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DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29 CFR Parts 1915 and 1926

[Docket No. OSHA–H005C–2006–0870]

RIN 1218–AD29

Occupational Exposure to Beryllium and Beryllium Compounds in Construction and Shipyard Sectors

AGENCY: Occupational Safety and Health Administration (OSHA), Labor.

ACTION: Proposed rule; request for comments and notice of public hearing

SUMMARY: OSHA is proposing to revise the standards for occupational exposure to beryllium and beryllium compounds in the construction and shipyards industries. These proposed changes are designed to accomplish three goals: to more appropriately tailor the requirements of the construction and shipyards standards to the particular exposures in these industries in light of partial overlap between the beryllium standards' requirements and other OSHA standards; to aid compliance and enforcement across the beryllium standards by avoiding inconsistency, where appropriate, between the shipyards and construction standards and proposed revisions to the general industry standard; and to clarify certain requirements with respect to materials containing only trace amounts of beryllium. This proposal would lead to total annualized cost savings of \$2.5 million at a 3 percent discount rate over 10 years; at a discount rate of 7 percent over 10 years, the annualized cost savings would be \$2.5 million. OSHA has preliminarily determined that these proposed changes would maintain safety and health protections for workers, while

facilitating compliance with the standards and yielding some cost savings. This proposal does not affect the general industry beryllium standard.

DATES: *Written Comments:* Written comments on this NPRM must be submitted (postmarked, sent, or received) by [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] in Docket Number OSHA-H005C-2006-0870. Comments on the information collection determination described in Section VI of the preamble (OMB Review under the Paperwork Reduction Act of 1995) may be submitted (postmarked, sent, or received) by [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] in Docket Number OSHA-2019-0006. OSHA will consider comments on the information collection determination submitted in either docket, but requests that commenters submit relevant comments to Docket Number OSHA-2019-0006.

Informal Public Hearing: The agency will hold an informal public hearing on Tuesday, December 3, 2019, in the Frances Perkins Building, U. S. Department of Labor, 200 Constitution Avenue, NW, Washington, DC 20210. The hearing will begin at 9:30 a.m. and OSHA expects the hearing to last until 5:30 p.m., ET. A schedule will be released prior to the start of the hearings and may be amended at the discretion of the presiding administrative law judge (ALJ).

Notice of Intention to Appear at the Hearing: Interested persons who intend to present testimony or question witnesses at the hearing must submit (transmit, send, postmark, deliver) a notice of intention to appear by [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] in Docket No. OSHA-H005C-2006-0870.

Hearing Testimony and Documentary Evidence: Interested persons who request more than 10 minutes to present testimony or intend to submit documentary evidence at the hearing must submit (transmit, send, postmark, deliver) the full text of their testimony and all documentary evidence by [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] in Docket No. OSHA-H005C-2006-0870.

ADDRESSES: *Written Comments:* You may submit written comments, notices of intention to appear, written hearing testimony, and documentary evidence, identified by Docket No. OSHA-H005C-2006-0870 for the NPRM and Docket No. OSHA-2019-0006 for the information collection determination, by any of the following methods:

Electronically: Submit comments and attachments, as well other information, electronically at <http://www.regulations.gov>, which is the Federal e-Rulemaking Portal. Follow the instructions online for submitting comments. After accessing “all documents and comments” in the docket (OSHA-H005C-2006-0870 for the NPRM or OSHA-2019-0006 for the information collection determination), check the “proposed rule” box in the column headed “Document Type,” find the document posted on the date of publication of this document, and click the “Comment Now” link. When uploading multiple attachments into Regulations.gov, please number all of your attachments because www.Regulations.gov will not automatically number the attachments. This will be very useful in identifying all attachments in the rule. For example, Attachment 1—title of your document, Attachment 2—title of your document, Attachment 3—title of your document. Specific instructions on uploading all documents are found in the Frequently Asked Questions portion and the Commenter’s Checklist on Regulations.gov.

Facsimile: OSHA allows fax transmission of comments that are 10 pages or fewer in length (including attachments). Fax these documents to the OSHA Docket Office at (202) 693-1648.

Regular mail, express delivery, hand delivery, and messenger (courier) service: Submit comments and any additional material to the OSHA Docket Office, Docket No. OSHA-H005C-2006-0870 for the NPRM or Docket No. OSHA-2019-0006 for the information collection determination, Occupational Safety and Health Administration, U.S. Department of Labor, Room N-3653, 200 Constitution Avenue NW, Washington, DC 20210; telephone: (202) 693-2350. OSHA's TTY number is (877) 889-5627. Contact the OSHA Docket Office for information about security procedures concerning delivery of materials by express delivery, hand delivery, and messenger service. The Docket Office will accept deliveries (express delivery, hand delivery, messenger service) during the Docket Office's normal business hours, 10:00 a.m. to 3:00 p.m., ET.

Instructions: All submissions must include the agency name and the docket number for this rulemaking (Docket No. OSHA-H005C-2006-0870 for the NPRM or Docket No. OSHA-2019-0006 for the information collection determination). All comments, including any personal information you provide, are placed in the public docket without change and may be made available online at <http://www.regulations.gov>. Therefore, OSHA cautions commenters about submitting statements they do not want made available to the public, or submitting comments that contain personal information (either about themselves or others), such as Social Security Numbers, birthdates, and medical data.

Docket: To read or download comments, notices of intention to appear, and other materials submitted in response to this *Federal Register* document, go to Docket No. OSHA-H005C-2006-0870 for the NPRM or Docket No. OSHA-2019-0006 for the information collection determination at <http://www.regulations.gov> or to the OSHA Docket Office at the above address. All comments and submissions are listed in the <http://www.regulations.gov> index; however, some information (e.g., copyrighted material) is not publicly available to read or download through that website. All comments and submissions are available for inspection and, where permissible, copying at the OSHA Docket Office.

Electronic copies of this *Federal Register* document are available at <http://www.regulations.gov>. Copies also are available from the OSHA Office of Publications; telephone (202) 693-1888. This document, as well as news releases and other relevant information, is also available at OSHA's website at <http://www.osha.gov>.

Citation Method: In the docket for the beryllium rulemaking, found at <http://www.regulations.gov>, every submission was assigned a document identification (ID) number that consists of the docket number (OSHA-H005C-2006-0870) followed by an additional four-digit number. For example, the document ID number for OSHA's Preliminary Economic Analysis and Initial Regulatory Flexibility Analysis is OSHA-H005C-2006-0870-0426. Some document ID numbers include one or more attachments (see, e.g., Document ID OSHA-H005C-2006-0870-2142).

When citing exhibits in the docket, OSHA includes the term "Document ID" followed by the last four digits of the document ID number, the attachment number or other attachment identifier, if necessary for clarity, and page numbers (designated "p." or

“Tr.” for pages from a hearing transcript). In a citation that contains two or more document ID numbers, the document ID numbers are separated by semicolons.

FOR FURTHER INFORMATION CONTACT:

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Copies of this Federal Register document and news releases: Electronic copies of these documents are available at OSHA's webpage at *https://www.osha.gov*.

SUPPLEMENTARY INFORMATION:

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Amendments to Standards

I. Background

On January 9, 2017, OSHA published the final rule *Occupational Exposure to Beryllium and Beryllium Compounds* in the *Federal Register* (82 FR 2470-2757).

Subsequently, on June 27, 2017, OSHA proposed to revoke the ancillary provisions for both construction and shipyards adopted in the January 9, 2017, final rule and to retain the new lower PEL of 0.2 $\mu\text{g}/\text{m}^3$ and STEL of 2.0 $\mu\text{g}/\text{m}^3$ for those sectors (82 FR 29182).¹ OSHA discussed in the proposal its consideration of extending the compliance dates in the January 9, 2017, final rule by a year for the construction and shipyard standards. OSHA reasoned that this potential extension would give affected employers additional time to come into compliance with the final rule's requirements, which could be warranted by the uncertainty created by the proposal. OSHA also stated in the proposal that it would not enforce the construction and shipyard standards without further notice while the rulemaking was underway.² OSHA provided a sixty-day comment period and received over 70 unique comments in response to this proposal.

On May 7, 2018, OSHA issued a direct final rule (DFR) adopting a number of clarifying amendments to address the application of the beryllium standard for general industry to materials containing trace amounts of beryllium (83 FR 19936). The DFR amended the text of the general industry standard to clarify OSHA's intent with respect to

¹ For a full discussion of the events leading to the proposed rule, see the preamble to the 2017 NPRM (82 FR at 29185-88).

² Subsequently, in March 2018, OSHA stated that it would begin enforcing the PEL and STEL on May 11, 2018 (see Memorandum for Regional Administrators, Delay of Enforcement of the Beryllium Standards under 29 CFR 1910.1024, 29 CFR 1915.1024, and 29 CFR 1926.1124, Mar. 2, 2018, available at: <https://www.osha.gov/laws-regs/standardinterpretations/2018-03-02>).

certain terms in the standard, including the definition of beryllium work area, the definition of emergency, and the meaning of the terms dermal contact and beryllium contamination. The DFR also clarified OSHA's intent with respect to provisions for disposal and recycling and with respect to provisions that the agency intended to apply only where skin can be exposed to materials containing at least 0.1% beryllium by weight. The DFR became effective on July 6, 2018, because OSHA did not receive significant adverse comment in response to the DFR (see 83 FR 31045 (7/3/18)).

On June 1, 2018, OSHA published a proposal to extend the compliance date for certain ancillary requirements of the general industry beryllium standard, from March 12, 2018, to December 12, 2018 (83 FR 25536). OSHA proposed an extension of the compliance date for the following provisions in the general industry standard: beryllium work areas and regulated areas (paragraph (e)), written exposure control plans (paragraph (f)(1)), personal protective clothing and equipment (paragraph (h)), hygiene areas and practices (paragraph (i) except for change rooms and showers), housekeeping (paragraph (j)), communication of hazards (paragraph (m)), and recordkeeping (paragraph (n)). OSHA reasoned that: (1) it planned to propose modifications to ancillary provisions of the beryllium general industry standard in response to stakeholder questions and concerns; (2) it would be undesirable for both the agency and the regulated community to begin enforcement of the ancillary provisions of the standard that would be affected by the upcoming rulemaking; (3) enforcing compliance with the relevant ancillary requirements, as currently written, before publishing the agreed-upon proposal, would likely result in employers taking unnecessary measures to comply with provisions that OSHA intended to clarify; and (4) the proposed compliance date extension would give

OSHA time to prepare and publish the planned substantive general industry NPRM to amend the standard before employers were required to comply with the affected provisions of the rule. At that point OSHA could rely on its de minimis policy and allow employers the option of complying with the proposed provisions of the substantive NPRM without risk of a citation. OSHA adopted the extension of the compliance dates, as proposed, on August 9, 2018 (83 FR 39351).

On December 11, 2018, OSHA published the substantive NPRM to modify several of the general industry beryllium standard's definitions, along with the provisions for methods of compliance, personal protective clothing and equipment, hygiene areas and practices, housekeeping, medical surveillance, communication of hazards, and recordkeeping (83 FR 63746). OSHA reasoned that the proposed modifications would provide clarification and simplify or improve compliance.

In a document published September 30, 2019, OSHA issued a final rule extending the compliance dates for the construction and shipyards ancillary provisions by one year from the publication date of the final and reaffirming the significant risk findings from the January 9, 2017, final rule (84 FR 51377). In this notice of proposed rulemaking, OSHA is considering relevant comments to the June 2017 construction and shipyards proposal, as well as general industry stakeholder input that led to the 2018 DFR and 2018 substantive NPRM, to propose revisions to the ancillary provisions of the construction and shipyard standards that are tailored to these sectors. While OSHA will consider comments on the June 2017 proposal to the extent they continue to be relevant in this rulemaking, OSHA requests that stakeholders, including those who commented on the

June 2017 proposal, also comment on the proposed revisions to the ancillary provisions in this proposal.

OSHA consulted with the Advisory Committee on Construction Safety & Health (ACCSH) regarding this proposal on September 9, 2019. ACCSH recommended that OSHA proceed with the proposal to “revise the beryllium standard for construction to ensure that the ancillary provisions are tailored to the construction industry and align with the general industry standard, where appropriate,” and unanimously recommended that OSHA do so as soon as possible. OSHA will publish meeting minutes and copies of materials presented to the Committee in the ACCSH docket at <https://www.regulations.gov/docket?D=OSHA-2018-0012>.

II. Pertinent Legal Authority

The purpose of the Occupational Safety and Health Act of 1970 (“the OSH Act” or “the Act”), 29 U.S.C. 651 et seq., is “to assure so far as possible every working man and woman in the Nation safe and healthful working conditions and to preserve our human resources.” 29 U.S.C. 651(b). To achieve this goal, Congress authorized the Secretary of Labor to promulgate occupational safety and health standards pursuant to notice and comment rulemaking. See 29 U.S.C. 655(b). An occupational safety or health standard is a standard “which requires conditions, or the adoption or use of one or more practices, means, methods, operations, or processes, reasonably necessary or appropriate to provide safe or healthful employment and places of employment.” 29 U.S.C. 652(8).

The Act also authorizes the Secretary to “modify” or “revoke” any occupational safety or health standard, 29 U.S.C. 655(b), and under the Administrative Procedure Act, regulatory agencies generally may revise their rules if the changes are supported by a

reasoned analysis, see *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 42 (1983). “While the removal of a regulation may not entail the monetary expenditures and other costs of enacting a new standard, and accordingly, it may be easier for an agency to justify a deregulatory action, the direction in which an agency chooses to move does not alter the standard of judicial review established by law.” *Id.* at 43.

The Act provides that in promulgating health standards dealing with toxic materials or harmful physical agents, such as the January 9, 2017, final rule regulating occupational exposure to beryllium, the Secretary must set the standard which most adequately assures, to the extent feasible, on the basis of the best available evidence, that no employee will suffer material impairment of health or functional capacity even if such employee has regular exposure to the hazard dealt with by such standard for the period of his working life. 29 U.S.C. 665(b)(5). The Supreme Court has held that before the Secretary can promulgate any permanent health or safety standard, he must make a threshold finding that significant risk is present and that such risk can be eliminated or lessened by a change in practices. See *Indus. Union Dept., AFL-CIO v. Am. Petroleum Inst.*, 448 U.S. 607, 641-42 (1980) (plurality opinion) (“Benzene”). OSHA need not make additional findings on risk for this proposal because OSHA previously determined that the beryllium standard addresses a significant risk, see 82 FR 2545-52, and reaffirmed that finding in the rule finalizing the 2017 shipyards and construction proposal, the final rule published September 30, 2019. See *Pub. Citizen Health Research Grp. v. Tyson*, 796 F.2d 1479, 1502 n.16 (D.C. Cir. 1986) (rejecting the argument that OSHA must “find that each and every aspect of its standard eliminates a significant risk”).

OSHA standards must also be both technologically and economically feasible. See *United Steelworkers v. Marshall*, 647 F.2d 1189, 1248 (D.C. Cir. 1980) (“Lead I”). The Supreme Court has defined feasibility as “capable of being done.” *Am. Textile Mfrs. Inst. v. Donovan*, 452 U.S. 490, 509-10 (1981) (“Cotton Dust”). The courts have further clarified that a standard is technologically feasible if OSHA proves a reasonable possibility, “within the limits of the best available evidence, . . . that the typical firm will be able to develop and install engineering and work practice controls that can meet the [standard] in most of its operations.” *Lead I*, 647 F.2d at 1272. With respect to economic feasibility, the courts have held that “a standard is feasible if it does not threaten massive dislocation to or imperil the existence of the industry.” *Id.* at 1265 (internal quotation marks and citations omitted).

OSHA exercises significant discretion in carrying out its responsibilities under the Act. Indeed, a number of terms of the statute give OSHA wide discretion to devise means to achieve the congressionally mandated goal of ensuring worker safety and health. See *Lead I*, 647 F.2d at 1230. Thus, where OSHA has chosen some measures to address a significant risk over other measures, those challenging the OSHA standard must “identify evidence that their proposals would be feasible and generate more than a de minimis benefit to worker health.” *N. Am. ’s Bldg. Trades Unions v. OSHA*, 878 F.3d 271, 282 (D.C. Cir. 2017).

Although OSHA is required to set standards “on the basis of the best available evidence,” 29 U.S.C. 655(b)(5), its determinations are “conclusive” if supported by “substantial evidence in the record considered as a whole,” 29 U.S.C. 655(f). Similarly, as the Supreme Court noted in *Benzene*, OSHA must look to “a body of reputable

scientific thought” in making determinations, but a reviewing court must “give OSHA some leeway where its findings must be made on the frontiers of scientific knowledge.” *Benzene*, 448 U.S. at 656. When there is disputed scientific evidence in the record, OSHA must review the evidence on both sides and “reasonably resolve” the dispute. *Tyson*, 796 F.2d at 1500. The “possibility of drawing two inconsistent conclusions from the evidence does not prevent the agency’s finding from being supported by substantial evidence.” *N. Am.’s Bldg. Trades Unions*, 878 F.3d at 291 (quoting *Cotton Dust*, 452 U.S. at 523) (alterations omitted). As the D.C. Circuit has noted, where “OSHA has the expertise we lack and it has exercised that expertise by carefully reviewing the scientific data,” a dispute within the scientific community is not occasion for the reviewing court to take sides about which view is correct. *Tyson*, 796 F.2d at 1500.

Finally, because section 6(b)(5) of the Act explicitly requires OSHA to set health standards that eliminate risk “to the extent feasible,” OSHA uses feasibility analysis rather than cost-benefit analysis to make standards-setting decisions dealing with toxic materials or harmful physical agents (29 U.S.C. 655(b)(5)). An OSHA standard in this area must be technologically and economically feasible—and also cost effective, which means that the protective measures it requires are the least costly of the available alternatives that achieve the same level of protection—but OSHA cannot choose an alternative that provides a lower level of protection for workers’ health simply because it is less costly. See *Int’l Union, UAW v. OSHA*, 37 F.3d 665, 668 (D.C. Cir. 1994); see also *Cotton Dust*, 452 U.S. at 514 n.32. In *Cotton Dust*, the Court explained 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. The court further stated that 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 section 6(b)(5). *Cotton Dust*, 452 U.S. at 509. Thus, while OSHA estimates the costs and benefits of its proposed and final rules, partly in accordance with Executive Orders 12866 and 13771, these calculations do not form the basis for the agency’s regulatory decisions.

III. Summary and Explanation of the Proposed Rule

The following discussion summarizes and explains the changes OSHA is proposing to the beryllium standards for construction and shipyards and the rationale for each proposed change.

The 2017 final rule promulgated three standards designed to protect workers from the serious health effects caused by occupational exposure to beryllium and beryllium compounds (see 82 FR 2470 (Jan. 9, 2017)). The three standards, which cover general industry (29 CFR 1910.1024), construction (29 CFR 1926.1124), and shipyards (29 CFR 1915.1024), each contains a comprehensive set of protections, consisting of the exposure limits in paragraph (c) and a number of ancillary provisions, typical of OSHA health standards, in paragraphs (d) through (n) (see 82 FR at 2476). The ancillary provisions encompass requirements for exposure assessment, competent person (construction) or regulated areas (shipyards), methods of compliance, respiratory protection, personal protective clothing and equipment, hygiene, housekeeping, medical surveillance and medical removal, communication of hazards, and recordkeeping (29 CFR 1915.1024(d)-(n); 29 CFR 1926.1124(d)-(n)).

Since the publication of the 2017 final rule, OSHA has sought to revise the beryllium standards in a number of separate rulemakings. Those bearing on this proposal include: (1) the June 27, 2017, construction and shipyards proposal (82 FR at 29182); (2) the May 7, 2018, general industry DFR (83 FR at 19936); and (3) the December 11, 2018, general industry proposal (83 FR at 63746) (see Section I, Background, above for more details). In light of the comments OSHA received on these rulemakings, and other information the agency received following the publication of the 2017 final rule, OSHA is proposing revisions to several paragraphs of the beryllium standards for construction and shipyards.

OSHA has preliminarily determined that, taken together, the limited exposures in the construction and shipyards industries and the partial overlap between the beryllium standards and other OSHA standards make revisions to both the construction and shipyards beryllium standards appropriate. The rationales for these proposed revisions fall into three categories. First, OSHA is proposing to remove or modify some provisions which—although appropriate in the general industry context—may be unnecessary or require revision to appropriately protect employees in the construction and shipyards industries. As will be explained further below, operations with beryllium exposure in the construction and shipyards industries are significantly less varied and employees are exposed to materials with significantly lower content beryllium than in the general industry sector. In addition, employees in these industries receive the protections of several other OSHA standards, as the agency explained both in the June 27, 2017, construction and shipyards proposal and in the final rule published September 30, 2019.

Second, OSHA is proposing to revise some provisions of the construction and shipyard standards to avoid inconsistencies with the clarifying changes the agency proposed in the December 11, 2018, general industry proposal. OSHA seeks to align these standards to the extent possible because the agency believes that, where there is no substantive difference among industries with respect to a particular provision, applying similar requirements across industries aids both compliance and enforcement. Conversely, applying different requirements to identical situations may lead to confusion. While most of the proposed changes in the December 2018 proposed rule were designed specifically for general industry, OSHA is proposing to align changes to paragraph (b), medical definitions; paragraph (k), medical surveillance; and paragraph (n), recordkeeping for workers' Social Security Numbers (SSNs) (83 FR at 63746), because the rationale underlying these proposed changes applies equally in the construction and shipyards contexts.

Third, OSHA is proposing to revise certain paragraphs of the construction and shipyard standards to address the application of provisions related to dermal contact to materials containing beryllium in trace quantities. In the general industry DFR, OSHA clarified that provisions triggered by dermal contact with beryllium or beryllium contamination would apply only for dust, fumes, mists, or solutions containing beryllium in concentrations greater than or equal to 0.1 percent by weight (83 FR at 19939). OSHA's rationale regarding this final set of proposed changes dates back to the agency's August 7, 2015, beryllium NPRM (which led to the 2017 final rule) (80 FR at 47565). Therein, OSHA proposed to exempt materials containing less than 0.1% beryllium by weight on the premise that workers exposed only to beryllium as a trace contaminant are

not exposed at levels of concern (80 FR at 47775). However, the agency noted evidence of high airborne exposures in construction and shipyard sectors, in particular during blasting operations and cleanup of spent media (80 FR at 47733). Therefore, OSHA proposed for comment several regulatory alternatives, including an alternative that would expand the scope of the proposed standard to also include all operations in general industry where beryllium exists only as a trace contaminant (80 FR at 47730) and an alternative that would expand the scope to include employers in the shipyard and maritime sectors (80 FR at 47777).

In the 2017 final rule, after considering stakeholders' comments, OSHA decided to apply the exemption for materials containing less than 0.1% beryllium by weight only where the employer has objective data demonstrating that employee exposure to airborne beryllium will remain below the action level of $0.1 \mu\text{g}/\text{m}^3$, measured as an 8-hour TWA, under any foreseeable conditions (82 FR at 2643). OSHA noted that the action level exception ensured that workers with airborne exposures of concern were covered by the standard. OSHA agreed with the many commenters and hearing testimony expressing concern that hazardous exposures to beryllium can occur with materials containing trace amounts of beryllium. While the agency acknowledged concerns expressed by ABMA and EEI that processing materials with trace amounts of beryllium may not necessarily produce significant exposures to beryllium, evidence in the record showed significant exposures in some operations using materials with trace amounts of beryllium. OSHA explicitly identified abrasive blasting as one such operation. The agency determined that preventing airborne exposures at or above the action level, even to trace amounts of

beryllium, reduces the risk of beryllium-related health effects to workers (82 FR at 2643; *see also* 82 FR at 2552).

While adopting this limited exemption for trace materials, OSHA also adopted the regulatory alternative expanding the scope of the rule to include both construction and shipyards, but recognized that these sectors had limited operations that generated airborne exposures to beryllium of concern and issued separate standards for these sectors.

Nonetheless, OSHA applied similar ancillary requirements across the general industry, construction, and shipyards beryllium standards. At the same time, the agency acknowledged that different approaches may be warranted for some provisions in construction and shipyards than for general industry due to the nature of the materials and work processes typically used in those industries (82 FR at 2690). Specifically, exposures to beryllium in construction and shipyards are limited to only a few operations, primarily abrasive blasting in construction and shipyards and some welding operations in shipyards (see Document ID 2042, FEA Chapter III, pp. 103-11 and Table III-8e). While the extremely high airborne exposures during the blasting operation can expose workers to beryllium in excess of the PEL, the blasting materials contain only trace amounts of beryllium (materials such as coal slag normally contain approximately 11 µg/g or 0.0001 percent) (Document ID 2042, Chapter IV, Technological Feasibility, Table IV.69). Furthermore, the rulemaking record contains evidence of beryllium exposure during only limited welding operations in shipyards (only 4 of 127 sample results showed detectable levels of airborne beryllium) (Document ID 2042, Chapter IV, Technological Feasibility, p. IV-580).

As the regulatory history above suggests, OSHA intended to protect employees working with trace beryllium when those employees experience significant airborne exposures. OSHA did not intend for provisions aimed at protecting workers from the effects of dermal contact to apply in the case of materials containing only trace amounts of beryllium in the absence of significant airborne beryllium exposure. For this reason, OSHA clarified in the general industry DFR that provisions triggered by dermal contact with beryllium or beryllium contamination would apply only for dust, fumes, mists, or solutions containing beryllium in concentrations greater than or equal to 0.1 percent by weight (83 FR at 19939). In construction and shipyards, where beryllium exposure occurs almost exclusively from materials that contain beryllium in concentrations less than or equal to 0.1 percent by weight, OSHA is now proposing to remove provisions triggered by dermal contact or beryllium contamination entirely.

Additionally, although limited welding operations in shipyards may include base materials or fume containing more than 0.1 percent beryllium by weight, OSHA has reason to believe that skin or surface contamination is not an exposure source of concern in these operations. A 2007 study by Cole indicated that the beryllium content of beryllium-aluminum alloy welding fume samples was lower than expected given the beryllium content of the base metal (see Document ID 0885, p. 685).³ OSHA therefore believes the amount of beryllium oxide to form on the surface of materials being welded in shipyards is likely far lower than would be expected based solely on the percentage of

³ The alloy examined by Cole et al. contained .0007 percent beryllium. As the study explained, “[b]ecause of its higher reactivity, beryllium should readily oxidize and be present in the weld fume. However, all results from this filler alloy showed beryllium emissions of $<0.2 \mu\text{g}/\text{m}^3$ even though the concentration of particulate matter exceeded $600 \text{ mg}/\text{m}^3$.” Applying the 0.0007 percent beryllium content of the alloy to the $600 \text{ mg}/\text{m}^3$ of the particulate generated yields an expected $4.2 \mu\text{g}/\text{m}^3$ of beryllium in the welding fume, about thirty times the observed quantity of less than $0.2 \mu\text{g}/\text{m}^3$. (Document ID 0855, pp. 684-85).

beryllium in the base metal. OSHA therefore expects that skin or surface contamination from beryllium dust, fumes, mists, or solutions in concentrations of 0.1 percent by weight or more is unlikely to result from the welding operations for beryllium/aluminum alloys sometimes found in shipyards. While OSHA is proceeding on this assumption for purposes of this proposal, the agency specifically requests comments and data on the potential for skin and surface contamination from materials containing more than 0.1 percent beryllium by weight in shipyard welding operations.

Based on the foregoing, OSHA is proposing a number of revisions to the beryllium standards for construction and shipyards. These revisions apply to the following: paragraph (b), definitions; paragraph (f), methods of compliance; paragraph (g), respiratory protection; paragraph (h), personal protective equipment (PPE); paragraph (i), hygiene areas and practices; paragraph (j), housekeeping; paragraph (k), medical surveillance; paragraph (m), communication of hazards; and paragraph (n), recordkeeping. The remainder of this summary and explanation provides detail on these proposed changes, including the agency's reasoning for each.

Paragraph (b) Definitions

Paragraph (b) of the beryllium standards for both construction and shipyards provides definitions of terms used in the beryllium regulatory text. OSHA is proposing to modify several existing definitions: *CBD diagnostic center*, *chronic beryllium disease (CBD)*, and *confirmed positive*; to add a definition of *beryllium sensitization*; and to eliminate the definition of *emergency*. All proposed changes to paragraph (b) would apply to both the construction and shipyards standards.

OSHA is proposing to modify the definitions of *CBD diagnostic center*, *chronic beryllium disease (CBD)*, and *confirmed positive* and add a definition of *beryllium sensitization* to align with changes the agency has proposed to the beryllium standard for general industry. OSHA proposed these modifications for the general industry standard in December 2018 to clarify the meaning of the terms used in that standard (83 FR at 63747). OSHA provided a sixty-day comment period for the general industry proposal, which closed on Feb. 11, 2019. OSHA's rationale for including these definitions applies equally in the construction and shipyards contexts. Accordingly, OSHA will consider the comments that were submitted in response to the proposed changes to definitions in the general industry standard along with any comments received during this rulemaking on the proposed definitions in determining whether to finalize the proposed definitions in the construction and shipyards standards. The comments to the general industry proposal can be found in Docket OSHA-2018-0003 at <http://regulations.gov>.

Beryllium sensitization. OSHA is proposing to add a definition for *beryllium sensitization* that encompasses the following concepts: that beryllium sensitization is a response in the immune system of a specific individual who has been exposed to beryllium; that there are no associated physical or clinical symptoms and no illness or disability with beryllium sensitization alone, but the response that occurs through beryllium sensitization can enable the immune system to recognize and react to beryllium; and finally that while not every beryllium-sensitized person will develop CBD, beryllium sensitization is essential for development of CBD. The agency is proposing to add this definition in order to provide additional clarification of other provisions in the standard, such as the definitions of *chronic beryllium disease (CBD)*

and *confirmed positive* and the provisions for medical surveillance (paragraph (k)) and hazard communication (paragraph (m)). This proposed revision is identical to the change proposed in the December 2018 general industry proposal and serves the same purpose (see 83 FR at 63747). The proposed addition of a definition for *beryllium sensitization* would not change employer obligations under paragraphs (k) and (m) and would not affect employee protections.

As OSHA determined in the 2017 final rule, after an individual has been sensitized, subsequent beryllium exposures via inhalation can progress to serious lung disease through the formation of granulomas and fibrosis (82 FR at 2491-98). Since the pathogenesis of CBD involves a beryllium-specific, cell-mediated immune response, CBD cannot occur in the absence of sensitization (NAS, 2008, Document ID 1355). Therefore, the proposed definition explaining that beryllium sensitization is essential for development of CBD is consistent with the agency's findings in the final rule.

In response to the December 2018 general industry proposal, several commenters expressed support for OSHA's inclusion of a definition of beryllium sensitization in the beryllium general industry standard, including National Jewish Health (NJH) (Document ID OSHA-2018-0003-0022, p. 2), the United Steelworkers (USW) (Document ID OSHA-2018-0003-0033, p. 1), Materion (Document ID OSHA-2018-0003-0038, p.8), the US Department of Defense (DoD) (Document ID OSHA-2018-0003-0029, p.1), and Edison Electric Institute (EEI) (Document ID OSHA-2018-0003-0031, p. 2). Two commenters agreed with OSHA's proposed definition with no changes (Document ID OSHA-2018-0003-0033, p. 1; 0038, p. 2).

While OSHA received no objections to including a definition of beryllium sensitization in the beryllium standard for general industry, The National Supplemental Screening Program (NSSP), a U.S. Department of Energy Former Worker Medical Screening Program and NJH recommended alternative text for the definitions (Document ID OSHA-2018-0003-0027 p. 1; 0022, p. 2; see also Document ID 0364, pp. 1, 44). Other commenters had concerns about specific statements in the definition (Document ID OSHA-2018-0003-0033, p. 1; 0027, p.1). As stated above, OSHA will consider these comments along with any comments submitted during this rulemaking in determining whether to finalize the proposed definition in the construction and shipyards standards.

CBD diagnostic center. OSHA is proposing to amend the definition of *CBD diagnostic center* to clarify certain requirements used to qualify an existing medical facility as a CBD diagnostic center. The proposed clarification would not change the employer requirement to offer a follow-up examination at a CBD diagnostic center to employees meeting the criteria set forth in paragraph (k)(2)(ii). OSHA is proposing *CBD diagnostic center* to mean a medical diagnostic center that has a pulmonologist or pulmonary specialist on staff and on-site facilities to perform a clinical evaluation for the presence of CBD. The proposed definition also states that a CBD diagnostic center must have the capacity to perform pulmonary function testing (as outlined by the American Thoracic Society criteria), bronchoalveolar lavage (BAL), and transbronchial biopsy. In the proposed definition, the CBD diagnostic center must also have the capacity to transfer BAL samples to a laboratory for appropriate diagnostic testing within 24 hours and the pulmonologist or pulmonary specialist must be able to interpret the biopsy pathology and the BAL diagnostic test results.

