who are at risk of silicosis, as identified by the specialist, must reduce their exposure to RCS as quickly as possible, rather than waiting for up to 30 days. This is especially important for employees who perform high-exposure trigger tasks. Additional changes have been made to renumber existing language.

New subsection (k) Medical removal.

In general, medical removal provisions protect employees from job loss if a PLHCP recommends that they eliminate or reduce their exposure to RCS. This encourages employees to participate in medical surveillance, which is essential for identifying silicosis before it becomes disabling or fatal. Because of the costs associated with medical removal, this provision also encourages employers to actively prevent employee exposure to RCS. This subsection applies specifically to employees who perform high-exposure trigger tasks, pursuant to subsection (j)(2)(A).

- Subsection (k)(1) specifies that when a PLHCP recommends that an employee who performs high-exposure triggers tasked, as specified under subsection (j)(2)(A), be removed from their normal job, or that the job be modified to reduce RCS exposure, the employee will be transferred to comparable work for which the employee is qualified or for which the employee can be trained within a period of six months. This provision is

necessary to protect an employee from job loss if they are medically removed from their normal job because of exposures to RCS that occurred on that job.

- Subsection (k)(2) specifies that if comparable work is unavailable, the employer must maintain the employee's pay, seniority and benefits until any one of the following occurs: (A) such work becomes available; (B) the employee is medically determined by the PLHCP to be able to return to their original job status; (C) the employee is determined by the PLHCP to be permanently unable to return to work involving exposure to RCS during high-exposure trigger tasks; or (D) six months have elapsed. These provisions are necessary to protect the employee from loss of pay, seniority, and benefits if they are medically removed from their normal job and no comparable job is available, and they are also necessary to limit the employer's liability to six months when no comparable job is available. Requiring employers to support a medically removed employee for six months is one of several provisions that will help motivate employers to prevent RCS exposures among employees who perform high-exposure trigger tasks.
- Subsection (k)(3) requires employers to pay the employee's normal hourly wage and weekly work schedule for up to six months while the employee's worker's compensation claim is being processed, again as applied to employees who perform high-exposure trigger tasks pursuant to subsection (j)(2)(A). Requiring employers to support a medically removed employee in this way for up to six months is one of several provisions that will help motivate employers to prevent RCS exposure among employees. The six-month time frame is necessary because it can take at least this amount of time for medical tests to be performed that are necessary to determine if a decline in pulmonary function, for example, is in fact a result of silicosis. This protection is also necessary to ensure that economic considerations do not prevent the employee from actively participating in medical surveillance exams, which are necessary to ensure that silicosis is detected at an early stage.
- Subsection (k)(4) specifies offsets in the amounts employers would have to pay to medically removed employees when no comparable work is available. For example, if an employee received partial wages from a workers' compensation program, the employer may reduce the employee's payments during the six months by that amount. This subsection is necessary to ensure that medically removed employees are not over-compensated during the six-month period when employers are paying their full wages and benefits.
- Subsection (k)(5) provides employees who perform high-exposure trigger tasks, pursuant to subsection (j)(2)(A), with the opportunity to obtain an independent medical review for silicosis. The employee designates the PLHCP who will conduct the review, and the employer must pay the costs of the review, which is then binding on all parties.

This provision is based on research showing that silicosis is often misdiagnosed for bacterial pneumonia (30% of cases) or tuberculosis (27% of cases).⁶⁵ This provision is necessary because an employee is only able to obtain the rights associated with medical removal if their silicosis is properly diagnosed.

Subsection (l) (formerly subsection (j)) Communication of respirable crystalline silica hazards to employees.

This subsection applies to all workplaces where exposure to respirable crystalline silica is likely to occur, not only to the stone fabrication industry. The following changes are proposed for this subsection:

- Numbering has been modified for consistency with current formatting.
- New subsection (l)(1) would require that training and communications materials be provided in a language and at a literacy level appropriate for the employees. This is necessary to ensure that information on the risks of silicosis is effectively communicated to employees.
- Existing subsections (j)(1), (2),(3) have been renumbered.
- Renumbered subsection (l)(3) would amend the text of signage that the employer is required to post at entrances to “regulated areas.” The text removes the phrase “Causes damage to lungs,” due to the addition of a more detailed phrase, “Causes permanent lung damage that may lead to death,” which would be required in both English and Spanish. Additions were made to provide the Spanish translation. This change is necessary to communicate the health risks of RCS exposure effectively to employees.
- New subsection (l)(4)(A)(2) would require the employer to ensure that each employee can demonstrate understanding of the symptoms of exposure to RCS, including cough, difficult breathing, and others. This is necessary to ensure that employees are alerted as early as possible to symptoms that could indicate silicosis, which allows employees to take actions to reduce exposures and seek medical attention. These actions could save an employee from permanent disability or death.
- Renumbered subsections (l)(4)(A)3. and 4. would require the employer to ensure that each employee can demonstrate understanding that high-exposure trigger tasks could result in exposure to RCS, and that the employer has implemented protections to prevent employee exposure to RCS during high-exposure trigger tasks. These provisions are necessary to ensure that employees are aware of the risks associated with high-exposure trigger tasks and the reasons behind workplace controls to prevent exposures.

⁶⁵ Fazio J, et al. Silicosis Among Immigrant Engineered Stone (Quartz) Countertop Fabrication Workers in California. *JAMA Internal Medicine*. 183(9): 991-998. Published online July 24, 2023.

<https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2807615>. Accessed August 16, 2023.