As discussed in the December 2018 general industry proposal (83 FR at 63747), the proposed definition includes the following changes to the current definition of *CBD diagnostic center*. First, the agency is proposing changing the language to reflect the agency's intent that pulmonologists or pulmonary specialists be on staff at a CBD diagnostic center. Whereas the current definition specifies only that a CBD diagnostic center must have a pulmonary specialist, OSHA is proposing to add the term "pulmonologist" to clarify that either type of specialist is qualified to perform a clinical evaluation for the presence of CBD. Additionally, the current definition states that a CBD diagnostic center has an on-site specialist. OSHA is proposing to change the language to state that a CBD diagnostic center must have a pulmonologist or pulmonary specialist on staff, rather than on site, to clarify that such specialists need not necessarily be on site at all times.

An additional proposed change to *CBD diagnostic center* would clarify that the diagnostic center must have the capacity to do any of the listed tests that the examining physician may deem necessary. As currently written, the definition could be misinterpreted to mean that any clinical evaluation for CBD performed at a CBD diagnostic center must include pulmonary testing, bronchoalveolar lavage, and transbronchial biopsy. The agency's intent is not to dictate what tests a specialist should include, but to ensure that any facility has the capacity to perform any of these tests, which are commonly needed to diagnose CBD. Therefore, the agency is proposing to modify part of the current definition from "[t]his evaluation must include pulmonary function testing..." to "[t]he CBD diagnostic center must have the capacity to perform pulmonary function testing..." These changes to the definition of *CBD diagnostic center*

are clarifying in nature, and OSHA expects they would maintain safety and health protections for workers.

OSHA received comments on this definition during the December 2018 general industry rulemaking. Materion submitted comments supporting OSHA's intent to specify the required capacities of a CBD diagnostic center, rather than the contents of a CBD evaluation, in the definition of *CBD diagnostic center* (Document ID OSHA-2018-0003-0038, pp. 16-17). NJH expressed concern that this change to the definition may indicate that the clinical evaluation for CBD need not include certain aspects of a CBD evaluation, which NJH, the Association of Occupational and Environmental Clinics (AOEC), and the ATS recommend should typically include full pulmonary function testing (lung volumes, spirometry, and diffusion capacity for carbon monoxide), chest imaging, and cardiopulmonary exercise testing, and may also include bronchoscopy in some cases (Document IDs OSHA-2018-0003-0022, p. 3; 0028, p. 2; 0021, pp. 1-2). OSHA will consider these comments, along with any comments submitted during this rulemaking, in developing the final beryllium standards for construction and shipyards.

Chronic beryllium disease (CBD). For the purposes of this standard, the agency is proposing *chronic beryllium disease* to mean a chronic granulomatous lung disease caused by inhalation of airborne beryllium by an individual who is beryllium-sensitized. The proposed definition includes several changes to the current definition of *chronic beryllium disease*.

First, OSHA proposes to add the term "granulomatous" to the phrase "lung disease" to better distinguish CBD from other occupationally associated chronic pulmonary diseases of inflammatory origin. A granulomatous lung formation is a focal

collection of inflammatory cells (e.g., T-cells) creating a nodule in the lung (Ohshimo et al., 2017, Document ID OSHA-H005C-2006-0870-2171, p. 2). The formation of the type of lung granuloma specific to a beryllium immune response can only occur in those with CBD (82 FR at 2492-2502).

An additional proposed clarification to the definition of *chronic beryllium disease* would change “associated with airborne exposure to beryllium” to “caused by inhalation of airborne beryllium.” This proposed change would be more consistent with the findings in the 2017 final rule that indicate beryllium is the causative agent for CBD and that CBD only occurs after inhalation of beryllium (82 FR at 2513). A further proposed change includes the addition of “by an individual who is beryllium sensitized.” This proposed change would clarify OSHA’s finding that beryllium sensitization is essential in the development of CBD (82 FR at 2492).

In response to the December 2018 general industry proposal, NJH, USW, and Materion agreed with OSHA that the 2017 final standard’s definition of *chronic beryllium disease* should be clarified (Document ID OSHA-2018-0003-0022, p. 2; 0033, p. 5; 0038, p. 17). However, some commenters expressed concern that the proposed definition of *chronic beryllium disease* does not provide sufficient information to guide diagnosis of CBD, and specifically that OSHA’s emphasis on the role of sensitization in the development of CBD may confuse diagnostic efforts (Document ID OSHA-2018-0003-0021, pp. 4-5; 0023, p. 2). Other commenters suggested alternative language for the definition of CBD (OSHA-2018-0003-0027, pp. 3-4; 0022, p. 2). OSHA will consider these comments, along with any comments submitted during this rulemaking, in developing the final beryllium standards for construction and shipyards.

Confirmed positive. OSHA is proposing to modify the definition of *confirmed positive* to mean that an employee has had two abnormal BeLPT test results, an abnormal and a borderline test result, or three borderline test results obtained within the 30 day follow-up test period required after a first abnormal or borderline BeLPT test result. It also means the result of a more reliable and accurate test indicating a person has been identified as having beryllium sensitization. The proposed definition includes several changes to the current definition of *confirmed positive*.

First, OSHA is proposing to remove the phrase “beryllium sensitization” from the first part of the definition, which currently states that the person tested has beryllium sensitization, as indicated by two abnormal BeLPT test results, an abnormal and a borderline test result, or three borderline test results. The proposed change would emphasize OSHA’s intent that *confirmed positive* should act as a trigger for continued medical monitoring and surveillance for the purposes of this standard and is not intended as a scientific or general-purpose definition of beryllium sensitization.

The term *confirmed positive* originates from a study that described the findings from a large-scale interlaboratory testing scheme (Stange et al., 2004; Document ID 1402). Stange et al. demonstrated that when samples with abnormal findings from one lab were retested in a second lab, the reliability of the results increased. As OSHA discussed in the preamble to the 2017 final rule, individuals who are confirmed positive through two abnormal BeLPT test results, an abnormal and a borderline, or three borderlines may be at risk for developing CBD (82 FR at 2646). OSHA intends the term *confirmed positive* in the beryllium standards to identify those individuals who may be at risk for developing CBD and should therefore be offered continued medical surveillance,

an evaluation at a CBD diagnostic center, and medical removal protection, regardless of whether they might otherwise be identified as “sensitized.”

The next proposed change to *confirmed positive* would include clarification that the findings of two abnormal, one abnormal and one borderline, or three borderline results need to occur within the 30-day follow-up test period required after a first abnormal or borderline BeLPT test result. After publication of the 2017 final rule, stakeholders suggested to OSHA that the definition of *confirmed positive* could be interpreted as meaning that findings of two abnormal, one abnormal and one borderline, or three borderline results over any time period, even as long as 10 years, would result in the employee being confirmed positive. This was not the agency’s intent. Such a timeframe may lead to false positives and thereby not enhance employee protections. Therefore, OSHA is proposing a clarification that any combination of test results specified in the definition must result from the tests conducted in one 30-day cycle of testing, including the initial test and the retesting offered when an initial result is a single abnormal result or borderline, in order to be considered confirmed positive.

As outlined in paragraph (k)(3)(ii)(E), an employee must be offered a follow-up BeLPT within 30 days if the initial test result is anything other than normal, unless the employee has been confirmed positive (e.g., if the initial BeLPT was performed on a split sample and showed two abnormal results). Thus, for example, if an employee’s initial test result is abnormal, and the result of the follow-up testing offered to confirm the initial test result is abnormal or borderline, the employee would be confirmed positive. But if the result of the follow-up testing offered to confirm the initial abnormal test result is normal, the employee would not be confirmed positive. The initial abnormal result and a

single abnormal or borderline result obtained from the next required BeLPT for that employee (typically, two years later) would not identify that employee as confirmed positive under the proposed definition of that term. OSHA requests comments on the appropriateness of this proposed time period for obtaining BeLPT test samples that could be used to determine whether an employee is confirmed positive.

Some commenters on the December 2018 general industry NPRM agreed with OSHA's proposed definition of *confirmed positive* (OSHA-2018-0003-0033, p. 5; 0038, p. 17-19), while other commenters expressed concerns over several aspects of the definition. OSHA received comments on the removal of the term "beryllium sensitized" from the definition (Document ID OSHA-2018-000-0022; p. 4; 0021, p. 3; 0028, p. 2; 0027, p. 3). OSHA also received several comments regarding OSHA's proposal to require that the test results specified in the agency's definition of confirmed positive must occur within a single testing cycle. These comments focused on several aspects of the proposed timing. First, many of the comments focused on the logistics of OSHA's proposed change (Document ID 0038, p. 17; 0022, p. 4; 0021, p. 4; 0024, p.1; 0033, p. 5; 0027, p. 3). Secondly, stakeholders commented on the appropriateness of limiting the use of the BeLPT from one test cycle in determining if a worker is confirmed positive (Document ID OSHA 2018-0003-0022, p. 4; 0021, p. 4; 0023, p. 2; 0027, pp 2-3; and 0024, p. 1). OSHA will consider these comments, along with any comments submitted during this rulemaking, in developing the final beryllium standards for construction and shipyards.

Finally, OSHA is proposing to remove the term *emergency* from paragraph (b) of the standards for construction and shipyards. As discussed later in this section, unlike general industry, OSHA has preliminarily determined that the construction and shipyards

industries—where beryllium occurs primarily in trace quantities and exposure occurs during abrasive blasting and welding operations—do not have emergencies in which exposures to beryllium will differ from the normal conditions of work. Therefore, OSHA has preliminarily determined that no requirements should be triggered for emergencies in construction and shipyards. Accordingly, OSHA is proposing to remove references to emergencies in provisions such as medical surveillance and hazard communication (see the summary and explanation of paragraphs (k) and (m)). Because OSHA is proposing to remove the term emergency from the standard, the definition is no longer needed. OSHA welcomes comment on the proposed removal of the definition of *emergency* from the beryllium standards for construction and shipyards.

Paragraph (f) Methods of compliance

Paragraph (f) of the beryllium standards for construction and shipyards, like the corresponding general industry provision (29 CFR 1910.1024(f)), requires that employers implement methods for reducing employee exposure to beryllium through a detailed written exposure control plan, engineering and work practice controls, and a prohibition on rotating employees to achieve compliance with the PEL. In the 2017 final rule, OSHA determined that written plans would “be instrumental in ensuring that employers comprehensively and consistently protect their employees” (82 FR at 2668). OSHA also concluded that requiring reliance on engineering and work practice controls is consistent with good industrial hygiene practice and with OSHA’s traditional approach for health standards (82 FR at 2672).

While extending these provisions to the construction and shipyards industry in the 2017 final rule, OSHA acknowledged that exposures to beryllium in these industries are

limited to only a few operations; abrasive blasting in construction and shipyards and some welding operations in shipyards. With respect to abrasive blasting, while the extremely high airborne exposures during the blasting operation can expose workers to beryllium in excess of the PEL, the blasting materials contain only trace amounts of beryllium (materials such as coal slag normally contain approximately 11µg/g or 0.0001%) (Document ID 2042, Chapter IV, Technological Feasibility, Table IV.69). Moreover, OSHA had evidence of beryllium exposure during only limited welding operations in shipyards (only 4 of 127 sample results showed detectable levels of airborne beryllium) (Document ID 2042, Chapter IV, Technological Feasibility, p. IV-580). Nonetheless, OSHA applied the same requirements to these industries as to general industry, where the operations with beryllium exposure are significantly more varied and employees are exposed to materials with significantly higher beryllium content.

OSHA is proposing to revise the requirements in paragraph (f) in light of the very narrow set of affected operations and the limited extent of beryllium exposure in the construction and shipyards industries. OSHA believes that some provisions in paragraph (f)—although appropriate in the general industry context—may be unnecessary to protect employees in the construction and shipyards industries. Likewise, as discussed in the introduction of the summary and explanation section, OSHA has preliminarily determined that provisions relating solely to dermal contact with beryllium should not apply in the construction and shipyards industries, where exposures involve materials containing or producing only trace amounts of beryllium (see the summary and explanation for paragraph (h), Personal Protective Clothing and Equipment). Accordingly, OSHA is proposing several revisions to both paragraph (f)(1) (Written

exposure control plan) and (f)(2) (Engineering and work practice controls) in the construction and shipyards standards.

Paragraph (f)(1) Written exposure control plan

Paragraph (f)(1) in both the construction and shipyards standards requires employers to establish, implement, and maintain a written exposure control plan containing the following: (1) A list of operations and job titles reasonably expected to involve airborne exposure to or dermal contact with beryllium (paragraph (f)(1)(i)(A)); (2) A list of operations and job titles reasonably expected to involve airborne exposure at or above the action level (paragraph (f)(1)(i)(B)); (3) A list of operations and job titles reasonably expected to involve airborne exposure above the TWA PEL or STEL (paragraph (f)(1)(i)(C)); (4) Procedures for minimizing cross-contamination (paragraph (f)(1)(i)(D)); (5) Procedures for minimizing the migration of beryllium within or to locations outside the workplace (paragraph (f)(1)(i)(E)); (6) A list of engineering controls, work practices, and respiratory protection required by paragraph (f)(2) of the standard (paragraph (f)(1)(i)(F)); (7) A list of personal protective clothing and equipment required by paragraph (h) of the standard (paragraph (f)(1)(i)(G)); and (8) Procedures for removing, laundering, storing, cleaning, repairing, and disposing of beryllium-contaminated personal protective clothing and equipment, including respirators (paragraph (f)(1)(i)(H)). Written exposure control plans in construction additionally must contain procedures used to restrict access to work areas when airborne exposures are, or can reasonably be expected to be, above the TWA PEL or STEL, to minimize the number of employees exposed to airborne beryllium and their level of exposure, including exposures generated by other employers or sole proprietors (paragraph (f)(1)(i)(I)).

OSHA is proposing several revisions to paragraph (f)(1). First, OSHA proposes to revise paragraph (f)(1)(i)(A) by removing the words “airborne” and “or dermal contact with” as qualifiers for exposure to beryllium. As revised, the provision would require simply a list of operations and job titles reasonably expected to involve exposure to beryllium, which would include abrasive blasting and welding operations where exposures at or above the action level are reasonably foreseeable based on objective data, in accordance with paragraph (a)(3), Scope. At the same time, OSHA is proposing to revoke paragraphs (f)(1)(i)(B) and (C), which require additional lists of operations and job titles involving exposure above the action level and above the TWA PEL or STEL, respectively. Given the small number of operations with beryllium exposure in these industries, the operations and job titles in these categories would be largely the same as those for which exposure to beryllium is reasonably expected. OSHA therefore believes that it is sufficient that an employer identify those operations and job titles that result in exposure to beryllium in any form and that fall within the scope of the standards, and that any additional lists would be unnecessary and redundant.

OSHA is also proposing to revoke the requirements that the written exposure control plan must include procedures for minimizing cross-contamination (paragraph (f)(1)(i)(D)) and procedures for minimizing the migration of beryllium within or to locations outside the workplace (paragraph (f)(1)(i)(E)). The purpose of these requirements was to ensure that workers not involved in beryllium-related operations would not be unintentionally exposed to beryllium in excess of the PELs. Instead, for the construction standard, OSHA is retaining the requirement for the written plan to include procedures to restrict access to work areas where exposures to beryllium could

reasonably be expected to exceed the TWA PEL or STEL (renumbered as paragraph (f)(1)(i)(D)), and the requirement that these procedures are to be implemented by a competent person (paragraph (e)(2)). For the shipyard standard, OSHA is retaining requirements for regulated areas (paragraph (e)), which require that employers designate areas where exposures to beryllium could exceed the PELs and limit access to authorized employees. In addition, OSHA is also proposing to add a new paragraph in both the construction ((f)(1)(i)(E)) and shipyards ((f)(1)(i)(D)) standards to require that the written exposure control plan include procedures used to ensure the integrity of each containment (such as tarps or structures used to keep sandblasting debris within an enclosed area) used to minimize exposures to employees outside the containment. The purpose of this proposed revision is to ensure that any containment used is not compromised such that employees outside of the containment are potentially exposed to beryllium at levels above the TWA PEL or STEL. OSHA believes that these requirements will adequately ensure that workers not directly involved in beryllium-related work are not exposed to beryllium in excess of the TWA PEL or STEL.

OSHA is further proposing to remove the requirement for written plans to contain procedures for removing, laundering, storing, cleaning, repairing, and disposing of beryllium-contaminated personal protective clothing and equipment, including respirators (paragraph (f)(1)(i)(H)). As discussed below, OSHA is proposing to remove requirements in paragraph (h)(2) of the construction and shipyard standards that relate to removing, storing, maintaining, cleaning, and disposing of PPE (see the summary and explanation for paragraph (h), Personal Protective Clothing and Equipment); therefore, OSHA believes that it is not necessary to include such procedures in the written plan.

Paragraph (f) retains the requirements that the written exposure control plan include a list of engineering controls, work practices, and respiratory protection required by paragraph (f)(2) and a list of personal protective clothing and equipment required by paragraph (h), renumbered as paragraphs (f)(1)(i)(B) and (C), respectively. Likewise, the standards retain paragraphs (f)(1)(ii) and (iii), which provide the requirements for maintaining, reviewing, and evaluating the written exposure control plan and providing access to the plan to each employee who can reasonably be exposed to airborne beryllium. OSHA is proposing only one change in these requirements, to revise paragraph (f)(1)(ii)(B) to refer simply to “exposure” rather than “airborne exposure to or dermal contact with.” This change is consistent with other paragraphs where OSHA is proposing to simplify the language in a similar manner (e.g., paragraph (f)(1)(i)(A), Written exposure control plan; paragraphs (k)(3)(ii)(A) and (k)(4)(i), Medical surveillance).

Paragraph (f)(2) Engineering and work practice controls

Paragraph (f)(2) of the construction and shipyards standards lists the requirements for the use of engineering and work practice controls to reduce and maintain employee airborne exposure below the TWA PEL and STEL. Paragraph (f)(2)(i) requires that, where exposures are, or can reasonably be expected to be, at or above the action level, the employer must ensure that at least one of the following is in place to reduce airborne exposure: (1) Material and/or process substitution (paragraph (f)(2)(i)(A)); (2) isolation, such as ventilated partial or full enclosures (paragraph (f)(2)(i)(B)); (3) local exhaust ventilation, such as at the points of operation, material handling, and transfer (paragraph (f)(2)(i)(C)); or (4) process control, such as wet methods and automation (paragraph

(f)(2)(i)(D)). Paragraph (f)(2)(ii) exempts an employer from this requirement to the extent that the employer can establish that the controls are infeasible or that airborne exposure is below the action level, using no fewer than two representative personal breathing zone samples taken at least 7 days apart, for each affected operation.

If, after implementing the controls required by paragraph (f)(2)(i), airborne exposures still exceed the TWA PEL or STEL, paragraph (f)(2)(iii) requires the employer to implement additional or enhanced engineering and work practice controls to reduce exposure below these limits. Finally, if the employer demonstrates that it is not feasible to reduce exposures below the TWA PEL and STEL through engineering and work practice controls, paragraph (f)(2)(iv) requires the employer to implement controls to reduce exposure to the extent feasible and supplement the controls through the use of respirators in accordance with paragraph (g) of the standard.

In this rulemaking, OSHA is proposing to remove the requirement to implement the controls currently listed in paragraph (f)(2)(i) where exposures are or can reasonably be expected to meet or exceed the action level. This requirement in the construction and shipyard standards was derived from the general industry standard, which requires that employers establish beryllium work areas where operations could release airborne beryllium and that employers implement at least one type of engineering control where exposures could reasonably be expected to exceed the action level within the work area. In reconsidering this requirement, OSHA believes that requiring implementation of engineering controls where exposures exceed the action level may not be reasonably appropriate for construction and shipyard operations. In the 2017 final rule, OSHA acknowledged that this approach to engineering and work practice controls was “not

typical for OSHA standards” in that OSHA health standards usually require such controls to be implemented where exposures exceed the PEL (82 FR at 2673). Furthermore, OSHA’s analysis of the technological feasibility of the PELs concluded that workers performing open-air blasting with mineral grit would “routinely” experience exposures in excess of the PEL even after implementing engineering controls, thus triggering requirements for respirator use (82 FR at 2584). Therefore, OSHA is proposing to rescind the requirement to trigger use of engineering and work practice controls by the action level.

Paragraph (f)(2) continues to require employers to implement engineering or work practice controls if needed to reduce airborne exposures to or below the TWA PEL of 0.2 $\mu\text{g}/\text{m}^3$ and STEL of 2.0 $\mu\text{g}/\text{m}^3$ unless the employer can demonstrate that such controls are not feasible. Where it is not feasible to implement engineering and work practice controls to comply with the exposure limits, paragraph (f)(2) requires the employer to implement and maintain engineering and work practice controls to reduce airborne exposure to the lowest levels feasible and supplement these controls by using respiratory protection in accordance with paragraph (g) of the proposed standard. These are the same requirements currently found in paragraphs (f)(2)(iii) and (iv) of the standards. Accordingly, OSHA is proposing to condense the portions of paragraphs (f)(2)(i)-(iv) that it proposes to retain into a single paragraph (f)(2), which would not have any subparagraphs or items.

The requirement to implement engineering and work practice controls is consistent with several other standards in both construction and shipyards that require the use of engineering controls to minimize toxic dust. For example, the ventilation standard in construction (29 CFR 1926.57(f)(2)(ii)) requires “[t]he concentration of respirable dust

or fume in the breathing zone of the abrasive-blasting operator or any other worker” to remain “below the levels specified in §1926.55.” Similarly, the use of ventilation in shipyards is required under other OSHA standards such as the Ventilation standard for abrasive blasting (29 CFR 1910.94(a)), which also applies to abrasive blasting in shipyards.

The reliance of proposed paragraph (f)(2) on the hierarchy of controls likewise reflects OSHA’s approach in other standards covering welding in shipyards. For example, 29 CFR 1915.51 requires that ventilation be used to keep welding fumes and smoke within safe limits, and 29 CFR 1915.51(d)(2)(iv) specifically covers welding involving beryllium, and states that “[b]ecause of its high toxicity, work involving beryllium shall be done with both local exhaust ventilation and air line respirators.”

In response to the 2017 proposal to rescind the ancillary provisions of the construction and shipyard standards, OSHA received comments from AFL-CIO on the importance of maintaining the hierarchy of controls and that primary reliance on PPE absent a specific requirement would not address bystander exposure to beryllium (Document ID 2140, p. 8). AFL-CIO also pointed out that the National Institute for Occupational Safety and Health (NIOSH) stresses the importance of reducing exposures to carcinogens first through engineering controls (including elimination and substitution) and work practices prior to the use of respirators in a recently updated chemical carcinogen policy (Document ID 2140, p. 8). OSHA agrees with AFL-CIO that it is important that the hierarchy of controls be followed to ensure that exposures are minimized, not only to abrasive blasting operators and welders, but also to bystanders or other workers nearby. Therefore, to ensure that employers apply the hierarchy principle

to reduce exposures to or below the PELs for beryllium, and to ensure that all potentially affected workers are appropriately so protected, OSHA is proposing to retain a specific requirement for construction and shipyard employers to implement engineering and work practice controls to achieve compliance with the PEL and STEL, as OSHA has required in all of its other health standards.

OSHA notes this proposal retains, without revision, paragraph (f)(3) of both the construction and shipyards standards, which prohibits employers from rotating employees to different jobs in order to achieve compliance with the PELs. OSHA continues to believe, as it found in the 2017 final rule, that it is important to prohibit this practice to ensure that employers do not expose more people than necessary to the hazards of beryllium solely to achieve the PEL instead of using engineering controls or work practices to reduce exposures (82 FR at 2675).

Paragraph (g) Respiratory Protection

Paragraph (g) in the beryllium standards for both construction and shipyards, like the corresponding general industry standard, requires the provision and use of respiratory protection from exposures to beryllium under specific conditions. Paragraph (g) also provides that required respiratory protection must be selected and used in accordance with OSHA's general Respiratory Protection standard at 29 CFR 1910.134. Finally, paragraph (g) requires employers to provide a powered air-purifying respirator (PAPR) when an employee entitled to a respirator under the beryllium standard requests one, as long as the PAPR provides adequate protection.

Paragraph (g)(1) requires employers to provide respiratory protection at no cost to employees and ensure that employees utilize such protection in five circumstances: (i)

during periods necessary to install or implement feasible engineering and work practice controls where airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL (paragraph (g)(1)(i)); (ii) during operations, including maintenance and repair activities and non-routine tasks, when engineering and work practice controls are not feasible and airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL (paragraph (g)(1)(ii)); (iii) during operations for which an employer has implemented all feasible engineering and work practice controls when such controls are not sufficient to reduce airborne exposure to or below the TWA PEL or STEL (paragraph (g)(1)(iii)); (iv) during emergencies (paragraph (g)(1)(iv)); and (v) when an employee who is eligible for medical removal under the standard chooses to remain in a job with airborne exposure at or above the action level (paragraph (g)(1)(v)).

In this rulemaking, OSHA is proposing to remove paragraph (g)(1)(iv), which requires the use of respiratory protection during emergencies.⁴ OSHA has preliminarily determined that this amendment is justified because other respiratory protection requirements make it likely that construction and shipyard workers will be using respiratory protection during normal tasks or activities (i.e., prior to any emergency), and thus provide adequate protections in the absence of the paragraph addressing respiratory protection in emergency situations.

An emergency is currently defined in paragraph (b) of both the construction and shipyards standards as “any uncontrolled release of airborne beryllium.” As explained above in the summary and explanation of paragraph (b), OSHA is proposing to remove this definition entirely from the construction and shipyards standards because the agency

⁴ As a result, OSHA is also proposing to renumber paragraph (g)(1)(v) as (g)(1)(iv) in both standards.

expects that, in these industries, an uncontrolled release of airborne beryllium (such as a release resulting from a failure of the blasting control equipment or a spill of the abrasive blasting media) would occur only during the performance of routine tasks already associated with the airborne release of beryllium - i.e., during abrasive blasting or welding processes. During these processes, OSHA anticipates that employees working in the immediate vicinity of an uncontrolled release of airborne beryllium would already be using respiratory protection required by paragraph (g) of the standards (because, for example, controls are not sufficient to reduce airborne exposure to or below the TWA PEL or STEL (paragraph (g)(1)(iii))).

Although OSHA is not proposing to remove any of the other respiratory protection requirements in paragraph (g), the agency recognizes that other provisions in the beryllium standards and in other OSHA standards may address respiratory protection in the construction and shipyards sectors. For example, current paragraph (j)(2)(iv) in the beryllium standards for construction and shipyards, renumbered as paragraph (j)(1)(iii) in this proposal, requires respirators where employees use dry sweeping, brushing, or compressed air to clean. Other potentially applicable standards in construction include the Ventilation standard (29 CFR 1926.57(f)(5)), the Personal Protective and Life Saving Equipment standard (29 CFR 1926.95), and the general Respiratory Protection standards (29 CFR 1910.134, 1926.103). In shipyards, other standards addressing respiratory protection include the Mechanical Paint Removers standard (29 CFR 1915.34(c)(3)), the Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment standards (29 CFR 1915.12(c)(4)(ii)), the Welding, Cutting, and Heating

standards for shipyards (29 CFR 1915.51(d)(2)(iv)), as well as the general Respiratory Protection standards (29 CFR 1910.134, 1915.154).

In response to the 2017 NPRM, some commenters expressed concern about the degree of protection afforded by other OSHA standards (Document ID 2135, p. 7; 2118, p. 5). For example, NABTU “strongly disagree[d]” with the notion that baseline usage of respirators and PPE “is far higher in construction and shipyards” than it is in other sectors (Document ID 2135, p. 7). Likewise, BHSC questioned the degree of protection afforded by the other OSHA standards to workers near abrasive blasting operations, stating that the estimated 100 percent PPE use for those workers “does not have supporting evidence of consistent and standard use across pot tenders and cleanup activities supporting abrasive blasting” (Document ID 2118, p. 5).

OSHA requests comments both on its proposal to delete paragraph (g)(1)(iv) and on whether it is necessary to maintain the other general provisions for respiratory protections in the beryllium standards in light of protections afforded by other OSHA standards.

Paragraph (h) Personal Protective Equipment

Paragraph (h) of the beryllium standards for the construction and shipyards industries (29 CFR 1926.1124(h) and 1915.1024(h), respectively) requires employers to provide and ensure the use of personal protective clothing and equipment (PPE) where employees have actual or reasonably expected dermal exposure or high levels of airborne exposure to beryllium, and also contains provisions pertaining to the removal, storage, cleaning, and replacement of the PPE. To comply with paragraph (h), employers are

expected to choose the appropriate type of PPE for their employees based on the results of the employer's hazard assessment (82 FR at 2682).

Specifically, paragraph (h)(1) requires employers to provide and ensure that each employee uses appropriate PPE in accordance with the written exposure control plan and OSHA's general PPE standards for the construction and shipyards industries (29 CFR part 1926, subpart E, and part 1915, subpart I), in two situations: (1) where airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL (paragraph (h)(1)(i)), and (2) where there is a reasonable expectation of dermal contact with beryllium (paragraph (h)(1)(ii)).

Paragraphs (h)(2) and (3) of the construction and shipyards beryllium standards provide requirements for removal, storage, cleaning, and replacement of the PPE required by paragraph (h)(1). Paragraph (h)(2)(i) requires employers to ensure that each employee removes all beryllium-contaminated PPE at the end of the work shift, at the completion of tasks involving beryllium, or when PPE becomes visibly contaminated with beryllium, whichever comes first. Paragraph (h)(2)(ii) requires employees to remove PPE consistent with the written exposure control plan required by paragraph (f)(1), and paragraph (h)(2)(iii) requires employers to ensure both that protective clothing is kept separate from employees' street clothing, and that storage facilities prevent cross-contamination as specified in the written exposure control plan. Paragraph (h)(2)(iv) requires employers to ensure that beryllium-contaminated PPE is only removed from the workplace by employees who are authorized to do so for the purpose of laundering, cleaning, maintaining, or disposing of such PPE, and paragraph (h)(2)(v) requires that PPE

removed from the workplace for laundering, cleaning, maintenance, or disposal be placed in closed, impermeable, and appropriately labeled bags or containers.

Paragraph (h)(3) of the standards establishes several requirements with respect to cleaning and replacement of PPE. Paragraph (h)(3)(i) requires employers to ensure that all reusable PPE is appropriately cleaned, laundered, repaired, and replaced as needed to maintain its effectiveness, while paragraph (h)(3)(ii) mandates that employers ensure that beryllium is not removed from PPE by blowing, shaking or any other means that disperses beryllium into the air. Paragraph (h)(3)(iii) requires employers to inform in writing the persons or the business entities who launder, clean, or repair the PPE used to comply with paragraph (h) of the potentially harmful effects of airborne exposure to and dermal contact with beryllium, and that the PPE must be must be handled in accordance with the beryllium standard.

In the 2017 NPRM, OSHA identified several other OSHA standards that require employees engaged in abrasive blasting operations (in construction and shipyards) and welding operations (in shipyards) to use PPE during their work. Additionally, subsequent to the 2017 final rule, OSHA clarified in the general industry DFR that the agency only intended to regulate contact with trace beryllium to the extent that it caused airborne exposures of concern. OSHA never intended for provisions aimed at protecting workers from the effects of dermal contact to apply in the case of materials containing only trace amounts of beryllium absent significant airborne exposures (83 FR at 19938).

In response to the 2017 proposal, commenters criticized OSHA's estimates regarding the existing use of PPE in the affected construction and shipyard operations. NABTU "strongly disagree[d]" with OSHA's statement in the 2017 NPRM (82 FR at

29216) that “[b]aseline usage of respirator and PPE is far higher in construction and shipyards” than in general industry (Document ID 2135, p. 7). Members of Congress commented that OSHA’s preliminary estimate that all affected employees already use full PPE 100 percent of the time (see 82 FR at 29197) did “not appear to be supported by testimony from the hearing, which suggests that while the abrasive blasters may have protections, there is limited or no protection for many other workers, including bystanders, who are exposed to beryllium-containing dust under the pre-existing standards” (Document ID 2135, p. 7). BHSC also expressed concern about the degree of protection afforded by the other OSHA standards to workers near abrasive blasting operations, stating that the estimated 100 percent PPE use for those workers “does not have supporting evidence of consistent and standard use across pot tenders and cleanup activities supporting abrasive blasting” (Document ID 2118, p. 5). Commenters also noted that generalized PPE requirements do not always signal to employers and employees that PPE is needed to protect against beryllium (see, e.g., Document ID 2124, pp. 10-11; 2129, p. 7; 2129, pp. 9-10; 2135, pp. 5-6).