- New subsection (l)(4)(A)5. would require that employees be trained in the use and implementation of engineering controls, work practices, and respiratory protection. This addition is necessary to ensure that employees understand the hazards of RCS and take steps to prevent exposure.
- Renumbered subsection (l)(4)(A)6. Includes a non-substantial grammatical change.
- Renumbered subsection (l)(4)(A)7. refers to renumbered subsection (j) in place of (i).
- New subsection (l)(4)(A)8. would require that employees be trained to understand the increased risk of death that results from the combined effects of smoking and silica exposure. This addition is necessary to ensure that employees understand the added benefits to their health of avoiding smoking, particularly with respect to dying from occupational silicosis.
- New subsection (l)(4)(A)9. would require that employees be trained to understand that tuberculosis can become active as a result of silica exposure. This addition is necessary to ensure that employees understand that activation of tuberculosis could be related to occupational exposure to silica.
- Renumbered subsection (l)(4)(B). No additional changes made.
- New subsection (l)(4)(C) would require employers to encourage employees to report symptoms related to RCS exposure, without fear of reprisal, and would prohibit employers from taking any adverse action against an employee who reports symptoms or who suffers from a silica-related illness. This addition is necessary to encourage reporting, which will ensure that employers are aware as early as possible that one or more employees may be developing silicosis. This will in turn allow the employer to take action to improve protections for employees by ensuring the effectiveness of exposure controls.

New subsection (m) Reporting of silicosis.

This subsection applies to all workplaces where exposure to respirable crystalline silica is likely to occur, not only to the stone fabrication industry.

- New subsection (m)(1) would require the employer to report certain information listed within subsections (m)(1)(A) through (m)(1)(K) to the CDPH and to Cal/OSHA within 24 hours of receiving notification of a confirmed silicosis or lung cancer case related to silica exposure. This provision is necessary to allow CDPH and Cal/OSHA to take early action to prevent further cases and to track the incidence and prevalence of cases statewide.
- New subsection (m)(2) would require PLHCPs and specialists to report confirmed cases of silicosis or lung cancer to Cal/OSHA with certain information listed within subsections (l)(2)(A) through (l)(2)(G). This sentence also requires PLHCPs and specialists to comply with the silicosis reporting requirements under CCR title 17. This provision is necessary because employers may not know if an employee has silicosis or lung cancer, and it allows Cal/OSHA and CDPH to take action to prevent further cases and to track the incidence and prevalence of cases statewide.

Renumbering of subsection (k) to (n) Recordkeeping.

- Renumbered subsection (n)(3)(A) refers to renumbered subsection (j) in place of (i).

Deletion of former subsection (l) Dates.

- Former subsection (l) would be deleted as all the implementation dates listed have passed and the subsection has no effect.

Appendix B

The proposal makes no changes to mandatory Appendix A but proposes several changes to non-mandatory Appendix B. The proposal would modify the language in Appendix B pertaining to Section 5204 - Medical Surveillance Guidelines (Non-Mandatory) to be consistent with changes that are proposed for section 5204, as well as to reflect current medical information about silica exposure and the toxicity of RCS generated by artificial stone. These changes are needed to reflect current medical information about silica exposure and the toxicity of RCS generated by artificial stone. Appendix B is non-mandatory, and the changes to it do not create any additional obligations nor detract from any existing obligation.

REFERENCE TO COMPARABLE FEDERAL REGULATION [GC §11346.2(c)]

The federal Occupational Safety and Health Administration (OSHA) regulations specific to silica 29 CFR section 1910.1053 are identical to their existing counterpart in section 5204 of the California Code of Regulations, title 8. These title 8 regulations were adopted pursuant to Labor Code section 142.3(a)(3), which applies to title 8 regulations that are identical to the corresponding federal regulation, except for changes in formatting.

Other federal OSHA regulations, such as those governing respiratory protection (29 Code of Federal Regulations (CFR) section 1910.134), sanitation and washing facilities (29 CFR section 1910.141), and PPE (29 CFR sections 1910.132, 1910.133 and 1910.138), are similar to their counterpart regulations in title 8 (Figure 5).

Figure 5. Federal and California regulations pertaining to silica protections.

| Industry | Title 29 Code of Federal Regulations Section | Title 8 California Code of Regulations Section |
|------------------|--|--|
| Construction | 1926.1153 - Respirable crystalline silica. | 1532.3. Occupational Exposures to Respirable Crystalline Silica. |
| General Industry | 1910.1053 - Respirable crystalline silica. | 5204. Occupational Exposures to Respirable Crystalline Silica. |

| | | |
|---|--|--|
| Ship Building, Ship Repairing and Ship Breaking | 1915.1053 - Respirable crystalline silica. | 5204. Occupational Exposures to Respirable Crystalline Silica. |
|---|--|--|

This proposal amends existing section 5204 such that it differs from, and is more protective than, the corresponding federal regulations listed above. Federal OSHA regulations do not include specific and comprehensive requirements to address the extreme danger presented by artificial stone.

ECONOMIC IMPACT ASSESSMENT

A cost-benefit analysis cannot be used as a basis for adopting an occupational safety and health standard. In *American Textile Manufacturers Institute, Inc. v. Donovan* (1981),⁶⁶ the U.S. Supreme Court held that:

Congress itself defined the basic relationship between costs and benefits by placing the “benefit” of worker health above all other considerations save those making attainment of this “benefit” unachievable. Any standard based on a balancing of costs and benefits by the Secretary that strikes a different balance than that struck by Congress would be inconsistent with the command set forth in §6(b)(5) [section (6)(b)(5) of the Occupational Safety and Health Act of 1970]. (*Am. Textile Mfrs. Inst., Inc. v. Donovan* (1981) 452 U.S. 490, 509.)

Labor Code section 144.6 is nearly identical to section (6)(b)(5) of the federal Occupational Safety and Health Act. In addition, section 142.3 requires California occupational safety and health regulations to be at least as effective as federal regulations, so the cost-benefit balance established by the U.S. Congress must be observed in establishing California occupational safety and health regulations.

EVIDENCE SUPPORTING FINDING OF NO SIGNIFICANT STATEWIDE ADVERSE ECONOMIC IMPACT DIRECTLY AFFECTING BUSINESSES [GC §§ 11346.2(b)(5)(A) and 11346.3].