In light of these comments and its review of existing standards, OSHA determined in the rule finalizing the 2017 proposal (the final rule published September 30, 2019) that existing OSHA standards applicable to construction and shipyards do not provide complete overlap with the PPE provisions of the beryllium standards for construction and shipyards. Consistent with OSHA’s usual approach to regulating employee exposure to other harmful substances (see, e.g., 52 FR 46168, 46271-72 (Dec. 4, 1987) (discussing the PPE provisions in the formaldehyde standard)), OSHA expects a specific PPE requirement in the beryllium standards will provide a valuable supplement

to the generally-applicable PPE standards by clearly explaining when PPE is necessary to protect employees from beryllium exposure. OSHA believes it is necessary to retain the provisions that are aimed at protecting employees who are exposed at airborne levels of concern from inhalation of re-entrained beryllium-containing dust, including the requirement to provide and use appropriate PPE when airborne exposure exceeds, or can be reasonably expected to exceed, the TWA PEL or STEL, as well as some requirements pertaining to removal, storage, cleaning, and replacement of PPE. As NABTU commented in response to the 2017 proposal, PPE requirements are necessary because they address the risk of exposure during the PPE removal process and the risk of additional inhalation exposure from accumulation on clothing, shoes, and equipment (Document ID 2129, p. 7 (citing 82 FR at 2678)).

At the same time, in light of the clarifications in the DFR and other comments on the 2017 proposal, OSHA has preliminarily determined that some revisions to paragraph (h) in the beryllium standards for the construction and shipyards industries are warranted. Accordingly, OSHA is proposing a number of changes to paragraph (h) of the construction and shipyards standards.

First, OSHA is proposing to remove the requirement to provide and ensure the use of PPE when there is reasonably expected dermal contact with beryllium (paragraph (h)(1)(ii)). OSHA clarified in the 2018 DFR for general industry that it did not intend to require employers who only work with materials containing trace amounts of beryllium to protect employees or other individuals against dermal contact with beryllium absent significant airborne exposures. As discussed above, in the construction and shipyards sectors, the operations that cause airborne exposure to beryllium that can exceed the

TWA PEL or STEL are either blasting operations that involve materials or generate particulate matter containing less than 0.1 percent beryllium by weight or are welding operations in shipyards where there is minimal or no skin contamination. Accordingly, OSHA is proposing to remove the requirement to provide and ensure the use of PPE when there is reasonably expected dermal contact with beryllium because it is not aware of any operations in the construction or shipyard sectors in which dermal contact with beryllium would occur at levels above trace amounts, making such a provision unnecessary.⁵

OSHA proposes to modify the PPE removal and storage provisions of paragraph (h)(2). OSHA is proposing to modify paragraph (h)(2)(i) by removing the requirement that PPE be removed when it becomes visibly contaminated with beryllium. OSHA is also proposing to revise (h)(2)(i) to remove the qualifier of “beryllium-contaminated” and add “required by this standard” so that the provision would apply to all PPE required by the beryllium construction and shipyard standards. The 2018 DFR modified the general industry beryllium standard to define *contaminated with beryllium* and *beryllium-contaminated* as “contaminated with dust, fumes, mists, or solutions containing beryllium in concentrations greater than or equal to 0.1 percent by weight” (83 FR at 19939). As explained above, OSHA believes there are no operations covered by the construction or shipyard beryllium standards that would create such a beryllium-contaminated surface. In fact, the vast majority of the operations (abrasive blasting) involve beryllium in

⁵ As a result of the proposed elimination of paragraph (h)(1)(ii), OSHA is also proposing to collapse paragraph (h)(1)(i) into paragraph (h)(1), which would have no subparagraphs or items. Where airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL, proposed paragraph (h)(1) would require employers to provide at no cost, and ensure that each employee uses, appropriate personal protective clothing and equipment in accordance with the written exposure control plan required under paragraph (f)(1) of this standard and OSHA’s Personal Protective and Life Saving Equipment standards for construction (29 CFR part 1926, subpart E).

concentrations of less than 0.1 percent by weight. In blasting operations, the requirement to remove PPE visibly contaminated with beryllium would thus rarely, if ever, be triggered. Likewise, there would be no beryllium-contaminated PPE at any of these covered worksites. OSHA has preliminarily determined, however, that if workers are using PPE because they are working with trace amounts of beryllium but nevertheless have the potential for airborne exposure above the TWA PEL or STEL, they are likely in highly dusty environments and accumulating large amounts of dust on their PPE. OSHA therefore believes it is necessary to continue to require employees to remove their PPE at the end of the work shift or all tasks involving beryllium because otherwise, this highly dusty PPE could be re-entrained into the air and contribute to the airborne exposure of workers who already are, or can reasonably be expected to be, exposed above the TWA PEL or STEL.

OSHA is proposing to modify paragraph (h)(2)(ii) to ensure that PPE is not removed in a manner that disperses beryllium into the air. This can be accomplished by cleaning the PPE prior to removal or carefully removing the PPE so as not to disturb the dust. OSHA is proposing to remove the requirement for employers to ensure that employees remove PPE in accordance with the written exposure control plan because, as explained above in the summary and explanation of paragraph (f)(1), OSHA is proposing to remove the requirement in the written exposure control plan (paragraph (f)(1)(i)(H)) to include procedures for doffing, laundering, storing, cleaning, repairing, and disposing of beryllium-contaminated PPE, including respirators. This proposed language is similar to that in paragraph (h)(3)(ii), which addresses the cleaning of PPE rather than the removal of PPE.

OSHA is proposing to remove paragraphs (h)(2)(iii) and (iv) from the construction and shipyard standards. Paragraph (h)(2)(iii) requires the employer to ensure that each employee stores and keeps beryllium-contaminated personal protective clothing and equipment separate from street clothing and that storage facilities prevent cross-contamination as specified in the written exposure control plan required by paragraph (f)(1) of this standard. Paragraph (h)(2)(iv) requires employers to ensure that beryllium-contaminated PPE is only removed from the workplace by employees who are authorized to do so for the purpose of laundering, cleaning, maintaining, or disposing of such PPE. As explained in the 2018 general industry DFR, OSHA defined “beryllium-contaminated” as contaminated with dust, fumes, mists, or solutions containing beryllium in concentrations greater than or equal to 0.1 percent by weight because the agency never intended for provisions aimed at protecting workers from the effects of dermal contact with beryllium to apply in the case of materials containing only trace amounts of beryllium. Because OSHA believes there are no operations covered by the construction or shipyard beryllium standards involving beryllium dust, fumes, mists, or solutions in more than trace amounts, the requirements pertaining to beryllium-contaminated PPE in the construction and shipyard standards would never be triggered and are unnecessary.

With regard to the cleaning and replacement procedures in paragraph (h)(3) of the standards, OSHA is proposing to clarify that paragraph (h)(3)(ii) applies to PPE required by the beryllium standard. This proposed change would assure employers that if dust containing trace amounts of beryllium migrates to the PPE of employees who are not reasonably expected to have airborne exposure to beryllium above the TWA PEL or STEL, the beryllium standard allows the employer to provide employees the opportunity

to clean their PPE in a manner that disperses that dust into the air. This proposed change is consistent with OSHA's goal of protecting employees who are already exposed at airborne levels of concern from inhalation of re-entrained beryllium-containing dust.

OSHA is proposing to remove paragraphs (h)(2)(v) and (h)(3)(iii) from the standards. Paragraph (h)(2)(v) requires that PPE removed from the workplace for laundering, cleaning, maintenance, or disposal be placed in closed, impermeable bags or containers labeled in accordance with paragraph (m)(2) of the construction standard and paragraph (m)(3) of the shipyards standard, as well as the Hazard Communication standard. Paragraph (h)(3)(iii) requires employers to inform, in writing, any person or business entity who launders, cleans, or repairs PPE required by the standards of the potentially harmful effects of exposure to airborne beryllium and dermal contact with beryllium, and of the need to handle the PPE in accordance with the standards. These provisions are in place to protect individuals who later handle beryllium-contaminated items (82 FR at 2683). Because, as explained in the 2018 general industry DFR, OSHA never intended for provisions aimed at protecting workers from the effects of dermal contact with beryllium to apply in the case of materials containing only trace amounts of beryllium, OSHA has preliminarily determined that it is not necessary to protect downstream handlers of PPE that have only come in contact with dust containing beryllium in trace amounts. OSHA has no reason to expect these downstream handlers are engaging in tasks that generate airborne exposures of concern such that re-entrainment of the dust would exacerbate an already-significant lung burden. OSHA therefore proposes to remove these two paragraphs from the construction and shipyard beryllium standards.

The agency welcomes comment on these proposed revisions to paragraph (h).

Paragraph (i) Hygiene Areas and Practices

Paragraph (i) of the 2017 final rule established requirements for hygiene areas and practices in general industry (29 CFR 1910.1024), construction (29 CFR 1926.1024), and shipyards (29 CFR 1915.1024). As promulgated, paragraph (i) requires employers in all three industries to: (1) provide readily accessible washing facilities to remove beryllium from the hands, face, and neck (paragraph (i)(1)(i)); (2) ensure that employees who have dermal contact with beryllium wash any exposed skin (paragraph (i)(1)(ii)); (3) provide change rooms if employees are required to use personal protective clothing and are required to remove their personal clothing (paragraph (i)(2)); (4) ensure that employees take certain steps to minimize exposure in eating and drinking areas (paragraph (i)(3)); and (5) ensure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in areas where there is a reasonable expectation of exposure above the TWA PEL or STEL (paragraph (i)(4)).

While emphasizing the importance of hygiene areas and practices in the final rule, OSHA also acknowledged that the sanitation standards in general industry (29 CFR 1910.41), construction (29 CFR 1926.51), and shipyards (29 CFR 1915.88) include provisions similar to some of those in the beryllium standards. For example, the sanitation standards include hygiene provisions requiring the employer to provide change rooms with separate storage facilities for protective clothing whenever employees are required by an OSHA standard to wear protective clothing. The sanitation standards also require employers to provide wash facilities and prohibits storage or consumption of food or beverages in any area where employees are exposed to a toxic material (82 FR at

2684). While extending these provisions to the construction and shipyards industry in the 2017 final rule, OSHA acknowledged that exposures to beryllium in these industries are limited to only a few operations. OSHA further acknowledged this overlap in the FEA for the 2017 final rule, stating that employers of abrasive blasters exposed to beryllium in construction and shipyards are typically already required to provide readily accessible washing facilities to comply with other OSHA standards (see 82 FR at 2609). Nonetheless, OSHA applied similar requirements to these industries as to general industry, where the operations with beryllium exposure are significantly more varied and employees are often exposed to materials with significantly higher beryllium content and where dermal contact can be of particular concern.

After publishing the 2017 final rule, OSHA clarified in the general industry DFR that the agency only intended to regulate contact with trace beryllium to the extent that it causes airborne exposures of concern. OSHA did not intend for provisions aimed at protecting workers from the effects of dermal contact to apply in the case of materials containing only trace amounts of beryllium (83 FR at 19938). Unlike in general industry, where processes involving exposure to beryllium are varied and employees are exposed to a large variety of materials that can contain high concentrations of beryllium, exposures in the construction and shipyards industries are limited to abrasive blasting operations in construction and shipyards and a small number of welding operations in shipyards (Document ID 2042, FEA Chapter III, pp. 103-11 and Table III-8e). While the extremely high airborne exposures during abrasive blasting operations can expose workers to beryllium in excess of the PEL, the blasting materials contain only trace amounts of beryllium (Document ID 2042, FEA Chapter IV, p. 612). Moreover, the

record before the agency contains evidence of beryllium exposure during only limited welding operations in shipyards (Document ID 2042, FEA Chapter III, Table III-8e) and as discussed above, OSHA has preliminarily determined that for these limited welding operations the exposure of concern is exposure to airborne beryllium and not dermal contact.

Unlike the general industry standard, which triggers PPE as well as other provisions on both the PELs and the potential for dermal contact or beryllium-contaminated surfaces, construction and shipyards activities under this standard do not have operations where skin contact is the exposure of concern. In light of the existing OSHA standards providing many of the same protections as the beryllium standards, the limited operations where beryllium exposure may occur in construction and shipyards, and the trace quantities of beryllium present in these operations, OSHA now believes that the requirements for hygiene areas and practices in the 2017 beryllium standards for construction and shipyards may be unnecessary to protect employees in these industries. Accordingly, the agency is proposing to remove paragraph (i) from the construction and shipyard standards.

In response to the 2017 NPRM proposing to revoke the ancillary provisions from the shipyards and construction standards, OSHA received only two comments that specifically addressed paragraph (i). One comment, from NABTU, expressed the need for hygiene requirements such as washing facilities, change rooms, and eating and drinking areas to prevent the spread of beryllium, noting that “[w]hen beryllium-exposed workers are afforded washing and clean-up areas, all construction workers on the site are protected from exposure” (Document ID 2129, p. 7). On the other hand, the Abrasive

Blasting Manufacturers Alliance (ABMA) identified a number of existing standards, including the sanitation standards, applicable to employees in construction and shipyards, and argued that these provisions provide adequate protection from exposure to beryllium. ABMA also indicated that hygiene practices are utilized during abrasive blasting regardless of the beryllium standard due to other substance-specific standards, such as lead, hexavalent chromium, cadmium, and arsenic, which require employees who are exposed to these materials through abrasive blasting to wash their hands and face. Though not a requirement, they also cite OSHA's 2006 guidance on abrasive blasting for shipyards, which recommends good hygiene practices (Document ID 2142, pp. 9-10; 2124 attachment 1, p. 6).

OSHA agrees with both commenters: beryllium-exposed workers should have access to washing facilities, and existing standards require the use of washing facilities for those workers in construction and shipyards. In addition, the sanitation standard for construction (29 CFR 1926.51(f)) requires employers to provide adequate washing facilities maintained in a sanitary condition for employees engaged in operations where contaminants may be harmful to the employees. It also requires that these washing facilities must be in proximity to the worksite and must be so equipped as to enable employees to remove such substances. Lavatories are also required at all places of employment and must be equipped with hot and cold running water, or tepid running water. Hand soap or similar cleansing agents must be provided along with hand towels, air blowers, or clean continuous cloth toweling, convenient to the lavatories.

The sanitation standard for shipyards (29 CFR 1915.88(e)) similarly requires employers to provide handwashing facilities at or adjacent to each toilet facility. The

criteria for these handwashing facilities are similar to the construction industry in that they must be equipped with hot and cold running water or tepid running water, soap, or skin cleansing agents capable of disinfection or neutralizing the contaminant, and drying materials and methods. This standard further requires the employer to inform each employee engaged in operations in which hazardous or toxic substances can be ingested or absorbed about the need for removing surface contaminants from their skin's surface by thoroughly washing their hands and face at the end of the work shift and prior to eating, drinking, or smoking (see 29 CFR 1915.88(e)(3)).

Even though the sanitation standards do not specifically mention beryllium, the use of the terms *harmful substances* in the construction sanitation standard and *hazardous or toxic substance* in the shipyard sanitation standard encompass beryllium exposure where airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL. With respect to abrasive blasting, the sanitation standards' washing facilities requirements are triggered by the use of blasting media; either due to contaminants in the blasting media (which may include beryllium, lead, hexavalent chromium, cadmium, and arsenic) or contamination from the substrate or coatings on the substrate. Similarly, in the limited welding operations involving beryllium exposure, workers will likely be exposed to other hazardous chemicals (including hexavalent chromium, lead, and cadmium) (see <https://www.osha.gov/SLTC/weldingcuttingbrazing/chemicals.html>), triggering the requirements of the sanitation standards. Accordingly, the sanitation standards provide comparable protections to the washing facilities requirements that OSHA is proposing to remove from both the construction and shipyard standards (paragraphs (i)(1)(i) and (ii)).

OSHA is also proposing to remove the requirement for employers to provide change rooms where employees are required to remove their personal clothing (paragraph (i)(2)), because the sanitation standards already provide comparable protections. The sanitation standard for construction (29 CFR 1926.51(i)) requires employers to provide change rooms if a particular standard requires employees to wear protective clothing because of the possibility of contamination with toxic materials. The change rooms must be equipped with storage facilities for street clothes and separate storage facilities for the protective clothing shall be provided.

Similarly, the sanitation standard for shipyards (§1915.88(g)) requires change rooms when the employer provides protective clothing to prevent employee exposure to hazardous or toxic substances. Furthermore, the employer must provide change rooms that provide privacy and storage facilities for street clothes, as well as separate storage facilities for protective clothing. Because these proposed beryllium standards would require PPE where exposures may exceed the TWA PEL or STEL, employers would be required to provide change rooms under the sanitation standards (if employees were required to remove their personal clothing),⁶ just as they would have been required by the beryllium standards.

OSHA is further proposing to remove paragraph (i)(3), which establishes provisions for eating and drinking areas, from the construction and shipyard standards. The provisions in the sanitation standards for construction (§1926.51(g)) and shipyards (§1915.88(h)) already require employers to ensure that food, beverages, and tobacco

⁶ Through interpretive guidance, OSHA has explained that the sanitation standards require the provision of change rooms only where employees must change their clothes (i.e., remove their street clothes) (see OSHA, Letter of Interpretation, Feb. 22 1996, available at <https://www.osha.gov/laws-regs/standardinterpretations/1996-02-22-1>).

products are not consumed or stored in any area where employees may be exposed to hazardous or toxic materials.

OSHA is also proposing to remove paragraphs (i)(3)(i) and (ii) of the construction and shipyards standards, which require that surfaces in eating and drinking areas be kept as free as practicable of beryllium (paragraph (i)(3)(i)) and that employees remove or clean contaminated clothing prior to entering these areas (paragraph (i)(3)(ii)). These provisions relate to minimizing dermal contact. However, as explained above, OSHA intends that provisions meant to reduce dermal contact should typically be applied to materials containing trace amounts of beryllium only where there is also the potential for significant airborne exposure. OSHA has preliminarily determined that the processes in construction and shipyards creating exposure to beryllium are either processes that involve materials containing less than 0.1% beryllium by weight or processes that do not produce surface or skin contamination.

OSHA further believes that other parts of the beryllium standard will reduce the potential for airborne beryllium in eating and drinking areas. For example, when employees are cleaning up dust resulting from operations that cause, or can reasonably be expected to cause airborne exposures over the TWA PEL or STEL, the employer must ensure the use of methods that minimize the likelihood and level of airborne exposure. And under proposed paragraph (h)(2)(ii), employers must ensure that PPE required by the standard is not removed in a manner that disperses beryllium into the air. Given that construction and shipyard operations primarily involve only trace amounts of beryllium, and other provisions of the beryllium standard such as engineering controls and

housekeeping requirements serve to minimize airborne exposures, OSHA believes that existing standards adequately protect employees in eating and drinking areas.

OSHA is also proposing to remove the reference in paragraph (i)(3)(iii) requiring that eating and drinking facilities provided by the employer must be in accordance with the sanitation standards. OSHA does not believe it is necessary to maintain this reference, as this would be the only requirement remaining in paragraph (i) and employers are required to comply with the sanitation standards regardless.

Finally, OSHA is proposing to remove paragraph (i)(4), concerning prohibited activities, which requires the employer to ensure that no employees eat, drink, smoke, chew tobacco or gum, or apply cosmetics in work areas where there is a reasonable expectation of exposure above the TWA PEL or STEL. The sanitation standards prohibit consuming food or beverages in areas exposed to toxic material and therefore provides the appropriate protections for areas where exposures are above the PEL. The sanitation standards are substantially similar to paragraph (i)(4) and provide appropriate protections for areas where exposures are above the PEL.

In summary, for the reasons discussed above, OSHA is proposing to remove paragraph (i), hygiene areas and practices, from the beryllium standards for construction and shipyards. OSHA requests comment on the proposed removal of paragraph (i). OSHA particularly welcomes comments and data on the use of wash facilities and changes rooms in construction and shipyards for operations that would be covered by the beryllium standards.

Paragraph (j) Housekeeping

The 2017 final beryllium rule includes provisions for housekeeping. It requires employers in both construction and shipyards to follow the cleaning procedures in their written exposure control plan, clean up spills and emergency releases promptly, use appropriate cleaning methods, and provide recipients of beryllium containing materials for disposal with a copy of the warnings described in paragraph (m) (82 FR at 2688). In the preamble to the 2017 final rule, OSHA indicated that these provisions are important because they minimize sources of exposure to beryllium that engineering controls do not completely eliminate. Good housekeeping measures are a cost-effective way to control worker exposures by removing settled beryllium that could otherwise become re-entrained into the surrounding atmosphere by physical disturbances or air currents and could enter an employee's breathing zone and increase potential dermal contact (82 FR at 2689).

OSHA also acknowledged that different approaches may be warranted for the housekeeping provisions for construction and shipyards than for general industry due to the nature of the materials and work processes typically used in construction and shipyards (82 FR at 2690). As discussed previously with respect to paragraph (f), although OSHA extended these provisions to the construction and shipyards industry in the 2017 final rule, OSHA also recognized that beryllium exposure in these industries is mainly limited to abrasive blasting in construction and shipyards and a small number of welding operations in shipyards (Document ID 2042, FEA Chapter III, pp. 103-11 and Table III-8e). While the extremely high airborne exposures during abrasive blasting operations can expose workers to beryllium in excess of the PEL, the blasting materials contain only trace amounts of beryllium (Document ID 2042, FEA Chapter IV, p. 612).

Moreover, the record before the agency contains evidence of beryllium exposure during only limited welding operations in shipyards (Document ID 2042, FEA Chapter III, Table III-8e). Nonetheless, OSHA applied most of the same requirements to these industries as to general industry,⁷ where the operations with beryllium exposure are significantly more varied and employees are exposed to materials with significantly higher content beryllium.

OSHA is reconsidering this approach in the construction and shipyards industries. In June 2017, OSHA proposed to rescind the ancillary provisions for the construction and shipyard beryllium standards, citing previously-existing OSHA standards that the agency surmised could duplicate some provisions of the 2017 standards. OSHA cited the construction ventilation standard, which requires that dust not be allowed to accumulate outside abrasive blasting enclosures and that spills be cleaned up promptly (29 CFR 1926.57(f)(7)). Likewise, certain provisions of OSHA's general ventilation standard for abrasive blasting (29 CFR 1910.94(a)) also apply to shipyards. Similar to the construction ventilation standard, the general ventilation standard contains the following requirements for abrasive blasting: “[d]ust shall not be permitted to accumulate on the floor or on ledges outside of an abrasive-blasting enclosure, and dust spills shall be cleaned up promptly” (29 CFR 1910.94(a)(7)).

While some comments OSHA received on the proposed revocation of paragraph (j) supported revocation on the basis of overlapping and duplicative provisions (e.g., ABMA, Document ID 2142), several commenters argued that the 2017 provisions offer

⁷ Due to the transient nature of the work processes in construction and shipyards and the fact that most of the work occurs outside, OSHA decided not to require employers in these industries to maintain all surfaces as free as practicable of beryllium, as it had done in general industry. Rather, the agency required employers in these industries to follow their written exposure control plan when cleaning beryllium-contaminated areas (82 FR at 2690).

beryllium-exposed workers significant additional protection. For example, NABTU indicated that the ventilation standard does not prohibit dry sweeping or brushing, which are prohibited by the 2017 beryllium standards except in rare circumstances (Document ID 2129, p. 7). AFL-CIO similarly commented that the use of dry sweeping and compressed air increase exposures in workers' breathing zone, and should be prohibited (Document ID 2140, p. 8).

In light of these comments and the agency's review of existing standards, OSHA acknowledged in the rule finalizing the 2017 proposal, published on September 30, 2019, that existing standards do not duplicate all of the protections provided by paragraph (j). OSHA believes that some of these beryllium-specific provisions remain necessary to protect workers in the construction and shipyards industries. At the same time, given the very narrow set of affected operations and the existence of some overlap between the 2017 standards and already-existing rules, OSHA also believes that some provisions in paragraph (j)—although appropriate in the general industry context—may be unnecessary to protect employees in the construction and shipyards industries.

Moreover, as discussed above in the Introduction, after publishing the 2017 final rule, OSHA clarified in the general industry DFR that the agency only intended to regulate contact with trace beryllium to the extent that it caused airborne exposures of concern. OSHA never intended for provisions aimed at protecting workers from the effects of dermal contact to apply in the case of materials containing only trace amounts of beryllium (83 FR at 19938). OSHA also discusses in the Introduction that the agency has preliminarily determined that the limited welding processes in shipyards create only a trace amount of surface contamination. Because exposures in the construction and

shipyards industries are limited almost entirely to abrasive blasting with materials containing trace amounts of beryllium or welding on materials where surface contamination is not a source of exposure, OSHA believes additional revisions to paragraph (j) may be warranted. For these reasons, OSHA is proposing several revisions to paragraph (j) in both the construction and shipyards standards.

First, OSHA is proposing to remove paragraph (j)(1) (general requirements for housekeeping) from the construction and shipyards standards. This provision currently requires employers to follow the written exposure control plan when cleaning beryllium-contaminated areas (paragraph (j)(1)(1)) and to ensure that spills and emergency releases of beryllium are cleaned up promptly (paragraph (j)(1)(2)). As discussed above, the ventilation standard for construction (29 CFR 1926.57(f)(7)) and OSHA's general ventilation standard (29 CFR 1910.94(a)) require prompt cleanup of spills during abrasive blasting in construction and shipyards, the primary sources of beryllium exposure in these industries. OSHA believes that routine general housekeeping and housekeeping related to spills are adequately covered by the existing ventilation standards in these sectors, and is proposing to eliminate paragraph (j)(1) of the final standards. Additionally, because the housekeeping provisions are triggered by only one operation (abrasive blasting) in construction and shipyards, this operation uses materials with only trace quantities of beryllium, and the main objective of these provisions is to minimize airborne exposure, OSHA has preliminarily determined that a unique written plan for how to clean is unnecessary in this context. OSHA notes that this is in contrast to general industry, where there is the concern for protecting from both dermal contact and airborne exposures over a variety of materials and processes and where employers may

need to have more complicated or unique cleaning procedures to adequately protect workers.

With respect to cleaning methods currently required by paragraph (j)(2), OSHA agrees with comments submitted by NABTU and AFL-CIO in response to the 2017 NPRM that the cleaning provisions in existing ventilation standards (29 CFR 1926.57(f)(7) and 29 CFR 1910.94(a)) do not provide the additional protections of prohibiting methods of cleaning that are likely to increase exposure in the breathing zone of the workers. Therefore, OSHA is retaining the existing requirements in the following paragraphs, renumbered in this proposal: paragraph (j)(1), with revision (requiring the use of cleaning methods that minimize the likelihood and level of airborne exposure); (j)(2) (prohibiting dry sweeping or brushing unless other methods are not safe or effective); (j)(3), with revision (limiting the use of compressed air for cleaning); (j)(4), with revision (requiring respirator use and PPE where employees use dry sweeping, brushing, or compressed air to clean); and (j)(5) (requiring cleaning equipment to be handled and maintained so as to reduce airborne exposure and re-entrainment of airborne beryllium). Specific proposed revisions to these paragraphs are discussed below.

First, OSHA is proposing to revise paragraph (j)(2)(i), renumbered as paragraph (j)(1), to remove the reference to “HEPA filtered vacuuming.” In the unique context of abrasive blasting, where operations produce copious amounts of dust, the use of HEPA vacuums may be problematic due to filter overload and clogging which in fact may cause additional exposures. This, too, is in contrast to general industry, where the content and amount of beryllium-containing dust or debris are varied and where HEPA filters can minimize the amount of beryllium that is re-entrained into the air.

Next, OSHA is proposing to revise both paragraphs (j)(2)(i) and (ii)—renumbered as paragraphs (j)(1) and (2), respectively—to remove the phrase “beryllium-contaminated areas.” Proposed paragraph (j)(1) would now require the use of methods that minimize the likelihood and level of airborne exposure when cleaning up dust resulting from operations that cause, or can reasonably be expected to cause, airborne exposure above the TWA PEL or STEL. Similarly, proposed paragraph (j)(2) would prohibit dry sweeping or brushing for cleaning dust resulting from operations that cause, or can reasonably be expected to cause, airborne exposure above the TWA PEL or STEL, unless methods that minimize the likelihood and level of airborne exposure are not safe and effective.

OSHA intends for these provisions to still apply where workers are either working in regulated areas in shipyards or in areas with exposures above the TWA PEL or STEL in construction. In the 2018 DFR, OSHA modified the general industry beryllium standard to define “contaminated with beryllium” and “beryllium-contaminated” as contaminated with dust, fumes, mists, or solutions containing beryllium in concentrations greater than or equal to 0.1 percent by weight (83 FR at 19939-40). As explained above, OSHA believes there are no operations covered by the construction or shipyard beryllium standards that would create such a beryllium-contaminated surface. In fact, the vast majority of the operations (abrasive blasting) involve beryllium in concentrations of less than 0.1 percent by weight. If OSHA maintained the term “beryllium-contaminated,” the requirements for when and how employers can use dry sweeping, brushing, or compressed air would rarely, if ever, be triggered and workers already exposed could have additional exposures.

Accordingly, OSHA is instead proposing to trigger the requirements in paragraphs (j)(1) and (2) on the presence of dust produced by operations that cause, or can reasonably be expected to cause, airborne exposure above the TWA PEL or STEL to ensure that beryllium is not re-entrained in areas where there are already high exposures. By referencing the presence of dust produced by these operations, rather than the operation itself, OSHA intends for these requirements to apply regardless of whether the operation is ongoing (i.e. whether abrasive blasting is taking place at the time of the cleaning).

Similarly, OSHA is proposing to revise paragraph (j)(2)(iii), renumbered as paragraph (j)(3), to remove the reference to “beryllium-contaminated areas” and to prohibit the use of compressed air for cleaning where the use of compressed air causes, or can reasonably be expected to cause, airborne exposure above the TWA PEL or STEL. This is a change from the existing requirement, which prohibits the use of compressed air “unless the compressed air is used in conjunction with a ventilation system designed to capture the particulates made airborne by the use of compressed air.” This change limits when an employer can use compressed air for cleaning under these standards. In the 2017 final rule, OSHA determined that the use of compressed air might occasionally be necessary in general industry (82 FR at 2693). Similarly, for construction and shipyards, OSHA intended to prohibit the use of compressed air during cleaning of beryllium contaminated areas or materials designated for recycling or disposal unless used in conjunction with a ventilation system. This is similar to other construction standards such as lead (29 CFR 1926.62) and silica (29 CFR 1926.1153).

However, OSHA has reconsidered whether the use of ventilation with compressed air is practical when cleaning areas with copious amounts of dust produced during abrasive blasting. Therefore, OSHA is proposing a practical measure for when the use of compressed air for cleaning is allowed. OSHA is proposing to limit the use of compressed air to circumstances in which there is a limited quantity of dust which, if re-entrained, would not result in exposures above the TWA PEL or STEL. OSHA requests comment on whether compressed air is used in construction for cleaning abrasive blasting areas and the feasibility or practicality of the use of ventilation systems under these conditions.

The agency is next proposing to revise paragraph (j)(2)(iv), renumbered as paragraph (j)(4), to remove the phrase “in beryllium-contaminated areas,” for the reasons already discussed. Because under this proposal, the rest of paragraph (j) would no longer reference beryllium-contaminated areas, OSHA is proposing to remove the reference from paragraph (j)(4) and to require the use of respiratory protection and PPE in accordance with paragraphs (g) and (h) whenever employees use dry sweeping, brushing, or compressed air.⁸

Next, OSHA is proposing to remove paragraph (j)(3) of the standards, which requires that, when transferring beryllium-containing materials to another party for use or disposal, employers provide the recipient a copy of the warning label currently required by paragraph (m). As part of this proposal, OSHA is also proposing to remove the labeling requirement in paragraph (m). As noted above, all beryllium-containing

⁸ This proposal retains existing paragraph (j)(2)(v) without any changes, but renumbers it as paragraph (j)(5). Also, OSHA is proposing to remove the heading for “Cleaning Methods” and refer to these requirements only as “Housekeeping,” as is its usual treatment of such requirements in health standards.

materials in the shipyard and construction industries contain or produce only trace amounts of beryllium. Accordingly, this proposed revision is consistent with OSHA's intention, explained in the May 2018 general industry DFR, that provisions aimed at protecting workers from the effects of dermal contact do not apply to materials containing only trace amounts of beryllium, such as abrasive blasting media, unless those workers are also exposed to airborne beryllium at or above the action level (83 FR at 19940). It also aligns with the housekeeping provisions of the general industry rule (as modified by the DFR), which do not require labeling for materials which contain only trace quantities of beryllium and are designated for disposal, recycling, or reuse.

In response to the July 2017 NPRM, Materion commented that labeling requirements found in the Hazard Communication standard (29 CFR 1910.1200) are an appropriate standard to apply under these circumstances (Document ID 2145, p. 40). OSHA preliminarily agrees with Materion that the HCS requirements provide the appropriate information for spent abrasive blasting media containing only trace amounts of beryllium, where the material may be contaminated with several toxic chemicals such as hexavalent chromium or lead from the blasted substrate or coating on the substrate (see OSHA Fact Sheet, Protecting Workers from the Hazards of Abrasive Blasting Materials, available at <https://www.osha.gov/Publications/OSHA3697.pdf>). OSHA is concerned that providing warnings specific to beryllium for materials that contain trace beryllium and where airborne exposures are not anticipated to be significant might overshadow or dilute other hazard warnings (e.g., lead). Therefore, OSHA is proposing to remove the specific labeling requirements for beryllium. However, OSHA continues to require that these materials be labeled according to the Hazard Communication standard and that, if

appropriate, the hazards of beryllium must be addressed on the label and Safety Data Sheet (SDS).

The agency welcomes comment on these proposed revisions to paragraph (j). In particular, OSHA is interested in methods employers are using to clean abrasive blasting areas and how they minimize workers' exposures.

Paragraph (k) Medical surveillance

The 2017 final beryllium rule includes provisions for medical surveillance. It requires employers in both construction and shipyards to offer eligible employees, at no cost to the employee, participation in the medical surveillance program. Paragraph (k) specifies requirements of the medical surveillance program, such as which employees are eligible for medical surveillance, as well as frequency and content of medical examinations.

As explained in the 2017 final rule, the purposes of medical surveillance for beryllium are: (1) to identify beryllium-related adverse health effects so that appropriate intervention measures can be taken; (2) to determine if an employee has any condition that might make him or her more sensitive to beryllium exposure; and (3) to determine the employee's fitness to use personal protective equipment such as respirators (82 FR at 2696). The inclusion of medical surveillance in the beryllium standard for construction and shipyards is consistent with section 6(b)(7) of the OSH Act (29 U.S.C. 655(b)(7)), which requires that, where appropriate, medical surveillance programs be included in OSHA health standards to aid in determining whether the health of employees is adversely affected by exposure to the hazards addressed by the standard.

In light of information the agency received following the publication of the 2017 final rule, including comments submitted in response to the 2017 NPRM and through the general industry rulemaking, OSHA is proposing several revisions to paragraph (k). First, OSHA is proposing to remove paragraph (k)(1)(i)(C), which requires employers to make medical surveillance required by this paragraph available to each employee who is exposed to beryllium during an emergency. As discussed previously in the summary and explanation for paragraph (g), OSHA is proposing to remove references to emergencies in the shipyards and construction standards because OSHA expects that any emergency in these industries (such as a release resulting from a failure of the blasting control equipment, a spill of the abrasive blasting media or the failure of the ventilation system during welding operations in shipyards) would occur only during the performance of routine tasks already associated with the airborne release of beryllium; i.e., during the abrasive blasting or welding process (see the summary and explanation for paragraph (g)). Therefore, employees would already be protected from exposure in such circumstances. Accordingly, OSHA is proposing to remove emergencies as a trigger for all provisions of the construction and shipyards standards, including medical surveillance (paragraph (k)(1)(i)(C)).⁹

Second, OSHA is proposing minor changes to paragraph (k)(3)(ii)(A), which currently requires the employer to ensure that the employee is offered a medical examination that includes a medical and work history, with emphasis on, among other things, past and present airborne exposure to or dermal contact with beryllium, and

⁹ Due to the proposed removal of paragraph (k)(1)(i)(C), OSHA is also proposing to add the word “or” at the end of paragraph (k)(1)(i)(B) (following the semi-colon), remove a reference to paragraph (k)(1)(i)(C) from paragraph (k)(2)(i)(B), and redesignate paragraph (k)(1)(i)(D) as paragraph (k)(1)(i)(C). In addition, to correspond with that redesignation, OSHA is proposing to replace the reference to paragraph (k)(1)(i)(D) in paragraph (k)(2)(ii) with a reference to proposed paragraph (k)(1)(i)(C).

paragraph (k)(4)(i), which currently requires the employer to ensure that the examining physician or other licensed health care professional (PLHCP) (and the agreed upon CBD diagnostic center, if an evaluation is required under paragraph (k)(7) of this standard) has certain information, including a description of the employee's former and current duties that relate to the employee's airborne exposure to and dermal contact with beryllium, if known. Specifically, OSHA is proposing to clarify these provisions by replacing the phrase “airborne exposure to and dermal contact with beryllium” in these provisions with the simpler phrase “exposure to beryllium.” OSHA reasons that employees with beryllium exposure of any kind should have access to records of their exposure, and this information should also be made available to an examining PLHCP and CBD diagnostic center, if applicable. OSHA intends for this proposed change to alleviate any unnecessary confusion created by the use of the term “dermal contact,” which is defined in the general industry standard, but not in the construction and shipyards standards.

Third, OSHA is proposing two revisions to paragraph (k)(7)(i) of the construction and shipyards standards, which currently requires the employer to provide, at no cost to the employee, an evaluation at a CBD diagnostic center that is mutually agreed upon by the employee and employer within 30 days of the employer receiving one of the types of documentation listed in paragraph (k)(7)(i)(A) or (B). These proposed changes are consistent with changes the agency proposed to paragraph (k)(7)(i) of the beryllium standard for general industry in December 2018.

The first change relates to a proposed change to the definition of the term *CBD diagnostic center*. As discussed in more detail above, the current definition of that term in the construction and shipyards standards requires that the evaluation at the CBD

diagnostic center include a pulmonary function test as outlined by American Thoracic Society (ATS) criteria, bronchoalveolar lavage (BAL), and transbronchial biopsy. OSHA proposes amending that definition to indicate that a CBD diagnostic center must be capable of performing those tests, but need not necessarily perform all the tests during all evaluations. OSHA intended for the employer to provide those tests if deemed appropriate by the examining physician at the CBD diagnostic center. Therefore, the agency proposes expanding paragraph (k)(7)(i) to require that the employer provide, at no cost to the employee and within a reasonable time after consultation with the CBD diagnostic center, any of the following tests if deemed appropriate by the examining physician at the CBD diagnostic center: A pulmonary function test as outlined by ATS criteria; BAL; and transbronchial biopsy. The proposed changes would ensure the employee receives those tests if recommended by the examining physician and receives them at no cost and within a reasonable time (83 FR at 63764). In addition, the revision would clarify its original intent that, instead of requiring all of those tests to be conducted after referral to a CBD diagnostic center, the standard would allow the examining physician at the CBD diagnostic center the discretion to select one or more of those tests as appropriate.

The second proposed change relates to the timing of the evaluation at the CBD diagnostic center. In the proposal for the 2017 final rule (the 2015 NPRM), OSHA proposed to require a consultation between the employee and the licensed physician within 30 days of the employee being confirmed positive to discuss a referral to a CBD diagnostic center, but there was no time limit for the employer to provide the evaluation at the CBD diagnostic center (80 FR 47800, Summary and Explanation for proposed

paragraphs (k)(6)(i) and (ii)). In the final rule, OSHA altered this requirement, now in paragraph (k)(7)(i), to require that the examination at the CBD diagnostic center be provided within 30 days of the employer receiving one of the types of documentation listed in paragraph (k)(7)(i)(A) or (B).

Following the publication of the 2017 final rule, stakeholders raised concerns that scheduling the appropriate tests with an examining physician at the CBD diagnostic center may take longer than 30 days, making compliance with this provision difficult. In the 2018 general industry NPRM, OSHA addressed this concern by proposing to revise paragraph (k)(7)(i) of the general industry standard to require that the employer provide an initial consultation with the CBD diagnostic center, rather than the full evaluation, within 30 days of the employer receiving one of the types of documentation listed in paragraph (k)(7)(i)(A) or (B). OSHA is proposing an identical change in this rule.

As explained in the 2018 general industry NPRM, OSHA believes that such a consultation could be scheduled with a physician within 30 days and could be provided by telephone or by virtual conferencing methods (83 FR at 63758). Providing a consultation before the full examination at the CBD diagnostic center demonstrates that the employer made an effort to begin the process for a medical examination. It also allows (1) the employee to consult with a physician to discuss concerns and ask questions while waiting for a medical examination, and (2) the physician to explain the types of tests that are recommended based on medical findings about the employee and the risks and benefits of undergoing such testing. Although this proposed change would allow the employer more time to provide the full evaluation, the proposed requirement to provide any recommended tests within a reasonable time after the initial consultation would also

ensure that the employer secured an appointment for the evaluation in a timely manner. This proposed change would not prohibit the employer from providing both the consultation and the full evaluation at the same appointment, as long as the appointment is within 30 days of the employer receiving one of the types of documentation listed in paragraph (k)(7)(i)(A) or (B).

OSHA received several comments on the proposed changes to the medical surveillance provisions discussed above from American Thoracic Society (ATS), NJH, Department of Defense (DoD), and Materion (Document ID OSHA-2018-003-0021, p. 3; 0022, p.3-6; 0029, p. 2; 0038, p. 34). Materion agreed with OSHA's proposed changes (Document ID OSHA-2018-003-0038, p. 34). Other commenters including ATS, NJH and DoD expressed some concerns. ATS and NJH also commented that an examination at the CBD diagnostic center should not be required to occur within 30 days of the referral because it may take weeks or months before the CBD diagnostic center has an opening for an evaluation. However, they opposed the proposed requirement for a consultation that can be performed via telephone or virtual conferencing within 30 days of the employer receiving documentation, commenting that it would just add cost and logistics to scheduling and is not necessary (Document ID OSHA-2018-003-0022, p. 6; 0021, p. 3). DoD opposed the proposed change for a telephone or virtual consultation, arguing that an ill worker should be examined immediately (Document ID 0029, p. 2). As stated above, OSHA will consider these comments, along with any comments submitted during this rulemaking, in developing the final beryllium standards for construction and shipyards. The agency welcomes comment on these proposed revisions to paragraph (k).

Paragraph (m) Communication of Hazards

Paragraph (m) of the beryllium standards for construction and shipyards sets forth the employer's obligations to comply with OSHA's Hazard Communication Standard (HCS) (29 CFR 1910.1200) relative to beryllium, and to provide warnings and training to employees about the hazards of beryllium.

In the 2017 final rule, OSHA discussed the importance of the communication of hazards provision (see 82 FR at 2724-29). The agency pointed out the need for employees to understand the hazards of beryllium exposure, the protective measures necessary to minimize potential health hazards, and the rights afforded them under these standards. OSHA also noted that the training requirements serve to explain and reinforce the information available on labels and SDSs, which are most effective when employees understand the information (82 FR at 2724). Because beryllium is a hazardous chemical with serious and debilitating health effects, it is imperative that employers ensure that employees can demonstrate that they understand the training materials and have knowledge of the topics covered during the training sessions.

OSHA intended for the hazard communication requirements in the 2017 final rule to be consistent with the HCS, while including additional specific requirements needed to protect employees exposed to beryllium to ensure that they have access to the relevant information concerning the hazards to which they are exposed. While incorporating the requirements of the HCS in the beryllium standards, OSHA further required that employers not only incorporate information about beryllium into their hazard communication programs and training but also provide training specifically on the hazards associated with beryllium on an annual basis.

OSHA is proposing three changes to paragraph (m) in both the construction and shipyard standards to align with proposed changes to other provisions in these standards. First, OSHA is proposing to remove the paragraph (m) provisions that require specific language for warning labels applied to materials designated for disposal or PPE when removed from the workplace (paragraph (m)(2) in construction and paragraph (m)(3) in shipyards).¹⁰ This is consistent with OSHA's proposal to remove the corresponding requirements to provide such warning labels. As explained above with regard to paragraphs (h)(2)(v) and (j)(3), OSHA is proposing to remove the requirements in both standards to label PPE removed from the workplace for laundering, cleaning, maintenance, or disposal and beryllium-containing material destined for disposal. The agency is proposing these changes to reflect its intent that provisions aimed at protecting workers from the effects of dermal contact do not apply to materials containing only trace amounts of beryllium—like all beryllium-containing material used in abrasive blasting in the construction and shipyards industries—unless those workers are also exposed to airborne beryllium at or above the action level. Similarly, for the limited welding operations in shipyards, OSHA has evidence that at best only trace amounts of particulate beryllium will form (see the summary and explanation for paragraphs (h)(2)(v) and (j)(3)). Without these underlying requirements to provide labels, the provisions of paragraph (m) mandating specific language for such labels become unnecessary.

Second, OSHA is proposing to revise the provisions of paragraph (m) for employee information and training related to emergency procedures (paragraph

¹⁰ As a result, OSHA is also proposing to renumber paragraph (m)(4) in the shipyards standard (29 CFR 1915.1024) as paragraph (m)(3), renumber paragraph (m)(3) in the construction standard (29 CFR 1926.1124) as paragraph (m)(2), and revise the references in paragraph (m)(1)(ii) of both standards accordingly.

(m)(3)(ii)(D) in construction and paragraph (m)(4)(ii)(D) in shipyards)¹¹ and personal hygiene practices (paragraph (m)(3)(ii)(E) in construction and paragraph (m)(4)(ii)(E) in shipyards), for consistency with OSHA's proposed removal of emergency procedures and personal hygiene practices from the construction and shipyard standards. As discussed previously with respect to paragraph (g), OSHA is proposing to remove references to emergencies in the shipyards and construction standards because OSHA expects that any emergency in these industries (such as a release resulting from a failure of the blasting control equipment, a spill of the abrasive blasting media, or the failure of the ventilation system for welding operations in shipyards) would occur only during the performance of routine tasks already associated with the airborne release of beryllium; i.e., during the abrasive blasting or welding process (see the summary and explanation for paragraph (g)). As such, employees would already be protected through the use of respiratory protection from exposure in such circumstances. OSHA is also proposing to remove the hygiene provisions due to overlap with existing OSHA standards, the limited operations where beryllium exposure may occur in construction and shipyards, and the trace quantities of beryllium present in these operations (see the summary and explanation for paragraph (i)). As with the labeling requirement, the removal of these provisions renders the correlating training requirements unnecessary. OSHA requests comment on these proposed changes. OSHA specifically requests comment on the proposed removal of the requirement to train employees on personal hygiene practices and whether the agency should instead require training on the hygiene requirements of the relevant sanitation standard (29 CFR 1926.51 for construction and 29 CFR 1915.88 for shipyards).

¹¹ OSHA is also proposing to renumber the provisions of paragraph (m)(3)(ii) in construction and paragraph (m)(4)(ii) in shipyards to reflect the removal of this paragraph.

OSHA is also proposing to revise paragraph (m)(3)(i) in construction and paragraph (m)(4)(i) in shipyards—renumbered as paragraphs (m)(2)(i) and (m)(3)(i), respectively—to remove dermal contact as a trigger for training. Again, OSHA clarified in the 2018 DFR for general industry that it did not intend for provisions aimed at protecting workers from the effects of dermal contact to apply in the case of materials containing only trace amounts of beryllium, absent significant airborne exposures (83 FR at 19938). In the 2017 final rule, OSHA recognized that beryllium exposure in construction and shipyard industries is narrowly limited to trace quantities contained in certain abrasive blasting media and to exposure during some welding operations in shipyards (82 FR at 2690; Document ID 2042 III-66). Therefore, OSHA has preliminarily determined that training in shipyards and construction should be provided to each employee who has, or can reasonably be expected to have, airborne exposure to beryllium, without regard to dermal contact. OSHA notes that both standards already exempt materials containing less than 0.1% beryllium by weight where the employer has objective data demonstrating that employee exposure to beryllium will remain below the action level as an 8-hour TWA under any foreseeable conditions (see 29 CFR 1926.1124(a)(3) (construction) and 29 CFR 1915(a)(3) (shipyards)). Therefore, OSHA anticipates that the training requirements in proposed paragraph (m)(2) for construction and proposed paragraph (m)(3) for shipyards will continue to apply to all employees that are covered under these standards.

OSHA is also proposing to revise paragraph (m)(2)(ii)(A) in the construction standard and paragraph (m)(3)(ii)(A) in the shipyards standard to require training on the health hazards associated with “exposure to beryllium.” Likewise, OSHA is proposing to

revise paragraph (m)(2)(ii)(D) in the construction standard and paragraph (m)(3)(ii)(D) in the shipyards standard to require training on measures employees can take to protect themselves from “exposure to beryllium.” OSHA intends for this phrase to encompass both airborne and skin exposure to beryllium. These revisions would resolve an inconsistency between the shipyards and construction standards with respect to references to dermal contact and would simplify these provisions.

The agency welcomes comment on these proposed revisions to paragraph (m) for the construction and shipyards sectors.

Paragraph (n) Recordkeeping

Paragraph (n) of the beryllium standards for construction and shipyards requires employers to make and maintain records of air monitoring data, objective data, medical surveillance, and training. It also requires employers to make all required records available to employees, their designated representatives, the Assistant Secretary, and the Director of NIOSH, in accordance with OSHA’s records access standard, 29 CFR 1910.1020.

OSHA proposes to revise paragraphs (n)(1)(ii)(F), (n)(3)(ii)(A), and (n)(4)(i) of both the construction and shipyards standards to remove requirements for workers’ Social Security Numbers (SSNs) in air monitoring, medical surveillance, and training records. As promulgated in the 2017 final rule, paragraph (n)(1)(ii)(F) requires employers to include employees’ SSNs in exposure measurement records. Paragraph (n)(3)(ii)(A) similarly requires SSNs in medical surveillance records. Finally, paragraph (n)(4)(i) requires SSNs in training records.

OSHA is proposing to remove the requirements for SSNs in these records in order to make the beryllium standards for shipyards and construction consistent with OSHA's other health standards. After promulgating the 2017 final rule, OSHA finalized Phase IV of its Standards Improvement Project (SIP-IV), which removed from OSHA standards all requirements for employee SSNs in employer records (84 FR 21416, 21439-40 (May 14, 2019)).¹² As OSHA explained in the SIP-IV final rule, removing requirements for SSNs results in additional flexibility for employers and allows employers to develop systems that best work for their unique situations (84 FR at 21440). OSHA also explained that the change would protect employee privacy and lower the risk of identity theft (84 FR at 21439-40).

Removing requirements for SSNs from the construction and shipyard standards, as proposed, would not require employers to delete SSNs from existing records or prohibit employers from using SSNs on records if they wish to do so. OSHA believes that compliance with the recordkeeping provisions in the proposed beryllium standards would be straightforward for construction and shipyard employers that already comply with other OSHA standards that no longer contain requirements for SSNs.

OSHA welcomes comments on its proposal to revise paragraphs (n)(1)(ii)(F), (n)(3)(ii)(A), and (n)(4)(i) to remove requirements for SSNs in air monitoring, medical surveillance, and training records.

¹² Eliminating requirements to include SSNs in records is also responsive to a directive from OMB that calls for federal agencies to identify and eliminate unnecessary collection and use of SSNs in agency systems and programs (see Memorandum from Clay Johnson III, Deputy Director for Management, Office of Management and Budget, to the Heads of Executive Departments and Agencies Regarding Safeguarding Against and Responding to the Breach of Personally Identifiable Information (M-07-16), May 22, 2007 (available at: <https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/memoranda/2007/m07-16.pdf>)).

IV. PRELIMINARY ECONOMIC ANALYSIS

A. Introduction

This Preliminary Economic Analysis (PEA) addresses issues related to the profile of affected application groups, establishments, and employees; the cost savings and the benefits of OSHA's proposal to modify several construction and shipyard ancillary provisions. The proposal makes no changes to the 2017 final rule's TWA PEL and STEL for the shipyard and construction industries. Relative to the estimated costs in the Final Economic Analysis (2017 FEA) in support of the January 9, 2017, beryllium final rule (Document ID 2042), this NPRM would lead to total annualized cost savings of \$2.5 million in 2018 dollars at a 3 percent discount rate over 10 years; at a discount rate of 7 percent over 10 years, the annualized cost savings are approximately the same at \$2.5 million. When the Department uses a perpetual time horizon, the annualized cost savings of the proposal would be \$2.3 million in 2016 dollars at a 7 percent discount rate.

The proposal is not an "economically significant regulatory action" under Executive Order 12866 or UMRA; nor, if finalized as proposed, is it a "major rule" under the Congressional Review Act (5 U.S.C. 801 et seq.). Neither the benefits nor the costs of this proposal exceed \$100 million. In addition, they do not meet any of the other criteria specified by UMRA for a significant regulatory action or the Congressional Review Act for a major rule.

OSHA is proposing changes to several provisions. These proposed changes are designed to accomplish three goals: (1) to more appropriately tailor the requirements of the construction and shipyards standards to the particular exposures in these industries in light of partial overlap between the beryllium standards' requirements and other OSHA

standards; (2) to aid compliance and enforcement across the beryllium standards by avoiding inconsistency, where appropriate, between the shipyards and construction standards and proposed revisions to the general industry standard; and (3) to clarify certain requirements with respect to materials containing only trace amounts of beryllium.

This PEA provides OSHA’s preliminary assessment of how this NPRM would affect the costs and benefits of complying with the various proposed beryllium provisions, including costs adjustments to reflect changes in exposure rates and baseline compliance rates. All costs are estimated in 2018 dollars. Costs reported in 2018 dollars were applied directly in this PEA; wage data were updated to 2018 dollars using BLS data (BLS, 2018a); and all other costs reported for years earlier than 2018 were updated to 2018 dollars using the GDP implicit price deflator (BEA, 2019).

This introduction to the PEA is followed by:

- Section B: Profile of Affected Application Groups, Establishments, and Employees
- Section C: Technological Feasibility Summary
- Section D: Cost Savings
- Section E: Benefits

B. Profile of Affected Application Groups, Establishments, and Employees

Introduction

In this section, OSHA presents the preliminary profile of industries affected by this proposal to modify certain ancillary provisions for the shipyard and construction sectors. The profile data in this section are drawn from the industry profiles in Chapter III and exposure profiles and data in Chapter IV of the 2017 FEA, as well as the PEA in the

June 27, 2017, beryllium proposal (2017 PEA; Document ID 2076). Where this analysis discusses comments, those comments were received in response to this 2017 PEA.

In the 2017 FEA, OSHA first identified the North American Industrial Classification System (NAICS) industries, both in the shipyard and construction sectors, with potential worker exposure to beryllium. Next, OSHA provided statistical information on the affected industries, including the number of affected entities and establishments, the number of workers whose exposure to beryllium could result in disease or death (“at-risk workers”), and the average revenue and profits for affected entities and establishments by six-digit NAICS industry.¹³ This information was provided for each affected industry as a whole, as well as for small entities, as defined by the Small Business Administration (SBA), and for “very small” entities, defined by OSHA as those with fewer than 20 employees, in each affected industry (U.S. Census Bureau, 2014). For each industry sector identified, the agency described the uses of beryllium and estimated the number of establishments and employees that potentially would be affected by this rulemaking. Employee exposure to beryllium can also occur as a result of certain processes (such as welding) that are found in many industries. This analysis will use the term “application group” to refer to a cross-industry group with a common process. OSHA requests comment, including data, on other potentially affected industries and occupations in the construction and shipyard sectors.

¹³ The Census Bureau defines an establishment as a single physical location at which business is conducted or services or industrial operations are performed. The Census Bureau defines a business firm or entity as a business organization consisting of one or more domestic establishments in the same state and industry that are specified under common ownership or control. The firm and the establishment are the same for single-establishment firms. For each multi-establishment firm, establishments in the same industry within a state will be counted as one firm; the firm employment and annual payroll are summed from the associated establishments. (U.S. Census Bureau, Statistics of U.S. Businesses, Glossary, 2017, <https://www.census.gov/programs-surveys/susb/about/glossary.html> (Accessed March 3, 2017)).

In Chapter III of the 2017 FEA, OSHA described each application group; identified the processes and occupations with beryllium exposure, including available sampling exposure measurements; and explained how OSHA estimated the number of establishments working with beryllium and the number of employees exposed to beryllium. Those estimates and the exposure profiles for abrasive blasting in construction and shipyards, and welding in shipyards,¹⁴ are presented in this section, along with a brief description of the application groups and an explanation of the derivation of the revised exposure profiles. For additional information about these data and the application groups, please see Chapter III of the 2017 FEA.¹⁵ Finally, this section discusses wage data, the hire rate, and current industry practices.

Affected Application Groups

OSHA's 2017 FEA identified one affected application group in the construction sector and two application groups in the shipyard sector with potential beryllium exposure. Both the shipyard and construction sectors have affected employees in the abrasive blasting application group, and the shipyard sector has affected employees in the welding application group. OSHA's understanding of the affected application groups has not changed so for a description of these application groups, please see Chapter III of the 2017 FEA and section V.B. of the 2017 construction and shipyards NPRM, the Profile of Affected Application Groups, Establishments, and Employees within the Preliminary Economic Analysis (82 FR 29189-29200). The agency requests comment on whether

¹⁴ The exposure profile used for welding in shipyards in this PEA, and in the 2017 PEA, differs from the exposure profile used in Chapter III the 2017 FEA because OSHA is now using maritime-specific data pulled from the appendices to Chapter IV of the 2017 FEA. See 82 FR 29195.

¹⁵ OSHA contractor Eastern Research Group (ERG) provided support for the 2017 FEA.

there are any other application groups in the construction and shipyard sectors with potential beryllium exposure.

Exposure Profile

This section summarizes the data from the 2017 FEA (see Document ID 2042, FEA Chapter IV – Technological Feasibility). It is presented here for informational purposes only. The information in this section is drawn entirely from the 2017 FEA and contains no new information.

Abrasive Blasting in Construction and Shipyards

The primary abrasive blasting job categories include the abrasive blasting operator (blaster) and pot tender (blaster's helper or assistant) during open blasting projects. Support personnel such as pot tenders or abrasive media cleanup workers might also be employed to clean up (e.g., by vacuuming or sweeping) and recycle spent abrasive and to set up, dismantle, and move containment systems and supplies (NIOSH, 1976, Document ID 0779; NIOSH, 1993, 0777; NIOSH, 1995, 0773; NIOSH, 2007, 0770; Flynn and Susi, 2004, 1608; Meeker et al., 2005, 0699).

Section 15 of Chapter IV of the 2017 FEA included a detailed discussion of exposure data and analysis for the development of the exposure profile for workers in abrasive blasting operations. Because OSHA addressed general industry abrasive blasting operations in other general industry sections where appropriate, such as in the nonferrous foundries industry, the exposure profile in Section 15 addressed only exposure data from construction and shipyard tasks. The exposure profile for abrasive blasters, pot tenders/helpers, and abrasive media cleanup workers was based on two National Institute for Occupational Safety and Health (NIOSH) evaluations of beryllium exposure from

abrasive blasting with coal slag, unpublished sampling results for abrasive blasting operations from four U.S. shipyards, and data submitted by the U.S. Navy (NIOSH, 1983, Document ID 0696; NIOSH, 2007, 0770; OSHA, 2005, 1166; U.S. Navy, 2003, 0145).

Welding in Shipyards

Similar to the profile for abrasive blasting activities, OSHA used exposure data from the 2017 FEA to develop the exposure profile for welding in shipyards. OSHA used the exposure data from Chapter IV-10 Appendices 2 and 3 and combined the aluminum base metal and non-aluminum or unknown base material data. OSHA removed shorter duration samples that appeared in Appendix 3 of FEA chapter IV-10. Seven maritime welding samples from Appendix 3, Table IV-10.6 with sampling durations of 240 minutes or greater were used in this profile to represent the 8-hour TWA samples.

Compared to Chapter III of the 2017 FEA, this caused a change in the exposure profile for welders in shipyards. The exposure profile for welding in shipyards is based on data presented in appendices 2 and 3 of Section 10.6 of Chapter IV, and again is more fully summarized in Section IV of the 2017 PEA. Those data measure exposures of shipyard-based welders, and OSHA has preliminarily determined that it is a more suitable data set on which to base the exposure profile of welders in shipyards than the data used in the 2017 FEA, which were based on general industry welding exposures.

Tables IV-1 and IV-2 summarize, from the exposure profiles, the number of workers at risk of beryllium exposure and the distribution of 8-hour TWA beryllium exposures by affected application group and job category. Exposures are grouped into ranges (e.g., $> 0.05 \mu\text{g}/\text{m}^3$ and $< 0.1 \mu\text{g}/\text{m}^3$) to show the percentages of employees in each job category and sector exposed at levels within the indicated range.

Table IV-3 presents data by NAICS code on the estimated number of workers at risk of beryllium exposure for each of the same exposure ranges, based on the exposure profile data and the estimated number of workers in each job category and application group. As shown, an estimated 2,168 workers have beryllium exposures above the TWA PEL of 0.2 $\mu\text{g}/\text{m}^3$.

Table IV-1: Distribution of Beryllium Exposures by Application Group and Job Category or Activity

Job Category/Activity	Exposure Level ($\mu\text{g}/\text{m}^3$)								Total
	0 to ≤ 0.05	>0.05 to ≤ 0.1	>0.1 to ≤ 0.2	>0.2 to ≤ 0.25	>0.25 to ≤ 0.5	>0.5 to ≤ 1.0	>1.0 to ≤ 2.0	>2.0	
Abrasive Blasting – Construction									
Abrasive Blaster	15.2%	15.2%	25.7%	2.5%	12.4%	4.7%	5.4%	18.9%	100.0%
Pot Tender	28.1%	28.1%	43.8%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Cleanup	33.3%	33.3%	26.7%	0.0%	0.0%	0.0%	3.3%	3.3%	100.0%
Abrasive Blasting – Shipyards									
Abrasive Blaster	15.2%	15.2%	25.7%	2.5%	12.4%	4.7%	5.4%	18.9%	100.0%
Pot Tender	28.1%	28.1%	43.8%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Cleanup	33.3%	33.3%	26.7%	0.0%	0.0%	0.0%	3.3%	3.3%	100.0%
Welding – Shipyards									
Welder	47.4%	47.4%	1.5%	0.0%	0.0%	3.0%	0.7%	0.0%	100.0%

Note: Data may not sum to totals due to rounding.

[a] The lowest exposure range in OSHA's technological feasibility analysis is $\leq 0.1 \mu\text{g}/\text{m}^3$ (see Chapter IV-02, Limits of Detection for Beryllium Data, in the 2017 FEA (Document ID 2042) in support of the new beryllium standards). Because OSHA lacked information on the distribution of worker exposures in this range, the agency evenly divided the workforce exposed at or below $0.1 \mu\text{g}/\text{m}^3$ into the two categories shown in this table and in the columns with identical headers in Tables IV-2 and IV-3 of this PEA. OSHA recognizes that this simplifying assumption may overestimate exposure in these lower exposure ranges.

* Employers in application group Abrasive Blasting – Shipyards are shipyards employing abrasive blasters that use mineral slag abrasives to etch the surfaces of boats and ships.

** Employers in application group Welding in Shipyards employ welders in shipyards. Some of these employers may do both welding and abrasive blasting.

Source: Table V-7, 2017 beryllium proposal (82 FR at 29195).

Table IV-2: Number of Workers Exposed to Beryllium by Affected Application Group, Job Category, and Exposure Range (mg/m³)

Application Group/ Job Category	Exposure Level (µg/m ³)							Total	
	0 to ≤0.05	>0.05 to ≤0.1	>0.1 to ≤0.2	>0.2 to ≤0.25	>0.25 to ≤0.5	>0.5 to ≤1.0	>1.0 to ≤2.0		>2.0
Abrasive Blasting – Construction									
Abrasive Blaster	511	511	863	83	416	159	182	636	3,360
Pot Tender	945	945	1,470	0	0	0	0	0	3,360
Cleanup	560	560	448	0	0	0	56	56	1,680
Abrasive Blasting – Shipyards									
Abrasive Blaster	186	186	314	30	152	58	66	232	1,224
Pot Tender	344	344	536	0	0	0	0	0	1,224
Cleanup	204	204	163	0	0	0	20	20	612
Welding – Shipyards									
Welder	13	13	1	0	0	1	1	0	26
Total									
Construction Subtotal	2,016	2,016	2,781	83	416	159	238	692	8,400
Maritime Subtotal	747	747	1,013	30	152	59	87	252	3,086
Total, All Industries	2,763	2,763	3,794	114	568	218	324	944	11,486

Note: Data may not sum to totals due to rounding. Figures with actual values representing less than one person have been rounded up to one (person).

* Employers in application group Abrasive Blasting – Shipyards are shipyards employing abrasive blasters that use mineral slag abrasives to etch the surfaces of boats and ships.

** Employers in application group Welding in Shipyards employ welders in shipyards. Some of these employers may do both welding and abrasive blasting.

Source: Table V-8, 2017 beryllium proposal (82 FR at 29196).

Table IV-3: Number of Workers Exposed to Beryllium by Affected Industry and Exposure Level (mg/m³)

Application Group/ NAICS	Industry	Exposure Level (µg/m ³)								Total
		0 to ≤0.05	>0.05 to ≤0.1	>0.1 to ≤0.2	>0.2 to ≤0.25	>0.25 to ≤0.5	>0.5 to ≤1.0	>1.0 to ≤2.0	>2.0	
Abrasive Blasting – Construction										
238320	Painting and Wall Covering Contractors	1,046	1,046	1,443	43	216	82	123	359	4,360
238990	All Other Specialty Trade Contractors	970	970	1,337	40	200	76	114	333	4,040
Abrasive Blasting – Shipyards										
336611a	Ship Building and Repairing	734	734	1,013	30	152	58	87	252	3,060
Welding in Shipyards										
336611b	Ship Building and Repairing	13	13	1	0	0	1	1	0	26
Total										
Construction Subtotal		2,016	2,016	2,781	83	416	159	238	692	8,400
Maritime Subtotal		747	747	1,013	30	152	59	87	252	3,086
Total, All Industries		2,763	2,763	3,794	114	568	218	324	944	11,486

Note: Data may not sum to totals due to rounding. Figures with actual values representing less than one person have been rounded up to one (person).