With the exception of new requirements related to communicating with employees, reporting and recordkeeping, for which costs are negligible, the proposal affects a small number of businesses that engage in “high-exposure trigger tasks” on artificial stone and certain natural stones (primarily countertop fabricators) that are exceptionally dangerous to their employees. The Board has determined that this proposal will not result in a significant, statewide adverse economic impact directly affecting businesses/individuals, including the ability of California businesses to compete with businesses in other states. The proposed regulation is unlikely to have a significant impact on the expansion of businesses currently operating in California. While

⁶⁶ *American Textile Mfrs. Inst., Inc. v. Donovan*, 452 U.S. 490 (1981). 452 U.S. 490.
<https://supreme.justia.com/cases/federal/us/452/490/>

the proposed regulation will require new and existing stone fabrication businesses to invest in engineering controls and personal protective equipment to prevent RCS exposures among employees, it is also expected to substantially reduce the number of silicosis cases in California. This in turn will reduce the costs associated with medical care, lost wages and benefits, lost lifetime productivity, and pain and suffering resulting from premature disability and death caused by silicosis and other RCS-attributable diseases, all of which are borne by employees, their families, employers, insurers, and public benefits programs.

Over 10 years, the expected costs of the proposed regulation to businesses are \$106.5 million. Annual benefits are expected to increase slowly from \$0.7 million in year one to \$95.7 million by year ten, reaching a total of \$492 million over the 10-year period. This does not include all indirect costs avoided that result from lost wages and benefits, lost lifetime productivity, and pain and suffering.

Thus, the economic impact on California businesses is a net positive, resulting from (1) reduced pain and suffering among employees and their families associated with disease, disability, and premature death for those affected, directly or indirectly, by silicosis and other RCS-attributable diseases; and (2) reduced direct and indirect costs for medical care, lost wages and benefits, and lost lifetime productivity that are currently borne by employers, insurers, employees, their families, and public benefits programs

Total number of affected businesses

The Board estimates that 841 fabrication shops will be affected by the proposed regulation. These shops together employ 4,955 employees.

DERIVATION

In 2023, CDPH's OHB conducted an online search to identify artificial stone fabrication shops in the state.⁶⁷ CDPH used information from Reference Solutions, an internet-based reference service available by subscription through the Government Division of Data Axle. CDPH conducted the search for stone fabrication shops using the Standard Industrial Classification (SIC) and North American Industry Classification System (NAICS) codes listed in Figure 6.

Figure 6. Industry Codes Used to Identify Stone Fabricators

| Industry Code | Description |
|----------------------|----------------------------------|
| 6-digit SIC Codes | |
| 5712-13 | Countertops |
| 5032-04 | Granite (Wholesale) |
| 3281-01 | Granite Products (Manufacturing) |

⁶⁷ Based on communication between CDPH and DIR.

| | |
|---------------------|--|
| 1741-06 | Marble Contractors |
| 5032-02 | Marble - Natural |
| 8-digit NAICS Codes | |
| 423320-29 | Marble - Natural (Wholesale) |
| 327991-06 | Marble Products - Natural (Manufacturing) |
| 423320-24 | Granite (Wholesale) |
| 423320-28 | Marble - Cultured (Wholesale) |
| 327991-04 | Granite Products (Manufacturing) |
| 238140-05 | Marble Contractors |
| 238140-16 | Stone Installation Services - Natural Granite/Marble |
| 444180-75 | Kitchen Counters (Retail) |
| 444180-45 | Marble - Natural (Retail) |

Based on OHB's search, the total number of establishments likely to be impacted by the proposed regulation is shown in Figure 7. We acknowledge that the total number of impacted establishments may be higher than the estimate provided in Figure 7 because some shops operate informally and do not have a web presence. The size of this informal economy in the stone fabrication sector is unknown.

Figure 7. Number of Affected Private Sector Establishments by Industry

| NAICS Code | Industry Name | Affected Establishments |
|--------------|--|-------------------------|
| 238140 | Masonry Contractors | 58 |
| 238340 | Tile & Terrazzo Contractors | 70 |
| 327991 | Cut Stone & Stone Product Manufacturing | 139 |
| 337110 | Wood Kitchen Cabinet & Countertop Manufacturing | 197 |
| 423320 | Brick, Stone, & Related Construction Material Merchant Wholesalers | 368 |
| -- | Other | 9 |
| Total | | 841 |

Source: Based on California Department of Public Health analysis of Reference Solutions data, as of October 2023.

Note: "Other" includes a small subset of Other Building Material Dealers (NAICS 444180) and Residential Remodelers (NAICS 236118).

Total number of affected small businesses

In its analysis of the California stone fabrication industry, CDPH identified the number of employees at each of the 841 facilities and found that 816 (97%) are small businesses. These small businesses employ 4,080 employees. Of the remaining 3% of shops, eight (1%) have 100 or more employees, and 16 (2%) have between 50 and 99 employees.

DERIVATION

Government Code §11346.3 defines small businesses as those having fewer than 100 employees that are not dominant in their field and are independently owned and operated. Based on the information collected by CDPH, approximately 0.9% of stone fabrication shops have 100 or more employees. An additional two percent of stone fabrication shops have between 50 and 99 employees, some of which appear to be affiliated with other establishments or are owned or operated by firms with multiple business locations. Several smaller shops also appear to be affiliated with at least one other business entity, but there is limited information on their ownership structure or whether such entities are dominant in their field.

Based on this information, we estimate that there are about 816 small businesses impacted by the proposed regulation ($841 \times 97.1\% = 816$), which together employ 4,080 employees. About 25 large businesses will be affected, which employ 875 employees. We acknowledge that the number of small businesses may be higher because informal businesses not captured by OHB's web search are most likely small businesses.

Estimated costs of implementation

For the 841 total fabrication shops, the Board estimated the total costs of the proposed regulation by deriving and aggregating total upfront costs, recurring costs, labor costs, and medical costs, which include requirements pertaining to medical surveillance and medical removal. We estimate that the total cost of implementation in the first year of the regulation is \$23.4 million, and the cumulative 10-year cost is \$106.5 million (Figure 8). The annual average cost for all 841 shops over the period 2024 to 2033 ranges from \$8.6 million to \$23.4 million, with a 10-year annual average of \$10.6 million.