* Employers in application group Abrasive Blasting – Shipyards are shipyards employing abrasive blasters that use mineral slag abrasives to etch the surfaces of boats and ships.

** Employers in application group Welding in Shipyards employ welders in shipyards. Some of these employers may do both welding and abrasive blasting.

Source: Table V-9, 2017 beryllium proposal (82 FR at 29196).

Summary of Affected Establishments and Employers

As shown in Table IV-4, OSHA estimates that a total of 11,486 workers in 2,796 establishments will be affected by this proposal. Also shown are the estimated annual revenues for these entities. Table IV-5 presents the agency's preliminary estimate of affected entities defined as small by SBA, and Table IV-6 presents OSHA's preliminary estimate of affected establishments and employees by NAICS industries for the subset of small entities with fewer than 20 employees.¹⁶ For the tables showing the characteristics of small and very small entities, OSHA generally assumed that beryllium-using small entities and very small entities would be the same proportion of overall small and very small entities as the proportion of beryllium-using entities to all entities as a whole in a NAICS industry. OSHA in the 2017 PEA requested public comment on the profile data presented in Tables IV-4, IV-5, and IV-6, and received none. OSHA continues to welcome comment on the number of affected establishments, entities, and employers.

¹⁶ Tables IV-5 and IV-6 indicate that small entities affected by the proposed rule contain 2,714 affected establishments affiliated with entities that are small by SBA standards and 2,365 affected establishments affiliated with entities that employ fewer than 20 employees. However, the small and very small entity figures in Tables IV-5 and IV-6 were not used to prepare the cost savings estimates in Section D of this PEA. For costing purposes in Section D, OSHA included small establishments owned by larger entities versus the figures in Tables IV-5 and IV-6 because such establishments do not qualify as "small entities" for the purposes of a Regulatory Flexibility Analysis. To see the difference in the number of affected establishments by size for costing purposes, consider the example of a "large entity" with 500 employees, consisting of 50 ten-employee establishments. In Section B., each of these 50 establishments would be excluded from Tables IV-5 and IV-6 because they are part of a "large entity"; in Section D., where all establishments are included because there is no filter for entity size, each would be considered a small establishment.

Thus, for purposes of Section D., there are 2,399 affected establishments with fewer than 20 employees, 369 affected establishments with between 20 and 499 employees, and 28 establishments with more than 500 employees. Census (2015) Statistics of US Businesses data suggest there are also a total of 3,464 establishments affiliated with entities in construction and shipyards employing between 20 and 499 employees, of which approximately 157 would be affected by the rule.

Table IV-4: Characteristics of Industries Affected by OSHA's Proposed Deregulatory Action for Beryllium - All Entities

NAICS Code	Industry	Total Entities [a]	Total Establishments [a]	Total Employees [a]	Affected Entities [b]	Affected Establishments [b]	Affected Employees [b]	Total Revenues (\$1,000) [a]	Revenues/Entity [a]	Revenues/Establishment [a]
Abrasive Blasting - Construction										
238320	Painting and Wall Covering Contractors	31,317	31,376	163,073	1,088	1,090	4,360	\$19,595,278	\$625,707	\$624,531
238990	All Other Specialty Trade Contractors	28,734	29,072	193,631	998	1,010	4,040	\$39,396,242	\$1,371,067	\$1,355,127
Abrasive Blasting - Shipyards										
336611a	Ship Building and Repairing	604	689	108,311	604	689	3,060	\$26,136,187	\$43,271,832	\$37,933,508
Welding in Shipyards										
336611b	Ship Building and Repairing	604	689	108,311	6	7	26	\$26,136,187	\$43,271,832	\$37,933,508
Total										
Construction Subtotal		60,051	60,448	356,704	2,086	2,100	8,400	\$58,991,520	\$982,357	\$975,905
Maritime Subtotal		604	689	108,311	610	696	3,086	\$26,136,187	\$43,271,832	\$37,933,508
Total, All Industries		60,655	61,137	465,015	2,696	2,796	11,486	\$85,127,707	\$1,403,474	\$1,392,409

[a] Data may not sum to totals due to rounding. [a] US Census Bureau, Statistics of US Businesses: 2012 (Document ID 2034).

[b] OSHA estimates of employees potentially exposed to beryllium and associated entities and establishments. Affected entities and establishments constrained to be less than or equal to the number of affected employees.

Source: Table V-4, 2017 beryllium proposal (82 FR at 29192).

Table IV-5: Characteristics of Construction and Shipyard Industries Affected by OSHA's Proposed Action for Beryllium - Small Entities

NAICS Code	Industry	SBA Small Business Classification (Employees) [a]	Small Business Entities [b]	Establishments for Small Entities [b]	Small Entity Employees [b]	Affected Small Business Entities [c]	Affected Small Establishments [c]	Affected Employees for Small Entities [c]	Total Revenues for Small Entities (\$1,000) [b]	Revenues/Small Entity	Revenues/Small Establishment
Abrasive Blasting - Construction											
238320	Painting and Wall Covering Contractors	100	31,221	31,243	133,864	1,085	1,085	3,579	\$16,552,251	\$530,164	\$529,791
238990	All Other Specialty Trade Contractors	100	28,537	28,605	143,112	991	994	2,986	\$29,789,492	\$1,043,890	\$1,041,409
Abrasive Blasting - Shipyards											
336611a	Ship Building and Repairing	1,250	585	629	27,170	585	629	768	\$6,043,893	\$10,331,440	\$9,608,732
Welding in Shipyards											
336611b	Ship Building and Repairing	1,250	585	629	27,170	6	6	7	\$6,043,893	\$10,331,440	\$9,608,732
Total											
Construction Subtotal		-	59,758	59,848	276,976	2,076	2,079	6,565	\$46,341,743	\$775,490	\$774,324
Maritime Subtotal		-	585	629	27,170	591	635	775	\$6,043,893	\$10,331,440	\$9,608,732
Total, All Industries		-	60,343	60,477	304,146	2,667	2,714	7,340	\$52,385,636	\$868,131	\$866,208

Data may not sum to totals due to rounding.

[a] SBA Size Standards, 2016.

[b] US Census Bureau, Statistics of US Businesses: 2012 (Document ID 2034).

[c] OSHA estimates of employees potentially exposed to beryllium and associated entities and establishments. Affected entities and establishments constrained to be less than or equal to the number of affected employees.

Source: Table V-5, 2017 beryllium proposal (82 FR at 29194).

Table IV-6: Characteristics of Industries Affected by OSHA's Proposed Deregulatory Action for Beryllium—Entities with Fewer Than 20 Employees

Application Group	NAICS	Industry	Entities with <20 Employees [a]	Establishments for Entities with <20 Employees [a]	Employees for Entities with <20 Employees [a]	Affected Entities with <20 Employees [b]	Affected Establishments for Entities with <20 Employees [b]	Affected Employees for Entities with <20 Employees [b]	Total Revenues for Entities with <20 Employees (\$1,000) [a]	Revenues Per Entity with <20 Employees	Revenue per Estab. For Entities with <20 Employees
Abrasive Blasting – Construction											
Abrasive Blasting - Construction	238320	Painting and Wall Covering Contractors	29,953	29,957	87,984	1,041	1,041	2,352	\$10,632,006	\$354,956	\$354,909
Abrasive Blasting - Construction	238990	All Other Specialty Trade Contractors	27,026	27,041	90,82	939	939	1,895	\$19,232,052	\$711,613	\$711,218
Abrasive Blasting – Shipyards*											
Abrasive Blasting - Shipyards	336611a	Ship Building and Repairing	380	381	2,215	380	381	381	\$547,749	\$1,441,445	\$1,437,661
Welding in Shipyards**											
Welding in Shipyards	336611b	Ship Building and Repairing	380	381	2,215	4	4	4	\$547,749	\$1,441,445	\$1,437,661
Total											
Construction Subtotal			56,979	56,998	178,806	1,980	1,980	4,247	\$29,864,058	\$524,124	\$523,949
Shipyards Subtotal			380	381	2,215	384	385	385	\$547,749	\$1,441,445	\$1,437,661
Total, All Industries			57,359	57,379	181,021	2,364	2,365	4,632	\$30,411,807	\$530,201	\$530,016

Data may not sum to totals due to rounding.

[a] US Census Bureau, Statistics of US Businesses: 2012 (Document ID 2034).

[b] OSHA estimates of employees potentially exposed to beryllium and associated entities and establishments. Affected entities and establishments constrained to be less than or equal to the number of affected employees.

* Employers in application group Abrasive Blasting – Shipyards are shipyards employing abrasive blasters that use mineral slag abrasives to etch the surfaces of boats and ships.

** Employers in application group Welding in Shipyards employ welders in shipyards. Some of these employers may do both welding and abrasive blasting.

Source: Table V-6, 2017 beryllium proposal (82 FR at 29195).

Loaded Wages and New Hire Rate

For this PEA, OSHA updated the 2017 PEA wage estimates from 2016 to 2018 levels using data for base wages by Standard Occupational Classification (SOC) from the March 2018 Occupational Employment Statistics survey of the Bureau of Labor Statistics. OSHA applied a fringe markup (loading factor) of 46.6 percent of base wages (BLS, 2018b, Document ID 2186);¹⁷ loaded hourly wages by application group and SOC are shown in Table IV-7. OSHA also updated the new hire rate for manufacturing from its 2017 PEA estimate of 25.7 percent to a final estimate of 34.7 percent (BLS, 2018c, Document ID 2173). The agency applied the updated rate (34.7 percent) in this preliminary profile and requests public comment on the preliminary wage and hire rates shown in Table IV-7.

Baseline Industry Practices and Existing Regulatory Requirements (“Current Compliance”) On Hazard Controls and Ancillary Provisions

Table IV-8 reflects OSHA’s estimate of baseline industry compliance rates, by application group and job category, for each of the ancillary provisions that, under the 2017 final rule, would affect the establishments that are subject to this preliminary deregulatory action. See Chapter III of the 2017 FEA for additional discussion of the current baseline compliance rates for each provision, which were estimated based on site visits, industry contacts, published literature, and the Final Report of the Small Business

¹⁷ A fringe markup (loading factor) of 46.6 percent was calculated in the following way. Employer costs for employee compensation for civilian workers averaged \$36.32 per hour worked in March 2018. Wages and salaries averaged \$24.77 per hour worked and accounted for 68.2 percent of these costs, while benefits averaged \$11.55 and accounted for the remaining 31.8 percent. Therefore, the fringe markup (loading factor) is $\$11.55 / \24.77 , or 45.6 percent. Total employer compensation costs for private industry workers averaged \$34.17 per hour worked in March 2018 (BLS, 2018b, Document ID 2186).

Advocacy Review (SBAR) Panel (SBAR, 2008, Document ID 0345). Note that the compliance rate is typically the same for all jobs in a given sector.

In the 2017 FEA, OSHA estimated that abrasive blasters in construction and shipyards had a 75 percent compliance rate with the PPE requirements in the beryllium standards. The 2017 PEA revised those estimates to 100 percent compliance based on the belief that 29 CFR 1926.57(f)(5)(v) already required abrasive blasting operators to wear full PPE, including respirators, gloves, safety shoes, and eye protection; that 29 CFR 1915.34(c)(3) required full PPE for abrasive blaster operators performing mechanical paint removal in shipyards; and that 29 CFR 1915.157(a) required welders in shipyards to wear gloves. (82 FR 29197). Some commenters disagreed with this estimate for abrasive blasting operations. NABTU noted that “with the exception of abrasive blasting operators wearing type CE respirators, construction workers’ use of PPE during abrasive blasting operations is extremely limited.” (Document ID 2129, p. 11). BHSC also expressed concern about the degree of protection afforded by the other OSHA standards to workers near abrasive blasting operations, stating that the estimated 100 percent PPE use for those workers “does not have supporting evidence of consistent and standard use across pot tenders and cleanup activities supporting abrasive blasting” (Document ID 2118, p. 5).

While the agency acknowledges these comments claiming that its revised 100 percent compliance estimate was too high for abrasive blasting operations, OSHA is also proposing to remove dermal contact with beryllium as a trigger for PPE requirements. This clarifies and limits the activities that would trigger PPE requirements under this proposal, making a higher baseline compliance estimate more appropriate. The agency

has preliminarily determined that a better estimate for PPE for abrasive blasting operations is in between the two previous estimates of 75 percent and 100 percent. OSHA preliminarily estimates 90% compliance for PPE for areas where exposures exceed, or can reasonably be expected to exceed, the TWA PEL or STEL, which are the only areas in which the standards would require PPE under the proposed revisions. For welders in shipyards, OSHA estimated a 0% compliance rate in the 2017 FEA and revised that estimate in the 2017 PEA because gloves are required under 29 CFR 1915.157(a) to protect workers from hazards faced by welders, such as thermal burns. OSHA continues to estimate a 100% PPE compliance rate for welders in shipyards in areas where exposures can exceed the TWA PEL or STEL because of the overlap with 29 CFR 1915.157(a).¹⁸

In the 2017 FEA, for the three occupational groups involved in abrasive blasting (operators, pot-tenders, and clean-up workers), OSHA estimated a 75% compliance rate with respirators that met the beryllium standards' requirements. In the 2017 PEA, operators, but not pot-tenders or clean-up workers, were revised to 100% compliance due to the strict existing standards for operators (see §§1926.57(f) and 1915.34(c)(3)(iv)). This PEA continues to use these baseline compliance estimates of 100% for operators and 75% for pot tenders and clean-up workers. For welders in shipyards, the 2017 FEA estimated 0% compliance with proper respirator use and a 25% compliance rate with the requirement to establish a respiratory protection program. OSHA is revising this estimate to 100% in this PEA because in shipyards, other standards addressing respiratory

¹⁸ In fact, the 0 percent baseline compliance rate for PPE in shipyard welding in the 2017 FEA was simply a mistake insofar as baseline compliance rate for PPE for welding in general industry was 100 percent in the same document. 2017 FEA, Ch. III, p. III-188.

protection include the Mechanical Paint Removers standard (29 CFR 1915.34(c)(3)), the Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment standards (29 CFR 1915.12(c)(4)(ii)), the Welding, Cutting, and Heating standards for shipyards (29 CFR 1915.51(d)(2)(iv)), as well as the general Respiratory Protection standards (29 CFR 1910.134, 1915.154).

The baseline compliance rates for the housekeeping provisions in the 2017 FEA were 0% for welders in shipyards and 75% for blasters, pot tenders, and clean-up workers in abrasive blasting in both construction and shipyards. In the 2017 PEA, OSHA reviewed existing housekeeping requirements and updated the estimate from 75% to 100% for abrasive blasting operations because some housekeeping is required by existing standards for abrasive blasting operations in construction and shipyards. The Summary and Explanation for housekeeping for this NPRM discusses the agency's preliminary finding that existing standards cover general housekeeping requirements for blasters, pot tenders, and clean-up workers, though these other standards allow some cleaning methods that the beryllium standards, and the proposed revisions, limit, like dry sweeping or brushing and compressed air. Under this proposal, housekeeping requirements would no longer apply when dust from trace amounts of beryllium could not be expected to cause airborne exposures above the TWA PEL and STEL. Hence, these requirements are estimated to only affect areas where workers are exposed above the TWA PEL or STEL in the exposure profile. While the proposed revisions will limit the methods that employers may use to clean up beryllium, OSHA estimates that cleaning methods that do not disperse beryllium into the air take approximately the same amount of time as cleaning methods already in use. For abrasive blasting operations, the agency therefore

maintains from the 2017 PEA its 100% compliance rate for housekeeping for abrasive blasting operations. OSHA requests comment on the compliance rate with the proposed housekeeping provisions in the abrasive blasting industries in construction and shipyards.

For welders in shipyards, OSHA estimated a 0% compliance rate for housekeeping in both the 2017 FEA and the 2017 PEA. As explained in the Summary and Explanation, OSHA has reason to believe that skin or surface contamination is not an exposure source of concern in welding in shipyards. The proposed revisions would also limit the circumstances in which housekeeping is required. OSHA therefore estimates that in welding in shipyards, employers will not have to engage in additional housekeeping to comply with the proposed revisions and is revising its baseline compliance estimate for housekeeping to 100% for welding in shipyards.

In the 2017 PEA, OSHA treated the compliance rates for vacuums, bags, and labels separately from the labor costs of housekeeping. OSHA estimated a 0% compliance rate for all industries in construction and shipyards for vacuums, bags, and labels because it believed the cost of such equipment was not covered by other standards. In this PEA, OSHA is setting the compliance rates under housekeeping for vacuums, bags, and labels to 100% as this proposal removes those requirements from the standard.

The baseline compliance rates for the hygiene areas provisions in the 2017 FEA were 0% for welders in shipyards and 75% for blasters, pot tenders, and clean-up workers in abrasive blasting in both construction and shipyards. As explained in the Summary and Explanation section of this preamble, OSHA is proposing to remove paragraph (i), Hygiene areas, from the construction and shipyards standards. The standards as modified by this proposal therefore no longer require employers to comply with any hygiene-

related provisions, and the baseline compliance is revised to 100% to demonstrate that there will be no cost associated with hygiene areas under the proposal.

The baseline compliance rate for each of the remaining provisions was unchanged from the 2017 FEA to the 2017 PEA and remains unchanged in this PEA. OSHA welcomes comments on the baseline compliance estimates shown in Table IV-8, particularly with respect to PPE and housekeeping.

As a final point on baseline industry practices, OSHA acknowledges the possibility of a future decline in the use of coal slag abrasive materials and welcomes comment and information on this issue. To the extent that coal slag abrasives are being replaced, for reasons unrelated to the implementation of this standard, by other blasting materials that do not have the potential for beryllium exposures of concern, the costs and benefits of compliance with the TWA PEL for abrasive blasting operations would also decrease.

Table IV-7: Loaded Hourly Wages and Hire Rate for Occupations (Jobs) Exposed to Beryllium and Affected by OSHA’s Proposed Beryllium Standard

Provision in the Standard	Job	NAICS	SOC[a]	Occupation	Median Hourly Wage	Fringe Markup Percentage, Total [b]	Loaded Hourly (or Daily[d]) Wage
Monitoring [c]	Industrial Hygienist Consultant	N/A	N/A	N/A	N/A	N/A	\$172.28
Monitoring [d]	IH Technician – Initial						\$2,759.73[d]
	IH Technician - Additional and Periodic						\$1,379.86
Regulated Area/Job Briefing [e]	Production Worker	31-33	51-0000	Production Occupations	\$17.37	46.6%	\$25.47
Medical Surveillance [e]	Human Resources Manager	31-33	11-3121	Human Resources Managers	\$53.38	46.6%	\$78.27
Exposure Control Plan, Medical Surveillance, and Medical Removal [e]	Clerical	31-33	43-4071	File Clerks	\$16.85	46.6%	\$24.71
Training [e]	Training Instructor	31-33	13-1151	Training and Development Specialists	\$28.99	46.6%	\$42.51
Medical Surveillance [e]	Physician (Employers' Physician)	31-33	29-1062	Family and General Practitioners	\$88.95	46.6%	\$130.43
Multiple Provisions [f]	First Line Supervisor	Various	51-1011	First-Line Supervisors of Production and Operating Workers	\$29.59	46.6%	\$43.39

Sources: U.S. Dept. of Labor, OSHA, Directorate of Standards and Guidance, Office of Regulatory Analysis (OSHA, 2019).

[a] 2010 Standard Occupational Classification System. Bureau of Labor Statistics. <http://www.bls.gov/soc/classification.htm>.

[b] BLS, 2018b. 46.6 percent represents fringe as a percentage of base wages. BLS-reported data for fringe as a percentage of total compensation is 31.8 percent.

[c] ERG estimates based on discussions with affected industries, and inflated to 2018 Dollars.

[d] Wages used in the economic analysis for the Silica final rule, inflated to 2018 Dollars.

[e] BLS, 2018a

[f] BLS, 2018a; Weighted average for SOC 51-1011 in NAICS 313000, 314000, 315000, 316000, 321000, 322000, 323000, 324000, 325000, 326000, 327000, 335000, 336000, 337000, and 339000.

Table IV-8: Estimated Current Compliance Rates for Industry Sectors Affected by OSHA's Proposed Beryllium Standard

Application Group	Job	Exposure Assessment	Regulated Areas/Competent Person	Medical Surveillance	Medical Removal Program	Exposure Control Plan	PPE	Hygiene		Training	Respirators		Housekeeping	
								Employees	Establishments		Employee/Respirator	Establishment/Respirator Program	Labor	Vacuum, Bags, Labels
Abrasive Blasting – Construction														
Abrasive Blasting - Construction	Abrasive Blaster	0%	75%	75%	0%	75%	90%	100%	100%	75%	100%	100%	100%	100%
Abrasive Blasting - Construction	Pot Tender	0%	75%	75%	0%	75%	90%	100%	100%	75%	75%	75%	100%	100%
Abrasive Blasting - Construction	Cleanup	0%	75%	75%	0%	75%	90%	100%	100%	75%	75%	75%	100%	100%
Abrasive Blasting – Shipyards														
Abrasive Blasting - Shipyards	Abrasive Blaster	0%	75%	75%	0%	75%	90%	100%	100%	75%	100%	100%	100%	100%
Abrasive Blasting - Shipyards	Pot Tender	0%	75%	75%	0%	75%	90%	100%	100%	75%	75%	75%	100%	100%
Abrasive Blasting - Shipyards	Cleanup	0%	75%	75%	0%	75%	90%	100%	100%	75%	75%	75%	100%	100%
Welding - Shipyards														
Welding - Shipyards	Welder	0%	0%	0%	0%	0%	100%	100%	100%	0%	100%	100%	100%	100%

Source: U.S. Dept. of Labor, OSHA, Directorate of Standards and Guidance, Office of Regulatory Analysis (OSHA, 2019).

[a] Estimated compliance rates for medical surveillance do not include medical referrals. OSHA estimates that baseline compliance rates for medical referrals are zero percent for all application groups shown in the table.

* Employers in application group Abrasive Blasting – Shipyards are shipyards employing abrasive blasters that use mineral slag abrasive to etch the surfaces of boats and ships.

** Employers in application group Welding in Shipyards employ welders in shipyards. Some of these employers may do both welding and abrasive blasting.

C. Technological Feasibility Summary

This section summarizes OSHA's technological feasibility findings made in the 2017 FEA (see Document ID 2042, FEA Chapter IV – Technological Feasibility). It is presented here for informational purposes only. The information in this section is drawn entirely from the 2017 FEA and contains no new information or assessment.

Overall, based on the information discussed in Chapter IV of the 2017 FEA, OSHA determined that the majority of the exposures in construction and shipyards are either already at or below the new final PEL, or can be adequately controlled to levels below the final PEL through the implementation of additional engineering and work practice controls for most operations most of the time. The one exception is that OSHA determined that workers who perform open-air abrasive blasting using mineral grit (i.e., coal slag) will routinely be exposed to levels above the final PEL even after the installation of feasible engineering and work practice controls, and therefore, these workers will also be required to wear respiratory protection. Therefore, OSHA concluded in the January 9, 2017 final rule that the final PEL of $0.2 \mu\text{g}/\text{m}^3$ is technologically feasible in abrasive blasting in construction and shipyards and in welding in shipyards.

D. Costs of Compliance

Introduction

Throughout this section, OSHA presents cost-saving formulas in the text, usually in parentheses, to help explain the derivation of cost-saving estimates for the individual provisions. Because the values used in the formulas shown in the text are shown only to the second decimal place, while the spreadsheets supporting the text are not limited to

two decimal places, the calculation using the presented formula will sometimes differ slightly from the totals presented in the tables.

These estimates of cost savings are largely based on the cost estimates presented for Regulatory Alternative 2a in the preamble for the 2017 final rule (82 FR at 2470, 2612-2615), which were in turn derived from the Costs of Compliance chapter (Chapter V) of the 2017 FEA. OSHA has retained the same calculation methods from the 2017 FEA, detailed in Chapter V of that document, and has updated all wages and unit costs to 2018 dollars. All cost savings in this PEA similarly are expressed in 2018 dollars and were annualized using discount rates of 3 percent and 7 percent, as required by OMB.¹⁹ Unit costs developed in this section were multiplied by the number of workers who would have to comply with the provisions, as identified in Section B of this PEA (Profile of Affected Application Groups, Establishments, and Employees). The estimated number of affected workers depends on what level of exposure triggers a particular provision and the percentage of those workers already in compliance. In a few cases, costs were calculated based on the number of firms. As in the 2017 FEA, OSHA is estimating that the beryllium standards will reduce the number of workers exposed to beryllium over the PEL by 90 percent. Therefore, for ancillary provisions that require employers to take action for employees who continue to be exposed over the PEL, like respiratory

¹⁹ See OMB Memo M-17-21 (April 5, 2017). OSHA included the 3 percent rate in its primary analysis, but Appendix IV-A of this PEA also presents costs by NAICS industry and establishment size categories using, as alternatives, a 7 percent discount rate—shown in Table IV-21—and a 0 percent discount rate—shown in Table IV-22.

protection and PPE, OSHA estimates the cost based on ten percent of the number of employees exposed over the PEL in the exposure profiles.

For purposes of calculating costs, OSHA assumes a 250-day work year. This is a standard calculation that OSHA and others use, which assumes employees work 5 days a week with 2 weeks of vacation, resulting in 250 work days per year (50 weeks x 5 work days a week). OSHA requests comment on the appropriateness of this estimate for both the construction and shipyard industries.

Estimated compliance rates are presented in Table IV-8 in Section B of this preamble. The estimated costs for this beryllium proposal represent the additional costs necessary for employers to achieve full compliance with the proposed rule. The costs of complying with the beryllium proposal's program requirements therefore depend on the extent to which employers in affected application groups have already undertaken some of the required actions. A discussion of affected workers is presented in Section B of this PEA. Complete calculations are available in the OSHA spreadsheet in support of this PEA (OSHA, 2019). Annualization periods for expenditures on equipment are based on equipment life, and one-time costs are annualized over a 10-year period.²⁰ The agency first presents costs for the full 2017 final rule with only updated wages, unit costs, and

²⁰ Executive Order 13563 directs agencies "to use the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible." In addition, OMB Circular A-4 suggests that analysis should include all future costs and benefits using a "rule of reason" to consider for how long it can reasonably predict the future and limit its analysis to this time period. Annualization should not be confused with depreciation or amortization for tax purposes. Annualization spreads costs out evenly over the time period (similar to the payments on a mortgage) to facilitate comparison of costs and benefits across different years. In cases where costs occur on an annual basis, but do not change between years, annualization is not necessary, and OSHA may refer simply to "annual" costs.

hiring rates based on 2018 data. All other estimates (compliance rates, exposure profile, etc.) are the same as the 2017 FEA. This is the baseline from which all cost savings of the proposal are benchmarked.

Table IV-9 shows these costs, which total for all occupations in construction and shipyards to \$12.7 million at a discount rate of 3 percent, an increase of 3% from the equivalent cost for the 2017 FEA (\$12.3 million).

**Table IV-9: Total Annualized Costs of full 2017 final Beryllium rule, by Sector and Six-Digit NAICS Industry;
Results Shown by Size Category (3 Percent Discount Rate, 2018 Dollars)**

Application Group/ NAICS	Industry	All Establishments	Small Entities (SBA-defined)	Very Small Entities (<20 Employees)
Abrasive Blasting – Construction				
238320	Painting and Wall Covering Contractors	\$4,704,939	\$3,962,355	\$2,775,400
238990	All Other Specialty Trade Contractors	\$4,360,056	\$3,352,464	\$2,288,751
Abrasive Blasting – Shipyards				
336611a	Ship Building and Repairing	\$3,531,117	\$1,131,837	\$593,268
Welding in Shipyards				
336611b	Ship Building and Repairing	\$74,259	\$21,743	\$12,163
Total				
Construction Subtotal		\$9,064,995	\$7,314,819	\$5,064,151
Maritime Subtotal		\$3,605,376	\$1,153,580	\$605,431
Total, All Industries		\$12,670,371	\$8,468,399	\$5,669,582

Notes:

Figures in rows may not add to totals due to rounding.

Source: US DOL, OSHA, Directorate of Standards and Guidance, Office of Regulatory Analysis

To estimate the cost savings of the proposal, OSHA estimated the difference between the costs of the 2017 final rule (with updated wages, prices, and hiring rate), Table IV-9, and the costs of this proposal. These cost savings are presented and discussed below. Table IV-10 shows first, by affected application group and six-digit NAICS code, annualized cost savings for all establishments, for all small entities (as defined by the Small Business Act and SBA's implementing regulations; see 15 U.S.C. 632 and 13 CFR 121.201), and for all very small entities (defined by OSHA as those with fewer than 20 employees). OSHA estimates that this proposal would yield a total annualized cost savings of \$2.5 million using a 3 percent discount rate across the shipyard and construction sectors.

The agency notes that it did not include an overhead labor cost either in the 2017 FEA in support of the January 9, 2017 final standards, the 2017 PEA, or in this PEA. There is not one broadly accepted overhead rate, and the use of overhead to estimate the marginal costs of labor raises a number of issues that should be address before being applying overhead costs to analyze the costs of any specific regulation. There are several approaches to look at the cost elements that fit the definition of overhead, and there are a range of overhead estimates currently used within the federal government—for example, the Environmental Protection Agency has used 17 percent,²¹ and government contractors

²¹ Cody Rice, U.S. Environmental Protection Agency, "Wage Rates for Economic Analyses of the Toxics Release Inventory Program," June 10, 2002 (document ID 2025). This analysis itself was based on a survey of several large chemical manufacturing plants: Heiden Associates, Final Report: A Study of Industry Compliance Costs Under the Final Comprehensive Assessment Information Rule, Prepared for the Chemical Manufacturers Association, December 14, 1989.

have reportedly used an average 50 percent for on-site (i.e., company site) overhead.²² Some overhead costs, such as advertising and marketing, vary with output rather than with labor costs. Other overhead costs vary with the number of new employees. For example, rent or payroll processing costs may change little with the addition of one employee in a 500-employee firm, but those costs may change substantially with the addition of 100 employees. If an employer is able to rearrange current employees' duties to implement a rule, then the marginal share of overhead costs such as rent, insurance, and major office equipment (e.g., computers, printers, copiers) would be very difficult to measure with accuracy.

If OSHA had included an overhead rate when estimating the marginal cost of labor, without further analyzing an appropriate quantitative adjustment, and adopted for these purposes an overhead rate of 17 percent on base wages, the cost savings of this proposal would increase by approximately \$237,000 per year, or approximately 10 percent above the primary estimate of cost savings.

²² For a further example of overhead cost estimates, please see the Employee Benefits Security Administration's guidance at Grant Thornton LLP, *2017 Government Contractor Survey*, <https://www.granthornton.com/-/media/content-page-files/public-sector/pdfs/surveys/2018/2017-government-contractor-survey>. According to Grant Thornton's *2017 Government Contractor Survey*, on-site rates are generally higher than off-site rates, because the on-site overhead pool includes the facility-related expenses incurred by the company to house the employee, while no such expenses are incurred or allocated to the labor costs of direct charging personnel who work at the customer site. For further examples of overhead cost estimates, please see the Employee Benefits Security Administration's guidance at <https://www.dol.gov/sites/dolgov/files/ebsa/laws-and-regulations/rules-and-regulations/technical-appendices/labor-cost-inputs-used-in-ebsa-opr-ria-and-pra-burden-calculations-july-2017.pdf>.

Table IV-10: Total Annualized Cost Savings, by Sector and Six-Digit NAICS Industry, for Entities Affected by the Shipyard and Construction Beryllium Standards (By Size Category, 3 Percent Discount Rate, 2018 Dollars)

Application Group/ NAICS	Industry	All Establishments	Small Entities (SBA-defined)	Very Small Entities (<20 Employees)
Abrasive Blasting – Construction				
238320	Painting and Wall Covering Contractors	\$931,193	\$766,473	\$507,332
238990	All Other Specialty Trade Contractors	\$862,849	\$640,416	\$409,777
Abrasive Blasting – Shipyards*				
336611a	Ship Building and Repairing	\$652,718	\$168,693	\$84,478
Welding in Shipyards**				
336611b	Ship Building and Repairing	\$20,525	\$5,419	\$3,007
Total				
Construction Subtotal		\$1,794,042	\$1,406,889	\$917,110
Shipyard Subtotal		\$673,243	\$174,112	\$87,485
Total, All Industries		\$2,467,286	\$1,581,001	\$1,004,594

Note: Figures in rows may not add to totals due to rounding.

* Employers in application group Abrasive Blasting – Shipyards are shipyards employing abrasive blasters that use mineral slag abrasives to etch the surfaces of boats and ships.

Source: US DOL, OSHA, Directorate of Standards and Guidance, Office of Regulatory Analysis.

Program Cost Savings

This subsection presents OSHA's estimated cost savings from this proposal for each provision individually. Each provision will be discussed separately below. Where there is either no change from the 2017 final rule or a change that does not alter the underlying methodology, such as a change in compliance rates or the elimination of the dermal contact trigger, no underlying methodology or unit cost estimates are presented as they are the same, updated to 2018 dollars, as the 2017 FEA. In other cases both the initial methodology and unit cost estimates are presented. All cost savings by program element, along with the cost savings for each affected NAICS industry, are shown in Table IV-15 at the end of this program cost-savings section.

Exposure Assessment

Overview of Regulatory Requirements in the 2017 Final Rule and Proposed Changes

OSHA is not proposing any changes to paragraph (d), Exposure assessment. OSHA is also not changing any estimates to the baseline compliance rate with this paragraph. Hence, there are no cost savings for this provision.

Beryllium Regulated Areas (Shipyards) And Competent Person (Construction)

OSHA is not proposing any changes to paragraph (e), the regulated areas provision in shipyards or the competent person provision in construction, nor are there any changes to compliance rates. Hence, there are no cost savings for this provision.

Methods of Compliance

Overview of Regulatory Requirements in the 2017 Final Rule

Under the current beryllium standards, employers are required to establish and maintain a written exposure control plan.

Further, employers must review it at least annually, and must update the exposure control plan when:

(A) Any change in production processes, materials, equipment, personnel, work practices, or control methods results or can reasonably be expected to result in new or additional airborne exposures to beryllium;

(B) The employer becomes aware that an employee has a beryllium-related health effect or symptom, or is notified that an employee is eligible for medical removal; or

(C) The employer has any reason to believe that new or additional airborne exposures are occurring or will occur.

Finally, the employer must make a copy of the written exposure control plan accessible to each employee who is, or can reasonably be expected to be, exposed to airborne beryllium.

Paragraph (f)(2)(i) of the 2017 final standards requires employers to use at least one engineering or work practice control where exposures are, or can reasonably be expected to be, above the action level unless the employer can establish that such controls are not feasible or that airborne exposure is below the action level. Paragraph (f)(3) prohibits rotation of workers among jobs to achieve compliance with the TWA PEL and STEL.

Cost Savings Estimates of this Proposal

For the written exposure control plan, OSHA is proposing several revisions. First, OSHA proposes to remove the words “airborne” and “or dermal contact with” as

qualifiers for exposure to beryllium. This would not change coverage of workers for which a written exposure control plan is needed for these sectors, and would therefore have no impact on costs. This proposal would reduce the number of elements that must explicitly be listed in the plan. The elements OSHA is proposing to eliminate are: procedures for minimizing cross contamination and the migration of beryllium within or to locations outside the workplace; procedures for removing, laundering, cleaning, storing, repairing, and disposing of beryllium contaminated PPE, including clothing, and equipment including respirators; a separate listing of operations and job titles for those that would entail beryllium exposure above action level; and a separate listing of those that would be above the TWA PEL or STEL. This streamlined written control plan would still include a list of operations and job titles that involve exposure to beryllium; a list of engineering controls, work practices, and respiratory protection; and procedures for restricting access to work areas where airborne exposures are, or can reasonably be expected to be, above the TWA PEL or STEL. OSHA is also proposing a new requirement to list procedures used to ensure the integrity of each containment used to minimize exposures to employees outside the containment.

The agency estimates that the cost for the written exposure control plan will be cut in half due to the reduced requirements in this proposal. This estimate includes the additional time needed for the new paragraph that requires including procedures for containment. OSHA estimated in the current beryllium standards that the time burden per establishment for an average-sized firm to develop the initial written exposure control plan was 8 hours. With the simplified written plan requirements, the agency thus judges that a manager will need only 4 hours, a reduction of 4 hours, for a per establishment cost

savings of \$313.08 at an hourly wage of \$78.27 (Human Resources Managers, SOC: 11-3121), to develop the plan.

In addition, because larger firms with more affected workers will need to develop more complicated written control plans, OSHA estimated for the current beryllium standards that the development of a plan would require an extra thirty minutes of a manager's time per affected employee. The reduced number of job titles and operations that would need to be listed in some cases for this proposal, as well as other elements, will decrease this burden, and the agency has lowered the time per affected employee to 15 minutes, a reduction of 15 minutes. The cost savings for 15 minutes less of a manager's time per affected employee to develop a less complicated plan is \$19.57 ($0.25 \times \78.27) per affected employee in this PEA.

Because of various triggers under which the employer would have to update the plan at least annually after the first year, the agency further estimated that in the current beryllium standards, on average, managers would need 12 minutes (0.2 hours) per affected employee per quarter—or 48 minutes (4×12), which equals 0.8 hours, per affected employee per year—to review and update the plan. The streamlined plan will similarly be simpler to update, and the agency assumes the amount will be cut in half, from 48 minutes per employee per year to 24 minutes, a reduction of 24 minutes. Thus, the cost savings for managers to review and update the plan would be \$31.31 ($0.4 \times \78.27 per affected employee) for years 2-10.

Finally, OSHA estimated 5 minutes of clerical time each year per employee for providing each employee with a copy of the written exposure control plan. This will not

change under this proposal, so there are no cost savings for this element. See Table IV-11 for a summary of these unit cost saving estimates.

Table IV-11: Unit Cost Savings for Written Exposure Control Plan

Item	Value
Develop Plan	
HR Manager Hour Decrease per Establishment	4
HR Manager Hour Decrease per Employee	0.25
HR Manager Wage	\$78.27
Unit Cost Savings per Establishment	\$313.08
Unit Cost Savings per Employee	\$19.57
Review Plan	
HR Manager Hour Decrease per Employee	0.10
Times Reviewed per Year	4
HR Manager Wage	\$78.27
Unit Cost Savings per Employee	\$31.31
Total	
Unit Cost Savings per Establishment	\$313.08
Unit Cost Savings per Employee	\$50.88

Sources: BLS, 2019a; BLS, 2018; US DOL, OSHA, Directorate of Standards and Guidance, Office of Regulatory Analysis.

OSHA estimates that the total annualized cost savings for reducing the requirements for development and update of a written exposure control plan is \$122,989 for all affected industries in shipyards and construction.

In addition, OSHA proposes to revise paragraph (f)(2) concerning engineering and work practice controls by removing the requirement to implement one engineering or work practice control where exposures are between the action level and the PEL. However, based on the technological feasibility analysis presented in Chapter IV of the 2017 FEA, OSHA determined that there were no instances in construction or shipyards where this provision would apply (see pp. V-11/12 of the 2017 FEA). Thus, this proposed revision has no effect on costs.

OSHA is not proposing to revise paragraph (f)(3), which prohibits rotation of workers to achieve the TWA PEL and STEL, so there are no cost savings associated with this provision.

OSHA is not proposing to revise the baseline compliance estimates for the requirements of paragraph (f), so there are no associated cost adjustments.

Respiratory Protection

Overview of Regulatory Requirements in the 2017 Final Rule

The employer must provide respiratory protection at no cost to the employee and ensure that each employee uses respiratory protection: during periods necessary to install or implement feasible engineering and work practice controls where airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL; during operations, including maintenance and repair activities and non-routine tasks, when engineering and work practice controls are not feasible and airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL; during operations for which an employer has implemented all feasible engineering and work practice controls when such controls are not sufficient to reduce airborne exposure to or below the TWA PEL or STEL; during emergencies; and when an employee who is eligible for medical removal under paragraph (l)(1) chooses to remain in a job with airborne exposure at or above the action level, as permitted by paragraph (l)(2)(ii) of this standard.

The selection and use of such respiratory protection must be in accordance with the Respiratory Protection standard (29 CFR 1910.134). The employer must provide at no cost to the employee a powered air-purifying respirator (PAPR) instead of a negative

pressure respirator when respiratory protection is required, an employee requests one, and the PAPR would provide adequate protection to the employee.

Cost Savings Estimates of this Proposal

Proposed changes

OSHA is proposing to revise paragraph (g) by removing the requirement to provide respiratory protection during emergencies. In the 2017 final rule, OSHA stated that emergencies should be rare and therefore did not account for any respirator costs due to emergencies. The cost adjustments described in this section are due to revised baseline compliance estimates and are discussed below.

Updated baseline compliance estimates

As discussed in section IV.B of this NPRM, the compliance rate for respirator use, for abrasive blast operators only, is estimated to be 100% in this PEA, due to closer analysis of existing standards for operators. The 2017 FEA estimated compliance rates for respirators for all abrasive blasting occupations as 75%. Hence, there is a cost adjustment due to the 25% of operators who will not need to be provided respirators as estimated under the 2017 final rule. For pot tenders and helpers, OSHA is not estimating a change in the compliance rate for respiratory protection. For welders in shipyards, the change in the exposure profile from the 2017 FEA to the 2017 PEA (as explained above in section IV.B.), and retained in this PEA, slightly decreased respirator use as well. The 2017 FEA estimated a 0% compliance rate for respiratory protection and a 25% compliance rate for setting up a respiratory protection program, while this PEA estimates a 100% compliance rate for both. The 2017 FEA estimated 29.7% of welders in shipyards had beryllium exposures over the new PEL of $0.2 \mu\text{g}/\text{m}^3$. The 2017 PEA and this PEA

estimate that only 3.7% of welders in shipyards have beryllium exposures over the new PEL of $0.2 \mu\text{g}/\text{m}^3$. As in the 2017 FEA, OSHA is estimating that the beryllium standards will reduce the number of workers with exposures above the PEL by 90 percent.

The cost method that follows is largely the same as that used in the 2017 FEA with updated 2018 wage rates, with two exceptions. First, blasting operators, due to other existing standards (1926.57(f), 1915.34(c)), must use supplied air respirators (SARs) and will not have the option of requesting a PAPR. Second, no cleaning costs for a PAPR were estimated in the 2017 FEA. This is revised below because OSHA now estimates that PAPRs will need to be cleaned periodically.

Unit cost estimates

There are five primary costs for respiratory protection. First, there is a cost per establishment to set up a written respirator program in accordance with the respiratory protection standard (29 CFR 1910.134). The respiratory protection standard requires written procedures for the proper selection, use, cleaning, storage, and maintenance of respirators. OSHA estimates that these procedures will take a human resources manager 8 hours to develop, at an hourly wage of \$78.27 (Human Resources Managers, SOC: 11-3121), for an initial cost of \$626 (8 x \$78.27). Every year thereafter, OSHA estimates that the same employee will take 2 hours to update the respirator program, for an annual cost of \$157 (2 x \$78.27).

The four other major costs of respiratory protection are the per-employee costs for all aspects of respirator use: equipment, training, fit testing, and cleaning.

In the 2017 FEA, no respirator cleaning was assumed to be required for PAPRs. OSHA now believes that despite the fact that PAPRs are assigned to individual

employees, PAPRs, like half-mask respirators, will need periodic cleaning. This cleaning cost for a PAPR is estimated to be the same as for a half mask respirator. Periodic cleaning of a PAPR is estimated to be needed every two days, or 125 times annually (250/2). Each cleaning is estimated to take 5 minutes, or 0.08 (5/60) hours, and the wage cost per hour is \$25.47 ((Production Occupations, SOC: 51-0000). Multiplied together, this gives an annual respirator cleaning cost of \$265.30 (125 x 0.08 x \$25.47). Summing these costs together, the total annualized per-employee cost for a full-face powered air-purifying respirator is \$1434.50 (\$145.27 + \$94.33 + \$929.60 + \$265.30).

Cost savings estimates

In the 2017 FEA, OSHA estimated that PAPRs would be used 10 percent of the time in situations where only the APF of 10 provided by a half-mask negative pressure respirator would normally be required to comply with the final beryllium TWA PEL and STEL. For the 25% of pot tenders and clean-up workers who need respirators (accounting for an unchanged baseline compliance rate of 75%), this amounts to 2.5% of the pot tenders and clean-up workers who are still exposed over the PEL after the standards take effect who will use PAPRs. OSHA is therefore adjusting the costs by including the cost of cleaning PAPRs for that 2.5% of workers.

For the revised compliance rate for abrasive blasting operators, from 75% in the 2017 FEA to 100% in this PEA, there is a cost adjustment due to the 25% of overexposed operators after the standards take effect who should not have had costs taken in the 2017 FEA. Since the 2017 FEA did not estimate cleaning costs for PAPRs, the cost savings here will not include such cleaning costs. This cost savings consists of the cost of PAPRs

minus cleaning costs (10% of respirators), and the cost of half-mask respirators (90% of respirators).

The cost adjustment due to the change in the exposure profile for welders discussed in section IV.B of this PEA uses this same methodology of accounting for savings due to PAPRs (minus cleaning costs) and half-mask respirators. Furthermore, OSHA notes there is a change in the exposure profile for welders in shipyards from the 2017 FEA, but because the revised baseline compliance rate for these workers is 100%, this does not affect the cost adjustment.

The exposure profile (Table IV-2) shows the number of abrasive blasting operators that are above the 0.2 $\mu\text{g}/\text{m}^3$ PEL. This PEA follows the 2017 FEA of estimating 10% of workers will still be above the PEL after the standards take effect. The compliance rate for operators went from 75% in the 2017 FEA to 100% in this PEA, so 25% of operators above the PEL after the rule is in place were assigned costs in the 2017 FEA that, with the 100% compliance rate, should no longer be taken. In the 2017 FEA, OSHA estimated the average cost of a respirator for an abrasive blasting operator as 90% of the cost of a half-mask respirator and 10% of a PAPR. For the abrasive blasting operators above the PEL, this gives a total cost adjustment of \$40,915.

As discussed above, 2.5% of pot-tenders and clean-up workers still exposed above the PEL after the standards take effect will be using PAPRs. The total number of such workers can be found in Table IV-2, and when multiplied by cleaning costs of PAPRs, this gives the additional cost adjustment of \$12,238 for the revision from the 2017 FEA of including cleaning costs for PAPRs for these workers.

Welders in shipyards were inadvertently assigned a 0% compliance rate in the 2017 FEA, revised in the 2017 PEA and this PEA to 100%. Hence all welders in shipyards, found in Table IV-2, will be affected. Like all others needing respirators, in the 2017 FEA, 90% were assigned half-mask respirators and 10% were assigned PAPRs. These two groups of welders, multiplied by the costs of their respective type of respirators, but without cleaning costs since cleaning costs were not included in the 2017 FEA, gives the cost adjustment of \$858 for welders in shipyards.

The reduction in workers needing respirators and needing to participate in respiratory protection programs due to the update of the compliance rate for abrasive blasting operators in both construction and shipyards and welders in shipyards, the extra cleaning costs for pot-tenders and clean-up workers who opt for PAPRs, and the updated unit costs give a total cost adjustment of \$54,011, as shown in Table IV-16.

Tables IV-12 and IV-13 summarizes the unit cost estimates for the two types of respirators.

Table IV-12: Unit Respiratory Protection Cost per Employee

Item	Value	
	Half Mask	PAPR
Training		
Class size	4	4
Hours	2	4
Employee wage	\$25.47	\$25.47
Supervisor wage	\$43.39	\$43.39
Hourly cost per employee	\$36.32	\$36.32
Annual Cost Savings per Employee	\$72.63	\$145.27
Respirator Cleaning Cost Savings		
Frequency per year	125	125
Employee hours	0.08	0.08
Employee wage	\$25.47	\$25.47
Annual Cost Savings per Employee	\$265.30	\$265.30
Fit Testing		
Testing group size	4.00	2.00

Employee hours	1.00	2.00
Employee wage	\$25.47	\$25.47
Supervisor wage	\$43.39	\$43.39
Annual Cost Savings per Employee	\$36.32	\$94.33
Equipment Cost		
Respirator	\$33.68	\$971.11
Respirator service life (years)	2	3
Annualized respirator cost savings (3%)	\$17.60	\$343.32
Annual accessory cost savings	\$210.42	\$586.29
Total Annualized Equipment Cost Savings (3%)	\$228.02	\$929.60
Total		
Equipment	\$228.02	\$929.60
Training, cleaning, and fit testing	\$374.26	\$504.90

Note: Figures in rows may not add to totals due to rounding.

Sources: BLS, 2019a; BLS, 2018; Magidglove, 2012; Grainger, 2012e; Restockit, 2012; Spectrumchemical, 2012; Conney, 2012a; Conney, 2012b; Zoro Tools, 2012a; Grainger, 2019c; Grainger, 2019d; Advanz Lens Goggles, 2019; Gemplers, 2012; Buying Direct, 2012; Amazon.com, 2013; Zoro Tools, 2013; Grainger, 2013b; EnviroSafety Products, 2013; BEA, 2019; US DOL, OSHA, Directorate of Standards and Guidance, Office of Regulatory Analysis; Grainger, 2019a; Grainger, 2019b.

Table IV-13: Half-Mask and Powered Air Purifying Respirator (PAPR) Unit Cost		
	Half- Mask	PAPR
Respirator		
Respirator	\$33.68	\$971.11
Annual Costs		
Training	\$72.63	\$145.27
Cleaning	\$265.30	\$265.30
Fit Testing	\$36.32	\$94.33
Accessories	\$210.42	\$586.29
Annual Subtotal	\$584.67	\$1,091.19
Annualized Costs		
Years	2	3
Annualized Unit Cost (3%)	\$602.28	\$1,434.51
Annualized Unit Cost (7%)	\$603.30	\$1,461.23

Sources: Magidglove, 2012; Grainger, 2012e; Restockit, 2012; Spectrumchemical, 2012; Conney, 2012a; Conney, 2012b; Zoro Tools, 2012a; Grainger, 2019c; Grainger, 2019d; Advanz Lens Goggles, 2019; Gemplers, 2012; Buying Direct, 2012; Amazon.com, 2013; Zoro Tools, 2013; Grainger, 2013b; EnviroSafety Products, 2013; Grainger, 2019a; Grainger, 2019b.

Personal Protective Clothing and Equipment

Overview of Regulatory Requirements in the 2017 Final Rule

Under the 2017 final rule, personal protective clothing and equipment are required for workers in shipyards and construction where exposure exceeds or can reasonably be expected to exceed the TWA PEL or STEL, or where there is a reasonable expectation of dermal contact with beryllium.

The employer must ensure that each employee removes all beryllium-contaminated personal protective clothing and equipment at the end of the work shift or, at the completion of all tasks involving beryllium, or when personal protective clothing or equipment becomes visibly contaminated with beryllium, whichever comes first. All such personal protective clothing and equipment must be removed as specified in the written exposure control plan. Personal protective clothing and equipment must be kept separate from street clothing and the employer must ensure that storage facilities prevent cross-contamination. The employer must ensure that personal protective clothing and equipment is not removed from the workplace except by authorized personnel, with appropriate containers and labels that are in accordance with paragraph (m)(2). All reusable personal protective clothing and equipment must be cleaned, laundered, repaired, and replaced as needed.

The employer must ensure that beryllium is not removed from personal protective clothing and equipment by blowing, shaking, or any other means that disperses beryllium into the air. The employer must inform in writing the persons or the business entities who launder, clean or repair the personal protective clothing or equipment required by this standard of the potentially harmful effects of airborne exposure to and dermal contact with beryllium and that the personal protective clothing and equipment must be handled in accordance with this standard.

Cost Savings Estimates of this Proposal

OSHA is proposing several revisions to the PPE provisions of the standards. OSHA proposes to remove the requirements regarding storage facilities, providing PPE when there is a reasonable expectation of dermal contact with beryllium, removal of PPE when it becomes visibly contaminated with beryllium, storing and keeping PPE separate from employees' street clothing, removal of beryllium-contaminated PPE from the workplace, and transportation and labeling of PPE that is removed from the workplace. OSHA is also proposing to remove the qualifier "beryllium-contaminated" and replace it with "required by this standard."

Under these proposed changes, the PPE provisions will only apply to employees who are, or can reasonably be expected to be, exposed over the TWA PEL or STEL. In the 2017 FEA, OSHA also estimated PPE costs for the 25% of employees who would be exposed below the PEL but who nevertheless may have dermal contact with beryllium. OSHA also estimated ten minutes of clerical time for each establishment with laundry needs to notify the cleaners in writing of the potentially harmful effects of beryllium exposure and how the protective clothing and equipment must be handled in accordance with the beryllium standard, so the proposed removal of that provision would result in a cost savings. OSHA did not estimate costs for storage facilities because it judged that no employers would need them.

As stated in the compliance section in IV.B, above, OSHA preliminarily estimates a 90% compliance rate for all PPE for workers who have exposures above the TWA PEL or STEL. This is a change from the 2017 FEA, which estimated a 75% compliance rate for PPE for all workers, not just those exposed above the TWA PEL or STEL, because of

the proposed change to the PPE provisions that would only require PPE where exposures can exceed the TWA PEL or STEL. Hence, there is an adjustment to costs due to the decreased number of workers, from 25% to 10%, with exposures above the TWA PEL or STEL who will need PPE. The exposure profile (Table IV-2) shows the number of workers who are exposed above the $0.2 \mu\text{g}/\text{m}^3$ PEL. For those above the PEL, the decrease in the compliance rate from 25% to 10%, or 15%, along with OSHA's standard calculation that 10% of those workers will continue to be exposed above the PEL after the standards take effect, means 1.5% of these workers will no longer need PPE. This number of workers times the unit costs (discussed below) gives the cost adjustment for this group. For those workers whose exposures are below the TWA PEL and STEL, there will also be a cost savings for the 25% that the 2017 FEA estimated did not have proper PPE, due to the proposed removal of the dermal contact trigger for PPE. The exposure profile (Table IV-2) shows the number of workers below the PEL. OSHA is proposing to revise the compliance rate from 75% to 100%, so 25% will no longer need PPE. This number of workers times the unit costs (discussed below) gives the cost adjustment for this group.

The cost savings due to the proposed removal of the requirement to notify laundries is per-establishment, not per-worker, and the number of establishments can be found in Table IV-4. The total number of affected establishments times the cost of clerical time, below, gives the cost savings for this proposed revision.

In the 2017 FEA, OSHA estimated that employers would rent rather than purchase PPE. The annual cost for rental would be \$53.67 per employee, inflated from the 2017 FEA estimate of \$48.62. The per-establishment annual cost savings for the ten

minutes of clerical time required to notify laundries is \$4.12 (\$24.71 hourly wage, File Clerks SOC 43-4071).

After accounting for the 25% of employees who no longer need PPE due to the removal of the dermal contact trigger, the change in the compliance rate from 75% to 90%, and the removal of the ten minutes of clerical time for notifying laundries, the total annualized cost savings and adjustment for the proposed revisions to the PPE paragraph is estimated to be \$164,330 at a 3 percent discount rate.

Hygiene Areas and Practices

Overview of Regulatory Requirements in the 2017 Final Rule

The 2017 final rule requires affected shipyard and construction employers to provide readily accessible washing facilities to remove beryllium from the hands, face, and neck of each employee exposed to beryllium; ensure that employees who have dermal contact with beryllium wash any exposed skin at the end of the activity, process, or work shift and prior to eating, drinking, smoking, chewing tobacco or gum, applying cosmetics, or using the toilet; and provide employees required to use PPE with a designated change room where employees are required to remove their personal clothing. Wherever the employer allows employees to consume food or beverages at a worksite where beryllium is present, the employer must ensure that surfaces in eating and drinking areas are as free as practicable of beryllium and no employees enter any eating or drinking area with personal protective clothing or equipment unless, prior to entry, surface beryllium has been removed from the clothing or equipment by methods that do not disperse beryllium into the air or onto an employee's body. The employer must also ensure that no employees eat, drink, smoke, chew tobacco or gum, or apply cosmetics in

work areas where there is a reasonable expectation of exposure above the TWA PEL or STEL.

Cost Savings Estimates in this Proposal

OSHA is proposing to rescind this paragraph in its entirety. Both washing facilities and change rooms would no longer be directly required under this proposal. However, because PPE is still required where airborne beryllium exceeds the TWA PEL or STEL, employers will still need to provide change rooms where exposures are above the TWA PEL or STEL pursuant to the sanitation standards.

The 2017 FEA estimated no costs for readily accessible washing facilities, under the expectation that employers already have such facilities in place where needed, and this PEA retains this estimate. Therefore, OSHA is estimating no cost savings from washing facilities due to this proposal. The 2017 FEA did include costs for disposable head coverings that would be purchased for processes where hair may become contaminated by beryllium. OSHA now believes that employers in construction and shipyards will not incur these costs under the existing standards because unlike in general industry, there are no requirements in construction or shipyards to provide showers where hair can become contaminated with beryllium. OSHA is therefore making a cost adjustment to account for this. The annual cost for one disposable head covering per day in 2018 dollars is \$30.78 (Grainger, 2013). The number of workers estimated to need such head coverings in the 2017 FEA is 542; so the total annual cost adjustment is \$16,669 ($\30.78×542).

The agency is not estimating cost savings for the proposed removal of requirements to add a change room and segregated lockers. The sanitation standards (29

CFR 1926.51 and 29 CFR 1915.88) require employers to provide change rooms whenever they require employees to wear PPE to prevent exposure to hazardous or toxic substances. Under this proposal, employers would still be required by the sanitation standards, combined with the PEL requirements in 2017 beryllium final rule, to provide PPE to employees to prevent exposure to beryllium. Therefore, no cost savings would arise from this proposed change.

The proposed revisions to the PPE paragraph would remove the need for employees to change out of PPE, generally at the end of a shift, for those not exposed to airborne beryllium above the TWA PEL and STEL. In the 2017 FEA, OSHA included the cost of changing clothes in the costs for the hygiene provisions rather than the PPE provisions. The cost for a clothing change is the same as in the 2017 FEA, updated to 2018 dollars. The agency expected that, in many cases, a worker will simply be adding, and later removing, a layer of clothing (such as a lab coat, coverall, or shoe covers) at work, which might involve no more than a couple of minutes a day. However, in other cases, a worker may need a full clothing change. Taking all these factors into account, OSHA estimated that a worker using PPE would need 5 minutes per day to change clothes (Document ID 2042, p. V-185). The annual cost per employee to change clothes is \$530.61. This cost is based on a production worker earning \$25.47 an hour (Production Occupation, SOC: 51-0000) and taking 5 minutes per day to change clothes for 250 days per year $((5/60) \times \$25.47 \times 250)$.

OSHA's proposed removal of the eating and drinking areas and prohibited activities provisions of paragraph (i) have cost implications only for training, which is discussed later in this cost section.

The agency estimates the total annualized cost savings of the proposed removal of paragraph (i) to be \$304,052 for all affected establishments. The breakdown of these cost savings by NAICS code can be seen in Table IV-15 at the end of this program cost-savings section.

Housekeeping

Overview of Regulatory Requirements in the 2017 Final Rule

The housekeeping provisions require the employer to follow the written exposure control plan when cleaning beryllium-contaminated areas, ensure that all spills and emergency releases of beryllium are cleaned up promptly and in accordance with the written exposure control plan required under paragraph (f)(1) of this standard. The provisions require the employer to ensure the use of HEPA-filtered vacuuming or other methods that minimize the likelihood and level of airborne exposure when cleaning beryllium-contaminated areas, and prohibit the employer from allowing dry sweeping or brushing for cleaning in such areas unless HEPA-filtered vacuuming or other methods that minimize the likelihood and level of airborne exposure are not safe or effective. The provisions also prohibit the employer from allowing the use of compressed air for cleaning in beryllium-contaminated areas unless the compressed air is used in conjunction with a ventilation system designed to capture the particulates made airborne by the use of compressed air. Where employees use dry sweeping, brushing, or compressed air to clean in beryllium-contaminated areas, the employer must provide, and ensure that each employee uses, respiratory protection and personal protective clothing and equipment in accordance with paragraphs (g) and (h) of the standards. The employer must also ensure that cleaning equipment is handled and maintained in a manner that

minimizes the likelihood and level of airborne exposure and the re-entrainment of airborne beryllium in the workplace. When the employer transfers materials containing beryllium to another party for use or disposal, the employer must provide the recipient with the warning required by paragraph (m).

Cost Savings Estimates in this Proposal

OSHA is proposing to remove the requirements to follow the written exposure control plan when cleaning and to promptly clean up spills and emergency releases. OSHA is also proposing to revise the cleaning methods requirements to remove the reference to HEPA-filtered vacuuming and to trigger these provisions on the presence of dust resulting from operations that cause, or can reasonably be expected to cause, airborne exposure above the TWA PEL or STEL, rather than on the presence of a “beryllium-contaminated area.” In addition, OSHA is proposing to remove the qualifier “in beryllium-contaminated areas” from the requirement to provide PPE and respiratory protection in accordance with other provisions in the standards. Next, OSHA is proposing to prohibit the use of compressed air for cleaning where the use of compressed air causes, or can reasonably be expected to cause, airborne exposure above the TWA PEL or STEL. Finally, OSHA is proposing to remove the requirement to provide a warning when transferring materials containing beryllium to another party for use or disposal.

The agency is estimating cost savings for removing the requirement to use HEPA-filtered vacuums for shipyards and construction and for removing the need for a warning label when transferring materials containing beryllium to another party for use or disposal. The other cost included for this provision is labor time spent doing

housekeeping tasks, and the agency estimates the proposed revisions do not alter its 2017 FEA estimate of an additional 5 minutes per day for each employee.

In the 2017 FEA, OSHA estimated a compliance rate for the housekeeping provisions of 75% for all workers in abrasive blasting based on the agency's determination that other standards required some housekeeping for abrasive blasting in both construction and shipyards. As discussed above, a further review of other standards has led the agency to revise its compliance rate for housekeeping to 100%. While the proposed revisions will limit the methods that employers may use to clean up beryllium, OSHA estimates that cleaning methods which do not disperse beryllium into the air take approximately the same amount of time as cleaning methods already in use. OSHA is making a cost adjustment in this PEA for the additional 25% of workers in abrasive blasting operations who are now estimated to be performing housekeeping tasks. Furthermore, while those areas that are below the TWA PEL and STEL no longer have any requirements for housekeeping tasks, OSHA is not estimating an additional cost savings because its revised compliance estimate is already at 100%. OSHA estimated in the 2017 FEA that welding in shipyards had a 0% compliance rate for housekeeping. This has also been changed to 100% compliance in this PEA, as explained in section B of this PEA. OSHA is also making a cost adjustment for this change in the compliance rate.

OSHA estimated the following costs for the housekeeping provisions in the 2017 FEA (Document ID 2042, pp. V-187-190, amounts adjusted for 2018 dollars): a one-time annualized cost per worker of a HEPA-filtered vacuum (\$640); the annual cost per worker of the additional time needed to perform housekeeping (\$531); and the annual cost of the warning labels per worker (\$6). The total annual per-employee cost was

\$1,177 (\$640+\$531+\$6). This per-employee cost is then multiplied by the 25% of workers in abrasive blasting operations and 100% of the welders who are now estimated to be in compliance versus the 2017 FEA to calculate the cost adjustment due to the revised baseline compliance rates.

The total annualized cost adjustment in this proposal due to revisions to this ancillary provision are \$1,734,022. The breakdown of these cost savings by NAICS code is shown in Table IV-15 at the end of this program cost-savings section.

Medical Surveillance

Overview of Regulatory Requirements in the 2017 Final Rule

The 2017 final rule requires affected employers in shipyards and construction to make medical surveillance available at a reasonable time and place, and at no cost, to the following employees:

1. Employees who are, or are reasonably expected to be, exposed at or above the action level for more than 30 days per year;
2. Employees who show signs or symptoms of chronic beryllium disease (CBD) or signs or symptoms of other beryllium-related health effects;
3. Employees exposed to beryllium during an emergency; and
4. Employees whose most recent written medical opinion required by this standard recommends periodic medical surveillance.

The medical surveillance paragraph also specifies the frequency with which examinations must be provided, the required contents of the examination, the information that the employer must provide to the physician or other licensed healthcare provider (PLHCP), the information that must be contained in the physician's written medical report for the

employee, the information that must be contained in the physician's written medical opinion for the employer, and procedures and requirements related to referral to a CBD diagnostic center.

Cost Savings of this Proposal

OSHA is proposing minor changes to the medical surveillance provision of the 2017 final rule.

First, OSHA proposes to remove the emergency trigger for medical surveillance. The 2017 FEA did not break out a separate cost for emergencies, stating that "a very small number of employees will be affected by emergencies in a given year" (p. V-196). The agency therefore preliminarily concludes that removing the emergency trigger will result in de minimis cost savings.

OSHA also proposes to replace the phrase "airborne exposure to and dermal contact with beryllium" in these provisions with the simpler phrase "exposure to beryllium." As explained in the Summary and Explanation section, this is not a substantive change and has no cost implications.

One proposed change would clarify the definition of *CBD diagnostic center*, that a center has a pulmonologist or pulmonary specialist on staff and must be capable of performing a variety of tests commonly used in the diagnosis of CBD, but need not necessarily perform all of the tests during all CBD evaluations. The 2016 FEA in fact did not estimate that all tests would be performed during all CBD evaluations, and so the agency takes no cost savings for this change.