This estimation assumes that 45% of both small and large fabrication shops are currently using effective wet methods on a consistent basis, based on a recent study which reported that only 45% of patients with confirmed or suspected silicosis reported using water suppression for dust mitigation.⁶⁸ The remaining 55% of stone fabrication shops will have to implement or increase the use of wet methods, while also adopting the additional worker protections noted above. Given these assumptions, the Board estimates that approximately 449 small fabrication shops ($816 \times 55\% = 449$) and 14 large fabrication shops ($25 \times 55\% = 14$) will need to implement wet methods. These establishments are estimated to have approximately 2,735 workers exposed to RCS ($449 \times 5 + 14 \times 35 = 2,735$).

⁶⁸ Fazio J, Gandhi S, Flattery J, Heinzerling A, Kamangar N, Afif N, Cummings K, Harrison R. Silicosis Among Immigrant Engineered Stone (Quartz) Countertop Fabrication Workers in California. *JAMA Internal Medicine*. July 24, 2023. Accessed at <https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2807615> on August 16, 2023.

The total cost per small shop of the proposed revisions depends on whether the shop already uses wet methods. Based on the findings of Fazio et al (2023), we assumed that 367 (45%) of the 816 small shops currently use wet methods.⁶⁹ The cost of implementing the proposed revisions in the first year for each of these shops is therefore estimated at \$13,300. The remaining 449 (55%) small shops that do not already use wet methods will need to invest in these technologies in the first year of the regulation. The cost of implementing the proposed revisions in the first year for each of these shops is therefore 2.4 times greater, estimated at \$31,900. Over ten years, the average annual cost for each small shop that already uses wet methods is \$4,400, whereas the average annual cost for each shop that currently does not use wet methods is \$16,800.

Figure 8. Total Annual and Ten-year Costs Due to the Proposed Regulation, by Establishment and Industry Total

| Establishments | Small fabrication shops currently using wet methods | Small fabrication shops not using wet methods | Large fabrication shops currently using wet methods | Large fabrication shops not currently using wet methods | Total Industry costs (\$M) | | |
|---------------------|---|---|---|---|----------------------------|-------------|---------|
| Number of Shops | 367 | 449 | 11 | 14 | | | |
| Year | Average Cost Per Shop | | | | Small Shops | Large Shops | Total |
| 2024 | \$13,300 | \$31,900 | \$85,300 | \$234,000 | \$19.2 | \$4.2 | \$23.4 |
| 2025 | \$3,410 | \$18,300 | \$20,500 | \$107,000 | \$9.4 | \$1.7 | \$11.2 |
| 2026 | \$3,410 | \$18,200 | \$20,500 | \$107,000 | \$9.4 | \$1.7 | \$11.1 |
| 2027 | \$3,410 | \$14,700 | \$20,500 | \$56,900 | \$7.9 | \$1.0 | \$8.9 |
| 2028 | \$3,410 | \$14,500 | \$20,500 | \$56,800 | \$7.8 | \$1.0 | \$8.8 |
| 2029 | \$3,410 | \$14,400 | \$20,500 | \$56,600 | \$7.7 | \$1.0 | \$8.7 |
| 2030 | \$3,410 | \$14,200 | \$20,500 | \$56,400 | \$7.6 | \$1.0 | \$8.6 |
| 2031 | \$3,410 | \$14,100 | \$20,500 | \$56,300 | \$7.6 | \$1.0 | \$8.6 |
| 2032 | \$3,410 | \$14,000 | \$20,500 | \$56,300 | \$7.6 | \$1.0 | \$8.6 |
| 2033 | \$3,410 | \$14,000 | \$20,500 | \$56,200 | \$7.5 | \$1.0 | \$8.6 |
| Total | \$44,000 | \$168,000 | \$269,000 | \$844,000 | \$91.7 | \$14.8 | \$106.5 |
| Average Annual Cost | \$4,400 | \$16,800 | \$26,900 | \$84,400 | \$9.2 | \$1.5 | \$10.6 |

Note: Average cost is rounded to three significant digits.

⁶⁹ Fazio J, Gandhi S, Flattery J, Heinzerling A, Kamangar N, Afif N, Cummings K, Harrison R. Silicosis Among Immigrant Engineered Stone (Quartz) Countertop Fabrication Workers in California. *JAMA Internal Medicine*. July 24, 2023. Accessed at <https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2807615> on August 16, 2023.

DERIVATION

Recurring costs include operating costs incurred to ensure capital equipment runs smoothly and performs as intended. The list of identified recurring costs includes respirator cleaning kits, replacement filters for respirators, and HEPA filters for vacuums.⁷⁰ For respirators, we assumed that each employee will require one respirator cleaning kit per year and approximately eight PAPR filters per year at replaced once every 4-6 weeks.

The proposed regulation will result in increased demand for water for shops that are not currently using wet methods. Based on average water utility rates for California as of July 2023, nonresidential metered service, the estimated cost of water use is \$0.007 per gallon.⁷¹

There are two approaches shops can use to manage their water resources: they can implement recycling procedures to minimize their water usage, or they can avoid installing recycling systems and use a constant stream of water by draining the used water to a sewer system. Based on industry input provided to Cal/OSHA, shops will use approximately 100 gallons of water per day if they install sufficient recycling procedures. Otherwise, this analysis assumes a constant rate of water flow to a typical home garden hose, which is between nine and 17 gallons per minute.⁷² We assumed constant water use for eight hours a day. We assumed that large fabrication shops will install water recycling systems, which will generate sufficient cost savings on water usage to offset the installation costs over time.

We estimate that only about 20% of small fabrication shops will purchase water recycling systems, while the remainder will send used water to sewer systems. Large shops are expected to discharge about 100 gallons per day into sewer systems, resulting in negligible industrial wastewater discharge fees.

Since many fabrication shops also provide installation services, we assumed that employees will engage in silica dust-producing activities (e.g., cutting, grinding and polishing) requiring water usage for three days each week, on average, with two days each week for preparation and installation activities. Therefore, we estimated typical water usage of approximately 780,000 gallons per year for a small shop.⁷³ Assuming water recycling, we estimate the average cost for

⁷⁰ Based on industry input, there are commonly used wet/dry blades available on the market and the average costs for wet and dry cutting blades are similar. Therefore, this analysis did not estimate an incremental cost associated with switching from dry cutting blades to wet cutting blades.

⁷¹ Based on average rates from California Water Service. Accessed at <https://www.calwater.com/rates/> on November 28, 2023.

⁷² Based on industry sources, for example, see Swan, *The Flow Rate of a Garden Hose*, blog (undated). Accessed at <https://swanhose.com/blogs/all-about-hoses/the-flow-rate-of-a-garden-hose-explained-swanhose> on November 28, 2023.

⁷³ Typical water usage costs for small fabrication shops are calculated as follows: 13 gallons/minute × 60 minutes per hour × 8 hours per day × 260 working days per year × 3/5 days per week with water usage × 80% of small shops + 100 gallons/day × 260 working days per year × 3/5 days per week with water usage × 20% of small shops.

a large shop based on using 100 gallons per day multiplied by $\frac{2}{3}$ of 260 working days per year, or approximately 110,000 gallons per year. Therefore, the estimated incremental cost of water use is approximately \$5,500 for a small shop and \$760 for a large shop. Figure 10 reports the average annual recurring costs for small and large shops.

Figure 10. Cost Assumptions and Annual Recurring Costs for Materials

| Recurring Cost | Average Unit Cost | Average Quantity | | Total Cost per Establishment | |
|--|-------------------|------------------------|------------------------|------------------------------|------------------------|
| | | Small fabrication shop | Large fabrication shop | Small fabrication shop | Large fabrication shop |
| Establishments Not Using Wet Methods (55% or 463 fabrication shops) | | | | | |
| Respirator cleaning kit | \$40 | 5 | 35 | \$200 | \$1,400 |
| Respirator replacement filter | \$64 | 40 | 280 | \$2,560 | \$17,920 |
| HEPA filters (for vacuum) | \$24 | 1 | 2 | \$24 | \$48 |
| Water use | \$0.007/gallon | 781,872 | 109,200 | \$5,473 | \$764 |
| Businesses Currently Using Wet Methods (45% or 378 fabrication shops) | | | | | |
| Respirator cleaning kit | \$39 | 5 | 35 | \$195 | \$1,365 |
| Respirator replacement filter | \$64 | 40 | 280 | \$2,560 | \$17,920 |
| HEPA filters (for vacuum) | \$24 | 1 | 2 | \$24 | \$48 |

Note: Unit cost estimates are based on an average of various cost estimates from industry sources, including listed and manufacturer’s suggested retail prices. Multiplying the average cost per firm by the number of small and large shops, respectively, yields the total estimated industry recurring costs.

Costs for small businesses (<100 employees)

The total cost per small shop of the proposed revisions depends on whether the shop already uses wet methods. 367 (45%) of 816 small shops currently use wet methods, so the cost of implementing the proposed revisions in the first year for each of these shops is estimated at \$13,300. The remaining 449 (55%) small shops that do not already use wet methods will need to invest in these technologies in the first year of the regulation. The cost of implementing the proposed revisions in the first year for each of these shops is therefore 2.4 times greater, estimated at \$31,900. Over ten years, the average annual cost for each small shop that already uses wet methods is \$4,400, whereas the average annual cost for each shop that currently does not use wet methods is \$16,800. (See Figure 8).

Costs for typical businesses (≥100 employees)

As with small shops, the total cost per large shop of the proposed revisions depends on whether the shop already uses wet methods. Eleven (45%) of the 25 large shops currently use wet methods, so the cost of implementing the proposed revisions in the first year for each of these shops is estimated at \$85,300. The remaining 14 (55%) large shops that do not already use wet methods will need to invest in these technologies in the first year of the regulation. The cost of implementing the proposed revisions in the first year for each of these shops is therefore 2.7 times greater, estimated at \$234,000. Over ten years, the average annual cost for each large shop that already uses wet methods is \$26,900, whereas the average annual cost for each shop that currently does not use wet methods is \$84,400. (See *Figure 8*).

Share of total costs for general industry versus construction

The proposed regulation applies only to general industry, not to construction. Construction is covered by CCR title 8, §1532.3 of the Construction Safety Orders, Occupational Exposures to Respirable Crystalline Silica (https://www.dir.ca.gov/title8/1532_3.html).

Costs for state and local agencies

Does not affect state or local agencies.

REASONABLE ALTERNATIVES TO THE PROPOSAL AND THE BOARD'S REASONS FOR REJECTING THOSE ALTERNATIVES [GC §11346.2(b)(4)(A)]

Based on in-person and remote meetings with representatives of the stone fabrication industry and artificial stone manufacturing industry, the Board considered two alternatives to the current proposal. Alternative #1 would limit the proposal to two requirements – (1) using wet methods when fabricating artificial stone (subsection (f)(2)(A)), and (2) authorizing the Division to shut down fabricators that do not use wet methods (subsection (g)(1)).

Alternative #1 would exclude all the other protective measures included in the proposal, such as housekeeping, respiratory protection, additional medical surveillance, medical removal, additional training, and reporting of silicosis. This would reduce the impact on small businesses of the proposed regulation. This alternative was rejected because of the following:

- Studies from the Georgia Institute of Technology and NIOSH noted above show that wet methods vary significantly in their effectiveness and, in many cases, are ineffective at reducing RCS exposures to safe levels. This alternative would rely entirely on the efficacy of wet methods in preventing worker exposures to RCS.
- Because wet methods are not necessarily protective, effective respiratory protection is also needed when workers perform tasks with artificial stone, even when water is used during those tasks. This alternative would not allow for improvements in respiratory protection.
- A substantial portion of harmful exposures result from disturbing debris and dust on floors and other surfaces after the stone product is fabricated. This problem exists even where wet cutting is used, as the dust and debris dry out quickly. This alternative would

not allow for improvements in housekeeping and procedures that are necessary to prevent RCS exposures.