To account for the proposed revision to the definition of *CBD diagnostic center*, OSHA is proposing to amend paragraph (k)(7)(i) to clarify that the employer must

provide, at no cost to the employee and within a reasonable time after consultation with the CBD diagnostic center, any of the following tests that a CBD diagnostic center must be capable of performing, if deemed appropriate by the examining physician at the CBD diagnostic center: a pulmonary function test as outlined by American Thoracic Society criteria testing, bronchoalveolar lavage (BAL), and transbronchial biopsy. This proposed change to paragraph (k)(7) would not change the requirements of the beryllium standard and therefore would not change the costs of compliance with the standard.

OSHA is also proposing that the employer provide an initial consultation with the CBD diagnostic center, rather than the full evaluation, within 30 days of the employer receiving notice that a full evaluation must be performed. This initial consultation can be done in conjunction with the tests but it is not required to be. As the initial consultation may be conducted remotely, by phone or virtual conferencing, the cost of the consultation would consist only of time spent by the employee and the PLHCP and would not have to include any travel or accommodation. In the 2017 FEA, and the 2018 PEA in support of the proposal to revise the general industry beryllium standard, OSHA accounted for the cost of both the employee's time and the examining physician's time for a 15-minute discussion (2017 FEA, p. V-206; 83 FR at 63764). Because the consultation would replace this initial discussion, there would be no additional cost. Furthermore, OSHA expects that allowing more flexibility in scheduling the tests at the CBD diagnostic center would allow employers to find more economical travel and accommodation options. As in the 2018 PEA in support of the proposed revisions to the general industry beryllium standard, the agency therefore preliminarily concludes these changes would produce minor, if any, cost savings, and no additional costs.

Another proposed change with potential implications for medical surveillance costs is a proposed change in the definition of *confirmed positive*. OSHA is proposing to clarify that the set of test results must all be obtained from a single 30-day testing cycle. The exact effect of this proposed change is uncertain as it is unknown how many employees would have a series of BeLPT results associated with a confirmed positive finding (two abnormal results, one abnormal and one borderline result, or three borderline results) over an unlimited period of time, but would not have any such combination of results within a single testing cycle. As in the PEA in support of the 2018 proposed revisions to the general industry standard, OSHA preliminarily concludes that this proposed change would not increase compliance costs and would incidentally yield some cost savings by lessening the likelihood of false positives.

Other proposed changes are to align these standards with the (proposed) general industry standard and, similar to the economic analysis there, are also estimated to only have de minimis effects on costs.

Medical Removal

Overview of Regulatory Requirements in the 2017 Final Rule

OSHA is not proposing any changes to paragraph (l), Medical removal protection. OSHA is also not proposing any changes to the baseline compliance rate with this paragraph. Therefore, there are no cost savings associated with this provision.

Communication of Hazards

Overview of Regulatory Requirements in the 2017 Final Rule

Paragraph (m) of the beryllium standards for construction and shipyards sets forth the employer's obligations to comply with OSHA's Hazard Communication Standard

(HCS) (29 CFR 1910.1200) relative to beryllium, and to provide warnings and training to employees about the hazards of beryllium.

Cost Savings in this Proposal

OSHA is proposing three changes to paragraph (m) in both the construction and shipyards standards. First, OSHA is proposing to remove the paragraph (m) provisions that require specific language for warning labels applied to materials designated for disposal or PPE when removed from the workplace (paragraph (m)(2) in construction and paragraph (m)(3) in shipyards). This is consistent with OSHA's proposal to remove the corresponding requirements to provide such warning labels and any cost implications are accounted for in the sections on those corresponding provisions.

Second, OSHA is also proposing to revise paragraph (m)(3)(i) in construction and paragraph (m)(4)(i) in boatyards—renumbered as paragraphs (m)(2)(i) and (m)(3)(i), respectively—to remove dermal contact as a trigger for training. This is not a substantive change, so OSHA expects no cost implications.

Third, OSHA is proposing to revise the provisions of paragraph (m) for employee information and training related to emergency procedures (paragraph (m)(3)(ii)(D) in construction and paragraph (m)(4)(ii)(D) in shipyards) and personal hygiene practices (paragraph (m)(3)(ii)(E) in construction and paragraph (m)(4)(ii)(E) in shipyards), for consistency with OSHA's proposed removal of emergency procedures and personal hygiene practices from the construction and shipyards standards. OSHA estimates that this proposed change will lead to a cost savings.

Below the agency first presents the methodology for training from the 2017 final rule with unit cost estimates updated to 2018 dollars, and then discusses and estimates the cost effects of this proposal.

In the 2017 FEA, OSHA estimated that training, which includes hazard communication training, would be conducted by in-house safety or supervisory staff with the use of training modules and videos and would last, on average, eight hours. (Note that this estimate does not include the time taken for hazard communication training that is already required by 29 CFR 1910.1200.) The agency judged that establishments could purchase sufficient training materials at an average cost of \$2.21 per worker, encompassing the cost of handouts, video presentations, and training manuals and exercises. For initial and periodic training, OSHA estimates an average class size of five workers (each at a wage of \$25.47 (updated from Production Occupations, SOC: 51-0000)) with one instructor (at a wage of \$42.51 (Median Wage for Training and Development Specialists, SOC: 13-1151)) over an eight hour period. The per-worker cost of initial training is therefore \$273.99 $((8 \times \$25.47) + (8 \times \$42.51/5) + \$2.21)$.

Annual retraining of workers is also required by the standards. OSHA estimates the same unit costs as for initial training, so retraining would require the same per-worker cost of \$273.99.

The first cost savings comes explicitly from the training provision itself, where the proposal rescinds training about emergency procedures. The agency estimates that this will decrease training time by 15 minutes. Other decreases in training time come from rescinded portions of hygiene requirements, including: washing areas, change

rooms, eating and drinking areas, and cross-contamination. The agency estimates that this would decrease needed training by another hour.

Together this would decrease the required per-employee training from 8 hours to 6.75 hours. Hence, the per-worker cost of initial and retraining is \$231.52 $((6.75 \times \$25.47) + (6.75 \times \$42.51/5) + \$2.21)$

Finally, using these unit cost estimates, as well as accounting for industry-specific baseline compliance rates (which, as explained in section IV.B of this PEA, are unchanged from the 2017 FEA), and based on a 34.7 percent new hire rate (BLS 2018c, using the annual manufacturing new hire rate, as was done in the 2017 FEA), OSHA estimates that the proposed revisions to the training requirements in the standards would result in an annualized total cost savings of \$102,102. The breakdown of these cost savings by NAICS code is shown in Table IV-15 at the end of this program cost-savings section.

Familiarization Costs

In the 2017 final rule, OSHA included familiarization costs to account for employers' time to understand the ancillary provisions and the other new and revised components of the applicable new standard. The changes that OSHA is proposing to most provisions are not extensive. Employers would thus only need to spend a brief amount of time reviewing them. OSHA expects that if this proposal is adopted, employers would spend one hour per firm reviewing its changed requirements.

Table IV-14 shows the unit costs, by establishment size, of reviewing the changes in this proposal. These costs will likely be one-time costs incurred during the first year after the effective date of a final rule resulting from this proposal, but the aggregate costs

are annualized for consistency with the other estimates for this proposal. Based on the unit familiarization (negative) cost savings in Table IV-14, the total annualized familiarization costs of this proposal are estimated to be \$14,221. The breakdown of these costs by NAICS code is in Table IV-15 at the end of this program cost-savings section, and these costs are reflected in the tables as a negative cost savings.

Table IV-14: Familiarization - Construction and Shipyard Assumptions and Unit Cost Savings

Item	Establishment Size (Employees)		
	Small (<20)	Medium (20-499)	Large (500+)
Hours per establishment	1.0	1.0	1.0
Total cost savings per establishment	-\$43.39	-\$43.39	-\$43.39
Annualized Cost Savings (3 Percent)	-\$5.09	-\$5.09	-\$5.09

Source: US DOL, OSHA, Directorate of Standards and Guidance, Office of Regulatory Analysis

Note: Figures in rows may not add to totals due to rounding.

Table IV-15: Annualized Cost Savings of Program Requirements for Industries Affected by the Re-Proposed Beryllium Standard by Sector and Six-Digit NAICS Industry (in 2018 Dollars using a 3 Percent Discount Rate)

Application Group/NAICS	Industry	Rule Familiarization	Exposure Assessment	Regulated Areas/ Competent Person	Medical Surveillance	Medical Removal Provision	Written Exposure Control Plan	Protective Work Clothing & Equipment	Hygiene Areas and Practices	Housekeeping	Training	Total Program Cost Savings
Abrasive Blasting - Construction												
238320	Painting and Wall Covering Contractors	-\$5,545	\$0	\$0	\$0	\$0	\$46,627	\$61,974	\$115,657	\$653,601	\$38,490	\$910,805
238990	All Other Specialty Trade Contractors	-\$5,138	\$0	\$0	\$0	\$0	\$43,205	\$57,426	\$107,168	\$605,630	\$35,665	\$843,957
Abrasive Blasting - Shipyards												
336611a	Ship Building and Repairing	-\$3,505	\$0	\$0	\$0	\$0	\$32,027	\$43,418	\$81,172	\$458,720	\$27,014	\$638,846
Welding - Shipyards												
336611b	Ship Building and Repairing	-\$34	\$0	\$0	\$0	\$0	\$1,129	\$1,512	\$55	\$16,072	\$932	\$19,667
Total												
Construction Subtotal		-\$10,682	\$0	\$0	\$0	\$0	\$89,833	\$119,400	\$222,825	\$1,259,230	\$74,156	\$1,754,762
Maritime Subtotal		-\$3,538	\$0	\$0	\$0	\$0	\$33,157	\$44,930	\$81,227	\$474,792	\$27,946	\$658,513
Total, All Industries		-\$14,221	\$0	\$0	\$0	\$0	\$122,989	\$164,330	\$304,052	\$1,734,022	\$102,102	\$2,413,275

Note: Figures in rows may not add to totals due to rounding.

Source: US DOL, OSHA, Directorate of Standards and Guidance, Office of Regulatory Analysis.

Total Annualized Cost Savings

As shown in Table IV-16, the total annualized cost savings of this proposal, using a 3 percent discount rate, is estimated to be about \$2.5 million.

Table IV-16: Annualized Cost Savings to Industries Affected by the Re-Proposed Beryllium Standard, by Sector and Six-Digit NAICS Industry (2018 Dollars, 3 Percent Discount Rate)

Application Group/ NAICS	Industry	Engineering Controls and Work Practices	Respirator Cost Savings	Program Cost Savings	Total Cost Savings
Abrasive Blasting - Construction					
238320	Painting and Wall Covering Contractors	\$0	\$20,389	\$910,805	\$931,193
238990	All Other Specialty Trade Contractors	\$0	\$18,892	\$843,957	\$862,849
Abrasive Blasting - Shipyards					
336611a	Ship Building and Repairing	\$0	\$13,873	\$638,846	\$652,718
Welding - Shipyards					
336611b	Ship Building and Repairing	\$0	\$858	\$19,667	\$20,525
Total					
Construction Subtotal		\$0	\$39,281	\$1,754,762	\$1,794,042
Maritime Subtotal		\$0	\$14,730	\$658,513	\$673,243
Total, All Industries		\$0	\$54,011	\$2,413,275	\$2,467,286

Note: Figures in rows may not add to totals due to rounding.

Source: US DOL, OSHA, Directorate of Standards and Guidance, Office of Regulatory Analysis.

Time Distribution of Cost Savings

OSHA analyzed the stream of (un-annualized) compliance cost savings for the first ten years after the proposed rule would take effect. As shown in Table IV-17, total compliance cost savings are expected to decline from year 1 to year 2 by almost half after the initial set of capital and program start-up expenditure savings has been incurred. Cost savings are then essentially flat with relatively small variations for the following years.

Table IV-17: Distribution of Undiscounted Compliance Costs and Cost Savings by Year (2018 Dollars)

Year	Program Cost Savings	Respirators	Engineering Controls	Rule Familiarization	Total
1	\$4,215,199	\$86,195	\$0	-\$121,305	\$4,180,088
2	\$2,178,201	\$46,071	\$0	\$0	\$2,224,272
3	\$2,178,201	\$47,743	\$0	\$0	\$2,225,944
4	\$2,178,201	\$51,427	\$0	\$0	\$2,229,628
5	\$2,178,201	\$47,743	\$0	\$0	\$2,225,944
6	\$2,178,201	\$46,071	\$0	\$0	\$2,224,272
7	\$2,178,201	\$53,098	\$0	\$0	\$2,231,300
8	\$2,178,201	\$46,071	\$0	\$0	\$2,224,272
9	\$2,178,201	\$47,743	\$0	\$0	\$2,225,944
10	\$2,178,201	\$51,427	\$0	\$0	\$2,229,628

Note: Figures in rows may not add to totals due to rounding.

Source: US DOL, OSHA, Directorate of Standards and Guidance, Office of Regulatory Analysis.

Table IV-18 breaks out total cost savings by each application group for the first ten years. Each application group follows the same pattern of a sharp decrease in cost savings between years 1 and 2, and then remains relatively flat for the remaining years.

Table IV-18: Total Undiscounted Cost Savings of the Re-Proposed Beryllium Standard by Year (2018 Dollars)

Application Group	Year									
	1	2	3	4	5	6	7	8	9	10
Abrasive Blasting - Construction	\$3,039,516	\$1,617,334	\$1,618,538	\$1,621,189	\$1,618,538	\$1,617,334	\$1,622,392	\$1,617,334	\$1,618,538	\$1,621,189
Abrasive Blasting - Shipyards	\$1,103,334	\$588,796	\$589,234	\$590,200	\$589,234	\$588,796	\$590,639	\$588,796	\$589,234	\$590,200
Welding - Shipyards	\$37,239	\$18,142	\$18,172	\$18,239	\$18,172	\$18,142	\$18,269	\$18,142	\$18,172	\$18,239
Total	\$4,180,088	\$2,224,272	\$2,225,944	\$2,229,628	\$2,225,944	\$2,224,272	\$2,231,300	\$2,224,272	\$2,225,944	\$2,229,628

Note: Figures in rows may not add to totals due to rounding.

Source: U.S. DOL, OSHA, Directorate of Standards and Guidance, Office of Regulatory Analysis.

Appendix IV-A

Summary of Annualized Cost Savings by Entity Size under Alternative Discount Rates

In addition to using a 3 percent discount rate in its cost analysis, OSHA estimated compliance cost savings using alternative discount rates of 7 percent and 0 percent.

Tables IV-19 and IV-20 present— for 7 percent and 0 percent discount rates, respectively—total annualized cost savings for affected employers by NAICS industry code and employment size class (all establishments, small entities, and very small entities).

As shown in these tables, the choice of discount rate has only a minor effect on total annualized compliance cost savings—for example, annualized cost savings for all establishments remain flat/slightly increase to \$2.5 million using a 7 percent discount rate, and remain flat/slightly decrease to \$2.5 million using a 0 percent discount rate.

Table IV-19: Total Annualized Cost Savings, by Sector and Six-Digit NAICS Industry, for Entities Affected by the Shipyard and Construction Beryllium Standards (By Size Category, 7 Percent Discount Rate, 2018 Dollars)

Application Group/ NAICS	Industry	All Establishments	Small Entities (SBA-defined)	Very Small Entities (<20 Employees)
Abrasive Blasting – Construction				
238320	Painting and Wall Covering Contractors	\$950,654	\$782,690	\$518,407
238990	All Other Specialty Trade Contractors	\$880,881	\$654,058	\$418,827
Abrasive Blasting – Shipyards*				
336611a	Ship Building and Repairing	\$666,280	\$172,674	\$86,542
Welding in Shipyards**				
336611b	Ship Building and Repairing	\$21,028	\$5,583	\$3,100
Total				
Construction Subtotal		\$1,831,536	\$1,436,748	\$937,234
Shipyard Subtotal		\$687,308	\$178,257	\$89,641
Total, All Industries		\$2,518,843	\$1,615,005	\$1,026,876

Note: Figures in rows may not add to totals due to rounding.

* Employers in application group Abrasive Blasting – Shipyards are shipyards employing abrasive blasters that use mineral slag abrasives to etch the surfaces of boats and ships.

Source: U.S. DOL, OSHA, Directorate of Standards and Guidance, Office of Regulatory Analysis.

Table IV-20: Total Annualized Cost Savings, by Sector and Six-Digit NAICS Industry, for Entities Affected by the Shipyard and Construction Beryllium Standards (By Size Category, 0 Percent Discount Rate, 2018 Dollars)

Application Group/ NAICS	Industry	All Establishments	Small Entities (SBA-defined)	Very Small Entities (<20 Employees)
Abrasive Blasting – Construction				
238320	Painting and Wall Covering Contractors	\$929,939	\$765,329	\$506,383
238990	All Other Specialty Trade Contractors	\$861,686	\$639,408	\$408,952
Abrasive Blasting – Shipyards*				
336611a	Ship Building and Repairing	\$651,883	\$168,209	\$84,196
Welding in Shipyards**				
336611b	Ship Building and Repairing	\$20,479	\$5,387	\$2,988
Total				
Construction Subtotal		\$1,791,625	\$1,404,737	\$915,335
Shipyard Subtotal		\$672,362	\$173,596	\$87,184
Total, All Industries		\$2,463,987	\$1,578,333	\$1,002,520

Note: Figures in rows may not add to totals due to rounding.

* Employers in application group Abrasive Blasting – Shipyards are shipyards employing abrasive blasters that use mineral slag abrasives to etch the surfaces of boats and ships.

Source: US DOL, OSHA, Directorate of Standards and Guidance, Office of Regulatory Analysis.

Appendix IV-B

Summary of Annualized Cost Savings by Cost Type under Alternative Discount Rates

In addition to using a 3 percent discount rate in its cost analysis, OSHA estimated compliance cost savings using alternative discount rates of 7 percent and 0 percent.

Tables IV-21 and IV-22 present— for 7 percent and 0 percent discount rates, respectively—total annualized cost savings for affected employers by NAICS industry code and type of cost savings.

Table IV-21: Annualized Compliance Cost Savings for Employers Affected by the Re-Proposed Beryllium Standard by Sector and Six-Digit NAICS Industry (7 Percent Discount Rate, in 2018 Dollars)

Application Group/ NAICS	Industry	Engineering Controls and Work Practices	Respirator Cost Savings	Program Cost Savings	Total Cost Savings
Abrasive Blasting – Construction					
238320	Painting and Wall Covering Contractors	\$0	\$20,892	\$929,762	\$950,654
238990	All Other Specialty Trade Contractors	\$0	\$19,358	\$861,523	\$880,881
Abrasive Blasting – Shipyards					
336611a	Ship Building and Repairing	\$0	\$14,196	\$652,084	\$666,280
Welding – Shipyards					
336611b	Ship Building and Repairing	\$0	\$873	\$20,154	\$21,028
Total					
Construction Subtotal		\$0	\$40,250	\$1,791,285	\$1,831,536
Maritime Subtotal		\$0	\$15,069	\$672,238	\$687,308
Total, All Industries		\$0	\$55,319	\$2,463,524	\$2,518,843

Note: Figures in rows may not add to totals due to rounding.

Source: US DOL, OSHA, Directorate of Standards and Guidance, Office of Regulatory Analysis.

Table IV-22: Annualized Compliance Cost Savings for Employers Affected by the Re-Proposed Beryllium Standard by Sector and Six-Digit NAICS Industry (0 Percent Discount Rate, in 2018 Dollars)

Application Group/ NAICS	Industry	Engineering Controls and Work Practices	Respirator Cost Savings	Program Cost Savings	Total Cost Savings
Abrasive Blasting – Construction					
238320	Painting and Wall Covering Contractors	\$0	\$20,334	\$909,605	\$929,939
238990	All Other Specialty Trade Contractors	\$0	\$18,842	\$842,845	\$861,686
Abrasive Blasting – Shipyards					
336611a	Ship Building and Repairing	\$0	\$13,834	\$638,049	\$651,883
Welding – Shipyards					
336611b	Ship Building and Repairing	\$0	\$855	\$19,623	\$20,479
Total					
Construction Subtotal		\$0	\$39,176	\$1,752,450	\$1,791,625
Maritime Subtotal		\$0	\$14,690	\$657,672	\$672,362
Total, All Industries		\$0	\$53,865	\$2,410,122	\$2,463,987

Note: Figures in rows may not add to totals due to rounding.

Source: US DOL, OSHA, Directorate of Standards and Guidance, Office of Regulatory Analysis.

E. Benefits

The changes proposed in this NPRM are designed to accomplish three goals: (1) to more appropriately tailor the requirements of the construction and shipyards standards to the particular exposures in these industries in light of partial overlap between the beryllium standards' requirements and other OSHA standards; (2) to aid compliance and enforcement across the beryllium standards by avoiding inconsistency, where appropriate, between the shipyards and construction standards and proposed revisions to the general industry standard; and (3) to clarify certain requirements with respect to materials containing only trace amounts of beryllium. As to the first group of changes,

this NPRM clarifies that OSHA did not, and does not, intend to apply the provisions aimed at protecting workers from the effects of dermal contact to industries that only work with beryllium in trace amounts where there is limited or no airborne exposure. In the prior FEA, OSHA did not isolate any quantifiable benefits from avoiding beryllium sensitization from dermal contact (see discussion at p. VII-16 through VII-18). Therefore, OSHA preliminarily concludes that the proposed revisions in this NPRM that focus on dermal contact will not have any impact on OSHA's previous benefit estimates for the standards as a whole.

OSHA also does not expect the second and third groups of proposed changes, i.e., those intended to more closely tailor the standards' requirements to the construction and shipyard industries and closely align them to the general industry standard's requirements, where appropriate, to result in a reduction in benefits. Rather, as explained in the Summary and Explanation, OSHA believes that the proposed changes would maintain safety and health protections for workers while aligning the standards with the intent behind the 2017 final rule and otherwise preventing costs that could follow from misinterpretation or misapplication of the standards. Therefore, OSHA preliminarily determines that the effect of these proposed revisions on the benefits of the standards as a whole would be negligible. OSHA invites comment on this preliminary determination.

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Economic Feasibility Analysis and Regulatory Flexibility Certification

Economic Feasibility Analysis

In the 2017 FEA, OSHA concluded that the beryllium standards for construction and shipyards were both economically feasible (see 82 FR at 2471). OSHA is proposing to modify some of the ancillary provisions in both standards and has preliminarily concluded that the proposed revisions would, overall, reduce costs for employers in both sectors (see section D, Costs of Compliance, in this PEA). Because the effect of this

proposed rule is a net reduction in costs, OSHA has preliminarily determined that this proposal is economically feasible in both the construction and shipyard sectors.

Regulatory Flexibility Certification

In accordance with the Regulatory Flexibility Act, 5 U.S.C. 601 et seq. (as amended), OSHA has examined the regulatory requirements of the proposal for construction and shipyards to determine whether they would have a significant economic impact on a substantial number of small entities. This proposal would modify certain ancillary provisions for shipyards and construction, resulting in a reduction of overall costs. Furthermore, the agency believes that this proposal would not impose any additional costs on small entities. Accordingly, OSHA certifies that the proposal would not have a significant economic impact on a substantial number of small entities.

Executive Order 13771: Reducing Regulation and Controlling Regulatory Costs

Consistent with Executive Order 13771 (82 FR 9339, February 3, 2017), OSHA has estimated the total annualized cost savings of this proposed rule, using a 3 percent discount rate, to be about \$2.5 million, or using a 7 percent discount rate, to be about \$2.5 million. Therefore, this proposed rule, if finalized, is expected to be an Executive Order 13771 deregulatory action.

VI. OMB Review under the Paperwork Reduction Act of 1995

A. Overview

OSHA is proposing to update the beryllium standards for the construction and shipyards industries, which contain collections of information that are subject to review by the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1995 (PRA), 44 U.S.C. 3501 et seq., and OMB regulations at 5 CFR part 1320. The

beryllium standards for general industry (29 CFR 1910.1024), construction (29 CFR 1926.1124), and shipyards (29 CFR 1915.1024)—contain collection of information (paperwork) requirements that have been previously approved by OMB. The requirements of all three standards are currently contained in the approved information collections request (ICR) under OMB control number 1218-0267. For purposes of OMB review under the PRA, OSHA is proposing to separate the collections of information in the beryllium standards for construction and shipyards from those in the general industry standard. Therefore, the agency is submitting two ICRs—one for the construction industry and one for the shipyards sector—and the agency is requesting two new OMB control numbers 1218-0NEW and 1218-NEW2. In addition, since OSHA is proposing to separate the collections of information in the beryllium standards for construction and shipyards in this proposal, OSHA is also proposing to remove the collections of information that are related to construction and shipyards from the collections of information previously approved by OMB under control number 1218-0267. There is a separate rulemaking that addresses changes to the collection of information for general industry under number 1218-0267 (see 83 FR 63746-63770). The PRA defines “collection of information” to mean “the obtaining, causing to be obtained, soliciting, or requiring the disclosure to third parties or the public, of facts or opinions by or for an agency, regardless of form or format” (44 U.S.C. 3502(3)(A)). Under the PRA, a Federal agency cannot conduct or sponsor a collection of information unless OMB approves it, and the agency displays a currently valid OMB control number (44 U.S.C. 3507). Also, notwithstanding any other provision of law, no employer shall be subject to penalty for

failing to comply with a collection of information if the collection of information does not display a currently valid OMB control number (44 U.S.C. 3512).

B. Solicitation of Comments

OSHA prepared and submitted two revised ICRs to OMB, separating the collections of information in the shipyards and construction standards from the existing OMB-approved paperwork package, and proposing to remove certain collections of information for those industries currently contained in that paperwork package, in accordance with 44 U.S.C. 3507(d). The agency solicits comments on the removal of these collection of information requirements and reduction in estimated burden hours associated with these requirements, including comments on the following items:

- Whether the collections of information are necessary for the proper performance of the agency's functions, including whether the information is useful;
- The accuracy of OSHA's estimate of the burden (time and cost) of the collections of information, including the validity of the methodology and assumptions used;
- The quality, utility, and clarity of the information collected; and
- Ways to minimize the compliance burden on employers, for example, by using automated or other technological techniques for collecting and transmitting information (78 FR at 56438).

C. Proposed Information Collection Requirements

As required by 5 CFR 1320.5(a)(1)(iv) and 1320.8(d)(2), the following paragraphs provide information about these two ICRs.

Construction (ICR):

1. *Title:* Occupational Exposure to Beryllium for the Construction Industry.
2. *Description of the ICR:* The proposal would separate the construction standards from the currently approved Beryllium ICR and remove existing collection of information requirements currently approved by OMB.
3. *Brief Summary of the Information Collection Requirements:*

The proposed standard for occupational exposure to beryllium and beryllium compounds in construction would revise the collection of information requirements contained in the existing ICR for that industry, approved under OMB under control number 1218-0267. OSHA is proposing, first, to separate the construction collection of information requirements from those of the general industry and shipyards standards, and requests a new control number specific to the construction standard (1218-0NEW). Next, OSHA is proposing to update the new ICR to reflect its proposal to (1) remove provisions in the construction standard that require employers to collect and record employees' social security number; (2) revise the contents of the written exposure control plan; and (3) remove certain requirements related to written warnings. See Table VI.1.

Table VI.1 -- Collection of Information Requirements Being Revised in the Beryllium Standard for Construction

Section number and title	Currently approved collection of information requirements	Proposed action
<p>§1926.1124(f)(1)(i) -- Methods of Compliance -- Written Exposure Control Plan.</p>	<ul style="list-style-type: none"> • A list of operations and job titles reasonably expected to involve airborne exposure to or dermal contact with beryllium; • A list of operations and job titles reasonably expected to involve airborne exposure to or dermal contact with beryllium; • A list of operations and job titles reasonably expected to involve airborne exposure above the TWA PEL or STEL; • Procedures for minimizing cross-contamination; 	<p>Remove paragraphs (f)(1)(i)(B) through (E) and (H), written exposure control plan.</p> <p>Revise paragraph (f)(1)(i)(A) to list operations and job titles reasonably expected to involve exposure to beryllium.</p>

Section number and title	Currently approved collection of information requirements	Proposed action
	<ul style="list-style-type: none"> • Procedures for minimizing the migration of beryllium within or to locations outside the workplace; • A list of engineering controls, work practices, and respiratory protection required by paragraph (f)(2) of the standard; • A list of personal protective clothing and equipment required by paragraph (h) of the standard; • Procedures for removing, laundering, storing, cleaning, repairing, and disposing of beryllium-contaminated personal protective clothing and equipment, including respirators; • Procedures used to restrict access to work areas when airborne exposures are, or can reasonably be expected to be, above the TWA PEL or STEL, to minimize the number of employees exposed to airborne beryllium and their level of exposure, including exposures generated by other employers or sole proprietors. 	Add a new requirement, paragraph (f)(1)(i)(E), to list procedures used to ensure the integrity of each containment used to minimize exposures to employees outside the containment.
<p>§1926.1124(h)(2)(v) -- Personal Protective Clothing and Equipment -- Removal and Storage.</p>	<p>When personal protective clothing or equipment required by this standard is removed from the workplace for laundering, cleaning, maintenance or disposal, the employer must ensure that personal protective clothing and equipment are stored and transported in sealed bags or other closed containers that are impermeable and are labeled in accordance with paragraph (m)(3) of the standard and the HCS (29 CFR 1910.1200).</p>	<p>Remove this labeling requirement from the beryllium standard for construction and therefore from the ICR.</p>
<p>§1926.1124(h)(3)(iii) -- Personal Protective Clothing and Equipment -- Cleaning and Replacement.</p>	<p>The employer must inform in writing the persons or the business entities who launder, clean or repair the personal protective clothing or equipment required by this standard of the potentially harmful effects of airborne exposure to and dermal contact with beryllium and that the personal protective clothing and equipment must be handled in accordance with the standard.</p>	<p>Remove this requirement from the beryllium standard for construction and therefore from the ICR.</p>

Section number and title	Currently approved collection of information requirements	Proposed action
<p>§1926.1124(k)(7) -- Medical Surveillance-- Referral to the CBD Diagnostic Center.</p>	<p>The employer must provide an evaluation at no cost to the employee at a CBD diagnostic center that is mutually agreed upon by the employer and the employee. The examination must be provided within 30 days of either of the events in paragraph (k)(7)(i)(A) or (B).</p>	<p>Add an initial consultation with the CBD diagnostic center, as follows:</p> <p>The employer must also provide, at no cost to the employee and within a reasonable time after the initial consultation with the CBD diagnostic center, any of the following tests if deemed appropriate by the examining physician at the CBD diagnostic center: pulmonary function testing (as outlined by the American Thoracic Society criteria), bronchoalveolar lavage (BAL), and transbronchial biopsy. The initial consultation with the CBD diagnostic center must be provided within 30 days of either of the events in paragraph (k)(7)(i)(A) or (B).</p>
<p>§1926.1124(n)(1)(ii)(F) -- Recordkeeping -- Air Monitoring Data.</p>	<p>The name, social security number, and job classification of each employee represented by the monitoring, indicating which employees were actually monitored.</p>	<p>Remove the requirement to collect and record social security numbers, as follows:</p> <p>The name and job classification of each employee represented by the monitoring, indicating which employees were actually monitored.</p>
<p>§1926.1124(n)(3)(ii)(A)-- Recordkeeping-- Medical Surveillance.</p>	<p>The record must include the following information about the employee: Name, social security number, and job classification.</p>	<p>Remove the requirement to collect and record social security numbers, as follows:</p> <p>The record must include</p>

Section number and title	Currently approved collection of information requirements	Proposed action
		the following information about the employee: Name and job classification.
§1926.1124(n)(4)(i) -- Recordkeeping -- Training.	At the completion of any training required by the standard, the employer must prepare a record that indicates the name, social security number, and job classification of each employee trained, the date the training was completed, and the topic of the training.	Remove the requirement to collect and record social security numbers, as follows: At the completion of any training required by the standard, the employer must prepare a record that indicates the name and job classification of each employee trained, the date the training was completed, and the topic of the training.

4. *OMB Control Number:* 1218-0NEW
5. *Affected Public:* Business or other-for-profit. This standard applies to employers in the construction industry who have employees that may have occupational exposures to any form of beryllium, including compounds and mixtures, except those articles and materials exempted by paragraphs (a)(2) and (3) of the standard.
6. *Number of Respondents:* 2,520
7. *Frequency of Responses:* On occasion; quarterly, semi-annually, annual; biannual.
8. *Number of Responses:* 29,330
9. *Average Time per Response:* Various.
10. *Estimated Annual Total Burden Hours:* 18,075

11. *Estimated Annual Total Cost (Capital-operation and maintenance):* \$5,611,902

Shipyards (ICR):

1. *Title:* Occupational Exposure to Beryllium for the Shipyards Sector.
2. *Description of the ICR:* The proposal would separate the shipyards standards from the currently approved Beryllium ICR and remove existing collection of information requirements currently approved by OMB.
3. *Brief Summary of the Information Collection Requirements:*

The proposed standard for occupational exposure to beryllium and beryllium compounds in shipyards would revise the collection of information requirements contained in the existing ICR for that industry, approved under OMB under control number 1218-0267. OSHA is proposing, first, to separate the shipyards collection of information requirements from those of the general industry and construction standards, and requests a new control number specific to the shipyards standard (1218-0NEW2). Next, OSHA is proposing to update the new ICR to reflect its proposal to (1) remove provisions in the shipyards standard that require employers to collect and record employees' social security number; (2) revise the contents of the written exposure control plan; and (3) remove certain requirements related to written warnings. See Table VI.2.