- Most occupational silicosis cases in California are not diagnosed or reported and most workers with occupational silicosis do not receive workers' compensation. This alternative would not allow for improvements in the medical surveillance provisions of section 5204, nor would it allow for the proposed medical removal requirements. Medical surveillance and medical removal increase the likelihood that workers with various stages of silicosis will be identified early, properly diagnosed and reported, and then protected from subsequent exposure to RCS.

Alternative #2 would prohibit the cutting, grinding, and polishing of artificial stone. This would constitute a de facto ban on fabrication of artificial stone in California. Alternative #2 was rejected because of the following:

- It could incentivize the creation of illegal fabrication shops that are hidden from regulators. These shops would likely continue to use unsafe methods and endanger their employees.
- It would incentivize out-of-state fabrication to adjacent states where more protective methods are not in place.
- If the prohibition applied only to general industry, it could result in an increase in the amount of onsite fabrication performed at construction sites, where its use would not be prohibited under the construction safety orders.

BENEFITS OF THE PROPOSED ACTION

What benefits can be anticipated from this rulemaking? [GC §11346.2(b)(1) and (§11346.3(b)(1)(D)].

In general, the proposed changes to section 5204 will reduce worker exposures to RCS; make compliance clearer and more straightforward for employers; and improve the efficiency of Cal/OSHA's compliance program by:

1. Defining specific high-exposure trigger tasks that require special exposure protections;
2. Removing air monitoring requirements as a prerequisite for employers to implement RCS exposure prevention measures;
3. Removing existing provisions that give employers opportunities to declare that RCS exposure prevention measures are infeasible;
4. Removing existing provisions that allow employers to rely on "objective data" to avoid implementing RCS exposure prevention measures;
5. Providing clarity on tasks that are expressly prohibited;
6. Updating the signage in "regulated areas" to convey the risk of death from RCS exposure;
7. Providing clarity on engineering and work practice controls that are expressly required;

8. Providing procedures for training employees on the risks of exposure to RCS, the causes of silicosis, and how to implement protections in the workplace;
9. Requiring effective respiratory protection, even when engineering controls are in place; and
10. Providing a means for Cal/OSHA to quickly identify RCS hazards and efficiently stop certain operations in a shop, or shut down the shop itself, pending abatement of those hazards.

For these reasons, the proposed regulation is expected to substantially reduce the number of silicosis cases in California. This in turn will reduce the costs associated with medical care, lost wages and benefits, lost lifetime productivity, and premature disability and death that result from silicosis, all of which are borne by employees, their families, employers, insurers, and public benefits programs.

Thus, the benefits of the proposed changes to section 5204 are two-fold:

- 1) Non-monetary benefits, including a reduction in the pain and suffering associated with disease, disability, and premature death for those affected, directly or indirectly, by silicosis and other RCS-attributable diseases; and
- 2) Monetary benefits, including lowered costs to employers, insurers, employees, their families and public benefits programs.

Quantifying the benefits of fatal and non-fatal disease cases avoided.

As described above, the Board estimates that 816 small fabrication shops and 25 large fabrication shops will need to implement the use of personal protective equipment and engineering controls to protect the safety and health of employees. These businesses have approximately 4,955 employees at risk of exposure to RCS.

To quantify the potential benefits of the proposed rule, we relied on exposure profiles (see Figure 11) and risk models (Figure 12) to estimate the number of cases of premature death and illness that could be avoided with the proposed regulation. To do this, we estimated the expected number of fatal and non-fatal disease cases expected to occur in the stone fabrication industry under current conditions, with the existing silica standard in place. We then subtracted the expected number of cases estimated to occur under the proposed regulation, assuming that the proposed regulation will reduce RCS exposure levels among fabrication workers to the AL of 25 $\mu\text{g}/\text{m}^3$.

Figure 11. Exposure Profile of Affected Workers

| Measure | 8-hour TWA RCS Dust Concentration ($\mu\text{g}/\text{m}^3$) | | | | | Total |
|---------|--|-------|--------|---------|------|-------|
| | <25 | 25-50 | 50-100 | 100-250 | >250 | |

| | | | | | | |
|---|-------|-------|-------|-------|-------|-------|
| Percent of Workers at Risk | 63.8% | 11.2% | 13.2% | 7.9% | 3.9% | 100% |
| Median baseline exposure ($\mu\text{g}/\text{m}^3$) | 8.5 | 35.2 | 72.0 | 184.0 | 435.0 | -- |
| Number of Employees at Risk | 3,162 | 554 | 652 | 391 | 196 | 4,955 |

Source: Surasi et al. (2022).

Figure 12. Estimated Number of Fatal and Nonfatal Illnesses in the Baseline and at the AL per 1,000 Workers (over 45 years)

| | 8-hour TWA RCS dust concentration ($\mu\text{g}/\text{m}^3$) | | | | |
|---|--|-------|--------|---------|---------|
| | <25 | 25-50 | 50-100 | 100-250 | >250 |
| Average Exposure for deriving disease rates ($\mu\text{g}/\text{m}^3$) | 8.5 | 35 | 72 | 184 | 435 |
| Baseline risk | Cases per 1,000 workers | | | | |
| Fatalities, Lung cancer | 7.5 | 14.4 | 23.1 | 61.6 | 261.9 |
| Fatalities, ESRD | 21.8 | 35.9 | 45.2 | 60.1 | 77.0 |
| Fatalities, LDOC, ~25% attributable to silicosis | 9.5 | 33.6 | 65.4 | 152.8 | 306.5 |
| Non-fatal silicosis | 11.1 | 31.5 | 115.2 | 939.6 | 1,000.0 |
| Post-regulation risk, assuming exposure at the AL (25 $\mu\text{g}/\text{m}^3$) | Cases per 1,000 workers | | | | |
| Fatalities, Lung cancer | -- | 12.0 | 12.0 | 12.0 | 12.0 |
| Fatalities, ESRD | -- | 32.0 | 32.0 | 32.0 | 32.0 |
| Fatalities, LDOC, ~25% attributable to silicosis | -- | 24.5 | 24.5 | 24.5 | 24.5 |
| Non-fatal silicosis | -- | 21.2 | 21.2 | 21.2 | 21.2 |

Notes:

ESRD = End-stage renal disease

LDOC = Lung disease other than cancer

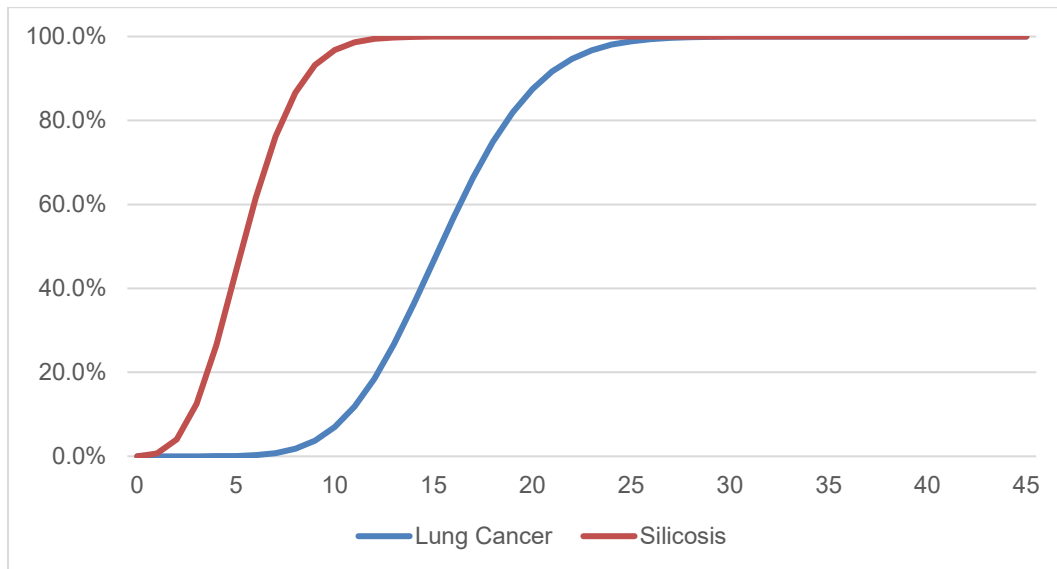
This assumption is based on Cal/OSHA inspection data showing that many stone fabrication workers are already working in conditions at or below the AL (see Figure 4, p. 12). Input from the industry suggests that, when used properly, wet methods can reduce the average silica dust concentration to the AL; however, studies noted above under subsection (h), Respiratory Protection (pp. 25-26) by the Georgia Institute of Technology and NIOSH have shown that wet methods vary significantly in their effectiveness and, in many cases, are ineffective at reducing RCS exposures.

To understand the benefits of the regulation, it's important to understand that the health benefits for workers of the lower RCS exposures will not occur immediately. Many silica-related diseases have a long latency period. For example, OSHA estimates there is a 15-year latency

period for lung cancer associated with exposures to RCS.⁷⁴ The full impact of the proposed regulation would therefore not be realized for many years. The greatest beneficiaries of the proposed regulation would be younger workers entering the workforce after the adoption of the proposed regulation. While older workers will have experienced silica exposures at higher levels over their working years, they too will still benefit from the new safety measures that employers will have to implement due to the proposed regulation.

To capture this latency effect, we applied a discrete probability distribution, using a cumulative Poisson distribution, with a mean value of 15 years for lung cancer and a mean value of 5 years for all other diseases, including silicosis, given the emerging evidence from the artificial stone industry. This analysis suggests that it will take about 25 years for lung cancer and 10 years for silicosis before realizing the full benefits of the proposed regulation. Figure 13 describes this pattern, showing that at about 25 years following implementation of the proposed regulation, a new steady state will be reached. In the new steady state, we assume that the regulation will have reduced exposures to the AL.

Figure 13. Cumulative Poisson Distribution for Lung Cancer and Silicosis (over 45 years) Following Implementation of the Proposed Regulation.



The steady-state level of benefits would be achieved in about 10 years for silicosis and 25 years for lung cancer. Figure 14 summarizes the financial benefits of the proposed regulation over the first ten years, showing average annual savings of \$49 million and a ten-year total of \$492

⁷⁴ U.S. Occupational Safety and Health Administration, “Final Economic Analysis and Final Regulatory Flexibility Analysis: Supporting Document for the Final Rule for Occupational Exposure to Respirable Crystalline Silica,” in Occupational Safety and Health Administration, “Occupational Exposure to Respirable Crystalline Silica: Final Rule,” Federal Register, Vol. 81, No. 58, March 24, 2016 § VII.

million. Benefits accrue each year as the number of disease cases and fatalities prevented accumulates. The longer-term benefits beyond 10 years continue to grow because of costs avoided from the reduction in fatal and non-fatal disease cases over several decades.

Figure 14. Estimated Savings in Health Expenditures from the Proposed Regulation, 2024-2033

| Year | Health Benefits (\$M) | | Total Benefits (\$M) |
|-------------------------|-------------------------|-----------------------------|----------------------|
| | Avoided Fatal Illnesses | Avoided Non-fatal Illnesses | |
| 2024 | \$0.3 | \$0.3 | \$0.7 |
| 2025 | \$1.9 | \$2.1 | \$3.9 |
| 2026 | \$5.8 | \$6.3 | \$12.1 |
| 2027 | \$12.3 | \$13.5 | \$25.8 |
| 2028 | \$20.5 | \$22.4 | \$42.9 |
| 2029 | \$28.7 | \$31.3 | \$60.0 |
| 2030 | \$35.6 | \$38.7 | \$74.3 |
| 2031 | \$40.7 | \$44.0 | \$84.7 |
| 2032 | \$44.2 | \$47.3 | \$91.5 |
| 2033 | \$46.5 | \$49.1 | \$95.7 |
| Total | \$236.6 | \$254.9 | \$491.6 |
| Average per year | \$23.7 | \$25.5 | \$49.2 |

Will the rulemaking affect the creation or elimination of jobs or businesses within the state?
 [GC §11346.3(b)(1)(A and B)].