Table VI.2 -- Collection of Information Requirements Being Revised in the Beryllium Standard for Shipyards

Section number and title	Currently approved collection of information requirements	Proposed action
<p>§1915.1024(f)(1)(i) -- Methods of Compliance -- Written Exposure Control Plan.</p>	<p>The employer must establish, implement, and maintain a written exposure control plan, which must contain:</p> <ul style="list-style-type: none"> • A list of operations and job titles reasonably expected to involve exposure to or dermal contact with beryllium; • A list of operations and job titles reasonably expected to involve airborne exposure at or above the AL; • A list of operations and job titles reasonably expected to involve airborne exposure above the TWA PEL or STEL; • Procedures for minimizing cross-contamination; • Procedures for minimizing the migration of beryllium within or to locations outside the workplace; • A list of engineering controls, work practices, and respiratory protection required by paragraph (f)(2) of the standard; • A list of personal protective clothing and equipment required by paragraph (h) of the standard; and • Procedures for removing, laundering, storing, cleaning, repairing, and disposing of beryllium-contaminated personal protective clothing and equipment, including respirators; 	<p>Remove paragraphs (f)(1)(i)(B) through (E) and (H), the written exposure control plan.</p> <p>Revise paragraph (f)(1)(i)(A) to list operations and job titles reasonably expected to involve exposure to beryllium.</p> <p>Add a new requirement, paragraph (f)(1)(i)(D) to list procedures used to ensure the integrity of each containment used to minimize exposures to employees outside the containment.</p>
<p>§1915.1024(h)(2)(v) -- Personal Protective Clothing and Equipment -- Removal and Storage.</p>	<p>When personal protective clothing or equipment required by this standard is removed from the workplace for laundering, cleaning, maintenance or disposal, the employer must ensure that personal protective clothing and equipment are stored and transported in sealed bags or other closed containers that are impermeable and are labeled in accordance with paragraph (m)(3) of the standard and the HCS (29 CFR 1910.1200).</p>	<p>Remove this labeling requirement from the beryllium standard for shipyards and therefore from the ICR.</p>

Section number and title	Currently approved collection of information requirements	Proposed action
<p>§1915.1024(h)(3)(iii) -- Personal Protective Clothing and Equipment -- Cleaning and Replacement.</p>	<p>The employer must inform in writing the persons or the business entities who launder, clean or repair the personal protective clothing or equipment required by this standard of the potentially harmful effects of airborne exposure to and dermal contact with beryllium and that the personal protective clothing and equipment must be handled in accordance with the standard.</p>	<p>Remove this requirement from the beryllium standard for shipyards and therefore from the ICR.</p>
<p>§1915.1024(k)(7) -- Medical Surveillance-- Referral to the CBD Diagnostic Center.</p>	<p>The employer must provide an evaluation at no cost to the employee at a CBD diagnostic center that is mutually agreed upon by the employer and the employee. The examination must be provided within 30 days of either the events in paragraph (k)(7)(i)(A) or (B).</p>	<p>Add an initial consultation with the CBD diagnostic center.</p> <p>Proposing: The employer must provide an evaluation at no cost to the employee at a CBD diagnostic center that is mutually agreed upon by the employer and the employee. The employer must also provide, at no cost to the employee and within a reasonable time after the initial consultation with the CBD diagnostic center, any of the following tests if deemed appropriate by the examining physician at the CBD diagnostic center: pulmonary function testing (as outlined by the American Thoracic Society criteria), bronchoalveolar lavage (BAL), and transbronchial biopsy. The initial consultation with the CBD diagnostic center must be provided within 30 days of either the events in paragraph (k)(7)(i)(A) or</p>

Section number and title	Currently approved collection of information requirements	Proposed action
		(B).
<p>§1915.1024(n)(1)(ii)(F) -- Recordkeeping -- Air Monitoring Data.</p>	<p>The name, social security number, and job classification of each employee represented by the monitoring, indicating which employees were actually monitored.</p>	<p>Remove the requirement to collect and record social security numbers, as follows:</p> <p>The name and job classification of each employee represented by the monitoring, indicating which employees were actually monitored.</p>
<p>§1915.1024(n)(3)(ii)(B) -- Recordkeeping-- Medical Surveillance.</p>	<p>The record must include the following information about the employee: Name, social security number, and job classification.</p>	<p>Remove the requirement to collect and record of social security numbers, as follows: Name and job classification.</p>
<p>§1915.1024(n)(4)(i) -- Recordkeeping -- Training.</p>	<p>At the completion of any training required by this standard, the employer must prepare a record that indicates the name, social security number, and job classification of each employee trained, the date the training was completed, and the topic of the training.</p>	<p>Remove the requirement to collect and record social security numbers, as follows:</p> <p>At the completion of any training required by this standard, the employer must prepare a record that indicates the name and job classification of each employee trained, the date the training was completed, and the topic of the training.</p>

4. *OMB Control Number:* 1218-NEW2

5. *Affected Public:* Business or other-for-profit. This standard applies to employers in the shipyards industry who have employees that may have occupational exposures to any form of beryllium, including compounds and mixtures, except

those articles and materials exempted by paragraphs (a)(2) and (3) of the standard

6. *Number of Respondents*: 925
7. *Frequency of Responses*: On occasion; quarterly, semi-annually, annual; biannual.
8. *Number of Responses*: 10,794
9. *Average Time per Response*: Various.
10. *Estimated Annual Total Burden Hours*: 6,609
11. *Estimated Annual Total Cost (Capital-operation and maintenance)*: \$2,057,856

D. Submitting Comments

In addition to the 30 days provided for public comment on this proposal, OSHA is providing an additional 30 days—for a total of *60 days* from the date this document is published in the Federal Register—for public comment on the information collection requirements contained in the proposed updates to the beryllium standards for construction and shipyards, as required by 5 CFR 1320.11(c).

Members of the public who wish to comment on the revisions to the paperwork requirements in this proposal must send their written comments to the Office of Information and Regulatory Affairs, Attn: OMB Desk Officer for the Department of Labor, OSHA (RIN 1218-AD29), Office of Management and Budget, Room 10235, Washington, DC 20503, Telephone: 202-395-6929/Fax: 202-395-6881 (these are not toll-free numbers), email: *OIRA_submission@omb.eop.gov*. The agency encourages commenters also to submit their comments on these paperwork requirements to the rulemaking docket (Docket Number OSHA-2019-0006), along with their comments on

other parts of the proposed rule. For instructions on submitting these comments to the rulemaking docket, see the sections of this *Federal Register* document titled **DATES** and **ADDRESSES**. Comments submitted in response to this document are public records; therefore, OSHA cautions commenters about submitting personal information such as Social Security Numbers and dates of birth.

E. Docket and Inquiries

To access the docket to read or download comments and other materials related to this paperwork determination, including the complete ICR (containing the Supporting Statement with attachments describing the paperwork determinations in detail) use the procedures described under the section of this document titled **ADDRESSES**.

You also may obtain an electronic copy of the complete ICR by visiting the web page at: <http://www.reginfo.gov/public/do/PRAMain>, scroll under “Currently Under Review” to “Department of Labor (DOL)” to view all of the DOL’s ICRs, including those ICRs submitted for proposed rulemakings. To make inquiries, or to request other information, contact Ms. Seleda Perryman, Directorate of Standards and Guidance, telephone (202) 693–2222.

VII. Federalism

OSHA reviewed this proposal in accordance with the Executive Order on Federalism (E.O. 13132, 64 FR 43255, August 10, 1999), which requires that Federal agencies, to the extent possible, refrain from limiting State policy options, consult with States prior to taking any actions that would restrict State policy options, and take such actions only when clear constitutional and statutory authority exists and the problem is national in scope. E.O. 13132 provides for preemption of State law only with the

expressed consent of Congress. Any such preemption is to be limited to the extent possible.

Under Section 18 of the OSH Act, Congress expressly provides that States and U.S. territories may adopt, with Federal approval, a plan for the development and enforcement of occupational safety and health standards. OSHA refers to such States and territories as “State Plan States” (29 U.S.C. 667). Occupational safety and health standards developed by State Plan States must be at least as effective in providing safe and healthful employment and places of employment as the Federal standards. Subject to these requirements, State Plan States are free to develop and enforce under State law their own requirements for safety and health standards.

OSHA previously concluded that promulgation of the beryllium standard complies with E.O. 13132 (82 FR at 2633), so this proposal complies with E.O. 13132. In States without OSHA-approved State Plans, Congress expressly provides for OSHA standards to preempt State occupational safety and health standards in areas addressed by the Federal standards. In these States, this proposal would limit State policy options in the same manner as every standard promulgated by OSHA. In States with OSHA-approved State Plans, this rulemaking would not significantly limit State policy options.

VIII. State Plan States

When Federal OSHA promulgates a new standard or more stringent amendment to an existing standard, the 28 States and U.S. territories with their own OSHA approved occupational safety and health plans (“State Plan States”) must amend their standards to reflect the new standard or amendment, or show OSHA why such action is unnecessary, e.g., because an existing State standard covering this area is “at least as effective” as the

new Federal standard or amendment. 29 CFR 1953.5(a). The State standard must be at least as effective as the final Federal rule. State Plans must adopt the Federal standard or complete their own standard within six months of the promulgation date of the final Federal rule. When OSHA promulgates a new standard or amendment that does not impose additional or more stringent requirements than an existing standard, State Plan States are not required to amend their standards, although the agency may encourage them to do so. The 28 States and U.S. territories with OSHA-approved occupational safety and health plans are: Alaska, Arizona, California, Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nevada, New Mexico, North Carolina, Oregon, Puerto Rico, South Carolina, Tennessee, Utah, Vermont, Virginia, Washington, and Wyoming. Connecticut, Illinois, Maine, New Jersey, New York, and the Virgin Islands have OSHA-approved State Plans that apply to State and local government employees only.

This proposal applies to the construction and shipyards industries. If adopted as proposed, the revised standards, in conjunction with other existing OSHA standards, would provide equivalent protection to the 2017 beryllium standards. Therefore, State Plan States whose current laws are at least as effective as the 2017 final rule would not have to revise these laws. State Plan States may nonetheless choose to conform to these proposed revisions if finalized.

IX. Unfunded Mandates Reform Act

OSHA reviewed this proposal according to the Unfunded Mandates Reform Act of 1995 (“UMRA”; 2 U.S.C. 1501 et seq.) and Executive Order 12875 (58 FR 58093). As discussed above in Section IV (“Preliminary Economic Analysis and Regulatory

Flexibility Certification”) of this preamble, the agency preliminarily determined that this proposal would not impose significant additional costs on any private- or public-sector entity. Further, OSHA previously concluded that the rule would not impose a Federal mandate on the private sector in excess of \$100 million (adjusted annually for inflation) in expenditures in any one year (82 FR at 2634). Accordingly, this proposal would not require significant additional expenditures by either public or private employers.

As noted above under Section VII (“State-Plan States”), the agency’s standards do not apply to State and local governments except in States that have elected voluntarily to adopt a State Plan approved by the agency. Consequently, this proposal does not meet the definition of a “Federal intergovernmental mandate” (see Section 421(5) of the UMRA (2 U.S.C. 658(5))). Therefore, for the purposes of the UMRA, the agency certifies that this proposal would not mandate that State, local, or Tribal governments adopt new, unfunded regulatory obligations of, or increase expenditures by the private sector by, more than \$100 million in any year.

X. Environmental Impacts

OSHA has reviewed this proposed beryllium rule according to the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321 et seq.), the regulations of the Council on Environmental Quality (40 CFR part 1500), and the Department of Labor’s NEPA procedures (29 CFR part 11). OSHA has made a preliminary determination that this proposed rule would have no significant impact on air, water, or soil quality; plant or animal life; the use of land; or aspects of the external environment.

XI. Consultation and Coordination with Indian Tribal Governments

OSHA reviewed this proposed rule in accordance with E.O. 13175 (65 FR 67249) and determined that it does not have “tribal implications” as defined in that order. This proposal does not have substantial direct effects on one or more Indian tribes, on the relationship between the Federal government and Indian tribes, or on the distribution of power and responsibilities between the Federal Government and Indian tribes.

List of Subjects in 29 CFR Parts 1915 and 1926

Beryllium, Cancer, Chemicals, Hazardous substances, Health, Occupational safety and health.

Authority and Signature

This document was prepared under the direction of Loren Sweatt, Principal Deputy Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, Washington, DC 20210.

The agency issues the sections under the following authorities: 29 U.S.C. 653, 655, 657; 40 U.S.C. 3704; 33 U.S.C. 941; Secretary of Labor’s Order 1-2012 (77 FR 3912 (1/25/2012)); and 29 CFR part 1911.

Signed at Washington, DC, on September 24, 2019.

Loren Sweatt,
Principal Deputy Assistant Secretary of Labor for Occupational Safety and Health.

Amendments to Standards

For the reasons set forth in the preamble, chapter XVII of title 29, parts 1915 and 1926, of the Code of Federal Regulations is proposed to be amended as follows:

PART 1915—OCCUPATIONAL SAFETY AND HEALTH STANDARDS FOR SHIPYARD EMPLOYMENT

1. The authority citation for part 1915 continues to read as follows:

Authority: 33 U.S.C. 941; 29 U.S.C. 653, 655, 657; Secretary of Labor's Order No. 12-71 (36 FR 8754); 8-76 (41 FR 25059), 9-83 (48 FR 35736), 1-90 (55 FR 9033), 6-96 (62 FR 111), 3-2000 (65 FR 50017), 5-2002 (67 FR 65008), 5-2007 (72 FR 31160), 4-2010 (75 FR 55355), or 1-2012 (77 FR 3912); 29 CFR part 1911; and 5 U.S.C. 553, as applicable.

2. Amend § 1915.1024 as follows:

- a. In paragraph (b):
 - i. Add a definition for “Beryllium sensitization” in alphabetical order;
 - ii. Revise the definitions of “CBD diagnostic center,” “Chronic beryllium disease (CBD),” and “Confirmed positive”; and
 - iii. Remove the definition of “Emergency”;
- b. Revise paragraph (f)(1)(i)(A);
- c. Remove paragraphs (f)(1)(i)(B), (C), (D), (E), and (H);
- d. Redesignate paragraphs (f)(1)(i)(F) and (G) as paragraphs (f)(1)(i)(B) and (C);
- e. Add new paragraph (f)(1)(i)(D);
- f. Revise paragraphs (f)(1)(ii)(B), (f)(2), and (g)(1)(iii);
- g. Remove paragraph (g)(1)(iv);
- h. Redesignate paragraph (g)(1)(v) as paragraph (g)(1)(iv);
- i. Revise paragraphs (h)(1) introductory text and (h)(2)(i) and (ii);
- j. Remove paragraphs (h)(2)(iii), (iv), and (v);
- k. Revise paragraph (h)(3)(ii);
- l. Remove paragraph (h)(3)(iii);

- m. Remove and reserve paragraph (i);
- n. Revise paragraphs (j) and (k)(1)(i)(B);
- o. Remove paragraph (k)(1)(i)(C);
- p. Redesignate paragraph (k)(1)(i)(D) as paragraph (k)(1)(i)(C);
- q. Revise paragraph (k)(2)(i)(B), (k)(2)(ii), (k)(3)(ii)(A), (k)(4)(i), (k)(7)(i) introductory text, and (m)(1)(ii);
- r. Remove paragraph (m)(3);
- s. Redesignate paragraph (m)(4) as paragraph (m)(3);
- t. Revise newly redesignated paragraphs (m)(3)(i) introductory text and (m)(3)(ii)(A);
- u. Remove newly redesignated paragraph (m)(3)(ii)(D);
- v. Further redesignate paragraphs (m)(3)(ii)(E) through (I) as paragraphs (m)(3)(ii)(D) through (H); and
- w. Revise newly redesignated paragraph (m)(3)(ii)(D) and paragraphs (n)(1)(ii)(F), (n)(3)(ii)(A), and (n)(4)(i).

The revisions and additions read as follows:

§ 1915.1024 Beryllium.

* * * * *

(b) * * *

Beryllium sensitization means a response in the immune system of a specific individual who has been exposed to beryllium. There are no associated physical or clinical symptoms and no illness or disability with beryllium sensitization alone, but the response that occurs through beryllium sensitization can enable the immune system to recognize

and react to beryllium. While not every beryllium-sensitized person will develop CBD, beryllium sensitization is essential for development of CBD.

CBD diagnostic center means a medical diagnostic center that has a pulmonologist or pulmonary specialist on staff and on-site facilities to perform a clinical evaluation for the presence of chronic beryllium disease (CBD). The CBD diagnostic center must have the capacity to perform pulmonary function testing (as outlined by the American Thoracic Society criteria), bronchoalveolar lavage (BAL), and transbronchial biopsy. The CBD diagnostic center must also have the capacity to transfer BAL samples to a laboratory for appropriate diagnostic testing within 24 hours. The pulmonologist or pulmonary specialist must be able to interpret the biopsy pathology and the BAL diagnostic test results.

Chronic beryllium disease (CBD) means a chronic granulomatous lung disease caused by inhalation of airborne beryllium by an individual who is beryllium-sensitized.

Confirmed positive means the person tested has had two abnormal BeLPT test results, an abnormal and a borderline test result, or three borderline test results obtained within the 30-day follow-up test period required after a first abnormal or borderline BeLPT test result. It also means the result of a more reliable and accurate test indicating a person has been identified as having beryllium sensitization.

* * * * *

(f) * * *

(1) * * *

(i) * * *

(A) A list of operations and job titles reasonably expected to involve exposure to beryllium;

* * * * *

(D) Procedures used to ensure the integrity of each containment used to minimize exposures to employees outside of the containment.

* * * * *

(ii) * * *

(B) The employer is notified that an employee is eligible for medical removal in accordance with paragraph (l)(1) of this standard, referred for evaluation at a CBD diagnostic center, or shows signs or symptoms associated with airborne exposure to beryllium; or

* * * * *

(2) *Engineering and work practice controls.* The employer must use engineering and work practice controls to reduce and maintain employee airborne exposure to beryllium to or below the TWA PEL and STEL, unless the employer can demonstrate that such controls are not feasible. Wherever the employer demonstrates that it is not feasible to reduce airborne exposure to or below the PELs with engineering and work practice controls, the employer must implement and maintain engineering and work practice controls to reduce airborne exposure to the lowest levels feasible and supplement these controls by using respiratory protection in accordance with paragraph (g) of this standard.

* * * * *

(g) * * *

(1) * * *

(iii) During operations for which an employer has implemented all feasible engineering and work practice controls when such controls are not sufficient to reduce airborne exposure to or below the TWA PEL or STEL; and

* * * * *

(h) * * *

(1) *Provision and use.* Where airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL, the employer must provide at no cost, and ensure that each employee uses, appropriate personal protective clothing and equipment in accordance with the written exposure control plan required under paragraph (f)(1) of this standard and OSHA's Personal Protective Equipment standards for shipyards (subpart I of this part):

* * * * *

(2) * * *

(i) The employer must ensure that each employee removes all personal protective clothing and equipment required by this standard at the end of the work shift or at the completion of all tasks involving beryllium, whichever comes first.

(ii) The employer must ensure that personal protective clothing and equipment required by this standard is not removed in a manner that disperses beryllium into the air.

(3) * * *

(ii) The employer must ensure that beryllium is not removed from personal protective clothing and equipment required by this standard by blowing, shaking or any other means that disperses beryllium into the air.

* * * * *

(j) *Housekeeping*. (1) When cleaning dust resulting from operations that cause, or can reasonably be expected to cause, airborne exposure above the TWA PEL or STEL, the employer must ensure the use of methods that minimize the likelihood and level of airborne exposure.

(2) The employer must not allow dry sweeping or brushing for cleaning up dust resulting from operations that cause, or can reasonably be expected to cause, airborne exposure above the TWA PEL or STEL unless methods that minimize the likelihood and level of airborne exposure are not safe or effective.

(3) The employer must not allow the use of compressed air for cleaning where the use of compressed air causes, or can reasonably be expected to cause, airborne exposure above the TWA PEL or STEL.

(4) Where employees use dry sweeping, brushing, or compressed air to clean, the employer must provide, and ensure that each employee uses, respiratory protection and personal protective clothing and equipment in accordance with paragraphs (g) and (h) of this standard.

(5) The employer must ensure that cleaning equipment is handled and maintained in a manner that minimizes the likelihood and level of airborne exposure and the re-entrainment of airborne beryllium in the workplace.

(k) * * *

(1) * * *

(i) * * *

(B) Who shows signs or symptoms of CBD or other beryllium-related health effects; or

* * * * *

(2) * * *

(i) * * *

(B) An employee meets the criteria of paragraph (k)(1)(i)(B) of this standard.

(ii) At least every two years thereafter for each employee who continues to meet the criteria of paragraph (k)(1)(i)(A), (B), or (C) of this standard.

* * * * *

(3) * * *

(ii) * * *

(A) A medical and work history, with emphasis on past and present exposure to beryllium, smoking history, and any history of respiratory system dysfunction;

* * * * *

(4) * * *

(i) A description of the employee's former and current duties that relate to the employee's exposure to beryllium;

* * * * *

(7) * * *

(i) The employer must provide an evaluation at no cost to the employee at a CBD diagnostic center that is mutually agreed upon by the employer and the employee. The employer must also provide, at no cost to the employee and within a reasonable time after the initial consultation with the CBD diagnostic center, any of the following tests if deemed appropriate by the examining physician at the CBD diagnostic center: pulmonary function testing (as outlined by the American Thoracic Society criteria), bronchoalveolar

lavage (BAL), and transbronchial biopsy. The initial consultation with the CBD diagnostic center must be provided within 30 days of:

* * * * *

(m) * * *

(1) * * *

(ii) Employers must include beryllium in the hazard communication program established to comply with the HCS. Employers must ensure that each employee has access to labels on containers of beryllium and to safety data sheets, and is trained in accordance with the requirements of the HCS (29 CFR 1910.1200) and paragraph (m)(3) of this standard.

* * * * *

(3) * * *

(i) For each employee who has, or can reasonably be expected to have, airborne exposure to beryllium;

* * * * *

(ii) * * *

(A) The health hazards associated with exposure to beryllium, including the signs and symptoms of CBD;

* * * * *

(D) Measures employees can take to protect themselves from exposure to beryllium;

* * * * *

(n) * * *

(1) * * *

(ii) * * *

(F) The name and job classification of each employee represented by the monitoring, indicating which employees were actually monitored.

* * * * *

(3) * * *

(ii) * * *

(A) Name and job classification;

* * * * *

(4) * * *

(i) At the completion of any training required by this standard, the employer must prepare a record that indicates the name and job classification of each employee trained, the date the training was completed, and the topic of the training.

* * * * *

PART 1926—SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION

Subpart Z—Toxic and Hazardous Substances

3. The authority citation for subpart Z of part 1926 continues to read as follows:

Authority: 40 U.S.C. 3704; 29 U.S.C. 653, 655, 657; and Secretary of Labor's Order No. 12-71 (36 FR 8754), 8-76 (41 FR 25059), 9-83 (48 FR 35736), 1-90 (55 FR 9033), 6-96 (62 FR 111), 3-2000 (65 FR 50017), 5-2002 (67 FR 65008), 5-2007 (72 FR 31160), 4-2010 (75 FR 55355), or 1-2012 (77 FR 3912) as applicable; and 29 CFR part 1911.

Section 1926.1102 not issued under 29 U.S.C. 655 or 29 CFR part 1911; also issued under 5 U.S.C. 553.

4. Amend § 1926.1124 as follows:

a. In paragraph (b):

- i. Add a definition for “Beryllium sensitization” in alphabetical order;
- ii. Revise the definitions of “CBD diagnostic center,” “Chronic beryllium disease (CBD),” and “Confirmed positive”; and
- iii. Remove the definition of “Emergency”;
- b. Revise paragraph (f)(1)(i)(A);
- c. Remove paragraphs (f)(1)(i)(B), (C), (D), (E), and (H);
- d. Redesignate paragraphs (f)(1)(i)(F), (G), and (I) as paragraphs (f)(1)(i)(B), (C), and (D);
- e. Remove the period at the end of newly redesignated paragraph (f)(1)(i)(D) and adding “; and” in its place;
- f. Add new paragraph (f)(1)(i)(E);
- g. Revise paragraphs (f)(1)(ii)(B), (f)(2), and (g)(1)(iii);
- h. Remove paragraph (g)(1)(iv);
- i. Redesignate paragraph (g)(1)(v) as paragraph (g)(1)(iv);
- j. Revise paragraphs (h)(1) and (h)(2)(i) and (ii);
- k. Remove paragraphs (h)(2)(iii), (iv), and (v);
- l. Revise paragraph (h)(3)(ii);
- m. Remove paragraph (h)(3)(iii);
- n. Remove and reserve paragraph (i);
- o. Revise paragraphs (j) and (k)(1)(i)(B);
- p. Remove paragraph (k)(1)(i)(C);
- q. Redesignate paragraph (k)(1)(i)(D) as paragraph (k)(1)(i)(C);

- r. Revise paragraphs (k)(2)(i)(B), (k)(2)(ii), (k)(3)(ii)(A), (k)(4)(i), and (k)(7)(i) introductory text;
- s. Remove paragraph (m)(2);
- t. Redesignate paragraph (m)(3) as paragraph (m)(2);
- u. Revise newly redesignated paragraphs (m)(2)(i) introductory text and (m)(2)(ii)(A);
- v. Remove newly redesignated paragraph (m)(2)(ii)(D);
- w. Further redesignate paragraphs (m)(2)(ii)(E) through (I) as paragraphs (m)(2)(ii)(D) through (H); and
- x. Revise newly redesignated paragraph (m)(2)(ii)(D) and paragraphs (n)(1)(ii)(F), (n)(3)(ii)(A), and (n)(4)(i).

The revisions and additions read as follows:

§ 1926.1124 Beryllium.

* * * * *

(b) * * *

Beryllium sensitization means a response in the immune system of a specific individual who has been exposed to beryllium. There are no associated physical or clinical symptoms and no illness or disability with beryllium sensitization alone, but the response that occurs through beryllium sensitization can enable the immune system to recognize and react to beryllium. While not every beryllium-sensitized person will develop CBD, beryllium sensitization is essential for development of CBD.

CBD diagnostic center means a medical diagnostic center that has a pulmonologist or pulmonary specialist on staff and on-site facilities to perform a clinical evaluation for the

presence of chronic beryllium disease (CBD). The CBD diagnostic center must have the capacity to perform pulmonary function testing (as outlined by the American Thoracic Society criteria), bronchoalveolar lavage (BAL), and transbronchial biopsy. The CBD diagnostic center must also have the capacity to transfer BAL samples to a laboratory for appropriate diagnostic testing within 24 hours. The pulmonologist or pulmonary specialist must be able to interpret the biopsy pathology and the BAL diagnostic test results.

Chronic beryllium disease (CBD) means a chronic granulomatous lung disease caused by inhalation of airborne beryllium by an individual who is beryllium-sensitized.

* * * * *

Confirmed positive means the person tested has had two abnormal BeLPT test results, an abnormal and a borderline test result, or three borderline test results obtained within the 30-day follow-up test period required after a first abnormal or borderline BeLPT test result. It also means the result of a more reliable and accurate test indicating a person has been identified as having beryllium sensitization.

* * * * *

(f) * * *

(1) * * *

(i) * * *

(A) A list of operations and job titles reasonably expected to involve exposure to beryllium;

* * * * *

(E) Procedures used to ensure the integrity of each containment used to minimize exposures to employees outside the containment.

(ii) ***

(B) The employer is notified that an employee is eligible for medical removal in accordance with paragraph (1)(1) of this standard, referred for evaluation at a CBD diagnostic center, or shows signs or symptoms associated with airborne exposure to beryllium; or

* * * * *

(2) *Engineering and work practice controls.* The employer must use engineering and work practice controls to reduce and maintain employee airborne exposure to beryllium to or below the TWA PEL and STEL, unless the employer can demonstrate that such controls are not feasible. Wherever the employer demonstrates that it is not feasible to reduce airborne exposure to or below the PELs with engineering and work practice controls, the employer must implement and maintain engineering and work practice controls to reduce airborne exposure to the lowest levels feasible and supplement these controls by using respiratory protection in accordance with paragraph (g) of this standard.

* * * * *

(g) * * *

(1) * * *

(iii) During operations for which an employer has implemented all feasible engineering and work practice controls when such controls are not sufficient to reduce airborne exposure to or below the TWA PEL or STEL; and

* * * * *

(h) * * *

(1) *Provision and use.* Where airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL, the employer must provide at no cost, and ensure that each employee uses, appropriate personal protective clothing and equipment in accordance with the written exposure control plan required under paragraph (f)(1) of this standard and OSHA's Personal Protective and Life Saving Equipment standards for construction (subpart E of this part).

(2) * * *

(i) The employer must ensure that each employee removes all personal protective clothing and equipment required by this standard at the end of the work shift or at the completion of all tasks involving beryllium, whichever comes first.

(ii) The employer must ensure that personal protective clothing and equipment required by this standard is not removed in a manner that disperses beryllium into the air.

(3) * * *

(ii) The employer must ensure that beryllium is not removed from personal protective clothing and equipment required by this standard by blowing, shaking or any other means that disperses beryllium into the air.

* * * * *

(j) *Housekeeping.* (1) When cleaning up dust resulting from operations that cause, or can reasonably be expected to cause, airborne exposure above the TWA PEL or STEL, the employer must ensure the use of methods that minimize the likelihood and level of airborne exposure.

(2) The employer must not allow dry sweeping or brushing for cleaning up dust resulting from operations that cause, or can reasonably be expected to cause, airborne exposure above the TWA PEL or STEL unless methods that minimize the likelihood and level of airborne exposure are not safe or effective.

(3) The employer must not allow the use of compressed air for cleaning where the use of compressed air causes, or can reasonably be expected to cause, airborne exposure above the TWA PEL or STEL.

(4) Where employees use dry sweeping, brushing, or compressed air to clean, the employer must provide, and ensure that each employee uses, respiratory protection and personal protective clothing and equipment in accordance with paragraphs (g) and (h) of this standard.

(5) The employer must ensure that cleaning equipment is handled and maintained in a manner that minimizes the likelihood and level of airborne exposure and the re-entrainment of airborne beryllium in the workplace.

(k) * * *

(1) * * *

(i) * * *

(B) Who shows signs or symptoms of CBD or other beryllium-related health effects; or
* * * * *

(2) * * *

(i) * * *

(B) An employee meets the criteria of paragraph (k)(1)(i)(B) of this standard.

(ii) At least every two years thereafter for each employee who continues to meet the criteria of paragraph (k)(1)(i)(A), (B), or (C) of this standard.

* * * * *

(3) * * *

(ii) * * *

(A) A medical and work history, with emphasis on past and present exposure to beryllium, smoking history, and any history of respiratory system dysfunction;

* * * * *

(4) * * *

(i) A description of the employee's former and current duties that relate to the employee's exposure to beryllium;

* * * * *

(7) * * *

(i) The employer must provide an evaluation at no cost to the employee at a CBD diagnostic center that is mutually agreed upon by the employer and the employee. The employer must also provide, at no cost to the employee and within a reasonable time after the initial consultation with the CBD diagnostic center, any of the following tests if deemed appropriate by the examining physician at the CBD diagnostic center: pulmonary function testing (as outlined by the American Thoracic Society criteria), bronchoalveolar lavage (BAL), and transbronchial biopsy. The initial consultation with the CBD diagnostic center must be provided within 30 days of:

* * * * *

(m) * * *

(2) * * *

(i) For each employee who has, or can reasonably be expected to have, airborne exposure to beryllium:

* * * * *

(ii) * * *

(A) The health hazards associated with exposure to beryllium, including the signs and symptoms of CBD;

* * * * *

(D) Measures employees can take to protect themselves from exposure to beryllium;

* * * * *

(n) * * *

(1) * * *

(ii) * * *

(F) The name and job classification of each employee represented by the monitoring, indicating which employees were actually monitored.

* * * * *

(3) * * *

(ii) * * *

(A) Name and job classification;

* * * * *

(4) * * *

(i) At the completion of any training required by this standard, the employer must prepare a record that indicates the name and job classification of each employee trained, the date the training was completed, and the topic of the training.

* * * * *

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