The estimated jobs created or eliminated are negligible relative to the size of the California workforce because only 841 shops are affected by the proposed revisions. Some fabrication shops will likely choose to close rather than comply with the proposed new requirements, and others may be required to close, pending abatement of hazards identified by Cal/OSHA. Both of these effects would result in job loss, though again this effect is negligible. On the other hand, employers who comply with the new requirements will likely be able to expand operations as non-compliant businesses are forced to close. The increased demand for capital equipment (such as tools that operate effectively with water, HEPA vacuums, water recycling, and plumbing systems) and personal protective equipment could benefit jobs in other sectors, but again, the effect is small, and some of this demand will likely be met through purchases from out-of-state manufacturers.

Will the rulemaking affect the expansion of businesses currently doing business within the state? [GC §11346.3(b)(1)(C)].

The proposed revisions to section 5204 could result in some smaller stone fabrication shops closing, which could result in consolidation in the industry toward larger shops with the resources to invest in the safety improvements that will be required under the proposed revisions. This will affect a relatively small number of establishments.

In general, the estimated impact of the proposed regulation on the demand for goods and services is minimal relative to the size of the California economy. The increased demand for capital equipment and personal protective equipment may benefit some businesses in other sectors; again, however, this effect is small and some of the demand will be met through purchases from out-of-state manufacturers. The increased demand for health assessments and periodic examinations may have a minor impact on healthcare providers in California; however, health services would only be required, on average, for fewer than 3,000 workers per year.

Will the rulemaking benefit the health and welfare of California residents, worker safety, and the state's environment? [GC §11346.3(b)(1)(D)].

The proposed changes to section 5204 will directly and substantially benefit the health and safety of nearly 5,000 California workers by protecting them from exposure to the uniquely toxic RCS that is produced while working with artificial stone. This will help prevent, and eventually eliminate, the disabling and often fatal effects of RCS-attributable diseases, including silicosis, lung cancer, end stage renal disease, and others.

ADVISORY COMMITTEE

This proposal is based on the silica Emergency Temporary Standard (ETS), which went into effect on December 29, 2023. The ETS was developed with the assistance of an advisory committee, which met on August 9, 2023. An advisory committee convened on **[insert date]** evaluated many of the changes that are now proposed herein for the permanent silica standard.

FIRE PREVENTION STATEMENT

This proposal does not include fire prevention or protection standards. Therefore, approval of the State Fire Marshal pursuant to Government Code Section 11359 or Health and Safety Code Section 18930(a)(9) is not required.

SPECIFIC TECHNOLOGY OR EQUIPMENT

[GC §§ 11340.1(a); 11346.2(b)(1); 11346.2(b)(4)(A)]

The proposed changes to section 5204 require the use of specific technologies to suppress dust while employees cut, grind, polish, or otherwise work with artificial stone, if it contains more than 0.1% silica, or natural stone if it contains more than 10% silica. This technology includes wet methods that are applied to the surface of the stone while tasks are being conducted and wet methods or vacuum cleaners equipped with HEPA filters to collect wastes, dust, residue, and debris that is generated from such tasks. This requirement is necessary because these technologies suppress dust during these operations and therefore protect employees from exposure to respirable crystalline silica.

The existing section 5204 is a performance standard that has been ineffective at protecting employees in the stone fabrication industry from exposure to RCS. This is evidenced by the following: (1) Cal/OSHA's 2019 Special Emphasis Program, which found 72% of employers to be out of compliance with section 5204; (2) the findings of Fazio et al (2023), which reports that only 45% of artificial stone fabrication workers with silicosis reported using wet methods to control RCS exposures; and (3) the April 2023 report from the CDPH Occupational Health Branch that the number of known silicosis cases among workers in this industry had increased from 100 in December 2023 to 127 in April, a 27% increase over a period of four months, and that three additional deaths had occurred from silicosis, for a total of 13, along with 16 workers who had received lung transplants.

While a performance-based approach could be implemented successfully by larger, well-resourced employers, this approach is not well-calibrated to the needs of the small businesses that make up the stone fabrication industry, and the highly hazardous conditions faced by employees in this industry. A more prescriptive approach is needed to protect these employees by providing explicit requirements for their employers.

In addition, requiring specific respiratory protective equipment is necessary because studies 46 have demonstrated that engineering controls are necessary but not sufficient to prevent employee exposure to RCS, even when they are operating properly. As noted above, in studies conducted by the Georgia Institute of Technology and NIOSH, wet methods are highly variable in their effectiveness, and in some cases they are ineffective at reducing RCS exposure levels to the AL or even the PEL. As such, the proposed changes also require the use of specific respiratory protection technologies, including a full-face, tight-fitting PAPR, or a respirator providing equal or greater protection with a HEPA, N100, R100, or P100 filter. Engineering controls can also become ineffective over time if they are not properly maintained or operated. In this case, respiratory protection adds a layer of protection to prevent exposure to RCS. Certain exceptions are allowed if an employer can demonstrate through representative air monitoring conducted at least every six months that employee exposures to RCS are continuously maintained below the action level.

**TECHNICAL, THEORETICAL, AND/OR EMPIRICAL STUDIES,
REPORTS, OR DOCUMENTS RELIED ON BY THE BOARD**

[GC §11346.2(b)(3)]

The Board has relied upon the following documents as part of the proposed changes to section 5204:

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These documents are available for review BY APPOINTMENT Monday through Friday, from 8:00 a.m. to 4:30 p.m., at the Standards Board's office at 2520 Venture Oaks Way, Suite 350, Sacramento, California 95833. Appointments can be scheduled via email at oshsb@dir.ca.gov or by calling (916) 274-5721.