

**DEPARTMENT OF LABOR****Occupational Safety and Health Administration****29 CFR Parts 1904, 1910, 1915, and 1926**

[Docket No. OSHA–2012–0007]

RIN 1218–AC67

**Standards Improvement Project-Phase IV****AGENCY:** Occupational Safety and Health Administration (OSHA), Labor.**ACTION:** Proposed rule; request for comments.

**SUMMARY:** In response to the President's Executive Order 13563, "Improving Regulations and Regulatory Review," the Occupational Safety and Health Administration (OSHA) is continuing its efforts to remove or revise outdated, duplicative, unnecessary, and inconsistent requirements in its safety and health standards. The current review, the fourth in this ongoing effort, is called Standards Improvement Project-Phase IV (SIP–IV). The goal of the proposed rulemaking is to reduce regulatory burden while maintaining or enhancing employees' safety and health. SIP–IV focuses primarily on OSHA's construction standards.

**DATES:** Submit comments and hearing requests by December 5, 2016. All submissions must bear a postmark or provide other evidence of the submission date.

**ADDRESSES:** Submit comments and additional material using any of the following methods:

*Electronic.* Submit comments and attachments electronically via the Federal eRulemaking Portal at <http://www.regulations.gov>. Follow the instructions online for making electronic submissions.

*Facsimile.* Commenters may fax submissions, including any attachments that are no longer than 10 pages in length to the OSHA Docket Office at (202) 693–1648; OSHA does not require hard copies of these documents. Commenters must submit lengthy attachments that supplement these documents (e.g., studies, journal articles) to the OSHA Docket Office, Technical Data Center, Room N–2625, U.S. Department of Labor, 200 Constitution Ave. NW., Washington, DC 20210. These attachments must clearly identify the commenter's name, date, subject, and docket number (i.e., OSHA–2012–0007) so the Agency can attach them to the appropriate comments.

*Regular mail, express mail, hand (courier) delivery, or messenger service.* Submit a copy of comments and any additional material (e.g., studies, journal articles) to the OSHA Docket Office, Docket No. OSHA–2012–0007, Technical Data Center, Room N–2625, U.S. Department of Labor, 200 Constitution Avenue NW., Washington, DC 20210; telephone: (202) 693–2350 (TDY number: (877) 889–5627). Note that security procedures may result in significant delays in receiving comments and other written materials by regular mail. Contact the OSHA Docket Office for information about security procedures concerning delivery of materials by express mail, hand delivery, or messenger service. The hours of operation for the OSHA Docket Office are 8:15 a.m.–4:45 p.m., e.t.

*Instructions.* All submissions received must include the Agency name and the docket number for this rulemaking (i.e., OSHA–2012–0007). OSHA places all submissions, including any personal information provided, in the public docket without change; this information will be available online at <http://www.regulations.gov>. Therefore, the Agency cautions commenters about submitting information 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, birth dates, and medical data.

OSHA requests comments on all issues related to this proposed rule, including whether these revisions will have any economic, paperwork, or other regulatory impacts on the regulated community.

*Docket.* To read or download submissions or other material in the docket (including material referenced in the preamble), go to <http://www.regulations.gov>, or contact the OSHA Docket Office at the address listed above. While the Agency lists all documents in the docket in the <http://www.regulations.gov> index, some information (e.g., copyrighted material) is not publicly available to read or download through this Web site. All submissions, including copyrighted material, are accessible at the OSHA Docket Office. Contact the OSHA Docket Office for assistance in locating docket submissions.

**FOR FURTHER INFORMATION CONTACT:**

*Press inquiries.* Contact Frank Meilinger, Director, OSHA Office of Communications, Room N–3647, U.S. Department of Labor, 200 Constitution Avenue NW., Washington, DC 20210; telephone: (202) 693–1999; email: [meilinger.francis2@dol.gov](mailto:meilinger.francis2@dol.gov).

*General and technical information.* Contact Blake Skogland, Office of Construction Standards and Guidance, OSHA Directorate of Construction, U.S. Department of Labor, 200 Constitution Avenue NW., Room N–3468, Washington, DC 20210; telephone: (202) 693–2020; fax: (202) 693–1689; email: [skogland.blake@dol.gov](mailto:skogland.blake@dol.gov).

*Copies of this Federal Register notice.* Electronic copies are available at <http://www.regulations.gov>. This **Federal Register** notice, as well as news releases and other relevant information, also are available at OSHA's Web page at <http://www.osha.gov>.

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**I. Executive Summary**

OSHA is proposing 18 revisions to existing standards in its recordkeeping, general industry, maritime, and construction standards, with most of the revisions to its construction standards. The purpose of Standards Improvement Projects (SIPs) is to remove or revise outdated, duplicative, unnecessary, and inconsistent requirements in OSHA's safety and health standards, which will permit better compliance by employers and reduce costs and paperwork burdens where possible, without reducing employee protections. OSHA is conducting SIP–IV in response to the President's Executive Order 13563, "Improving Regulations and Regulatory Review" (76 FR 38210). OSHA would update three standards to align with current medical practice, including a reduction to the number of necessary employee x-rays, updates to requirements for pulmonary function testing, and updates to the table used for decompression of employees during underground construction. Additionally, the proposed revisions include an update to the consensus standard incorporated by reference for signs and devices used to protect workers near automobile traffic, a revision to the requirements for roll-over protective structures to comply with current consensus standards,

updates for storage of digital x-rays and the method of calling emergency services to allow for use of current technology, and a revision to lockout/tagout requirements in response to a court decision, among others. OSHA is also proposing to remove from its standards the requirements that employers include an employee's social security number (SSN) on exposure monitoring, medical surveillance, and other records in order to protect employee privacy and prevent identity fraud.

SIP rulemakings do not address new significant risks or estimate benefits and economic impacts of reducing such risks. Overall, SIP rulemakings are reasonably necessary under the OSH Act because they provide cost savings, or eliminate unnecessary requirements. The Agency does estimate cost savings and paperwork reductions for SIP rulemakings. The Agency has estimated that one revision (updating the method of identifying and calling emergency medical services) may increase construction employers costs by about \$28,000 per year while two provisions (reduction in the number of necessary employee x-rays and elimination of posting requirements for residential construction employers) provide estimated costs savings of \$3.2 million annually. The Agency has not estimated or quantified benefits to employees from reduced exposure to x-ray radiation or to employers for the reduced cost of storing digital x-rays rather than x-ray films, among others. The Agency has preliminarily concluded that the proposed revisions are economically feasible and do not have any significant economic impact on small businesses. The Preliminary Economic Analysis in this preamble provides an explanation of the economic effects of the proposed revisions.

## II. Background

The purpose of the SIP-IV rulemaking is to remove or revise outdated, duplicative, unnecessary, and inconsistent requirements in OSHA's safety and health standards. The Agency believes that improving OSHA standards will increase employers' understanding of their obligations, which will lead to increased compliance, improve employee safety and health, and reduce compliance costs.

In 1995, in response to a Presidential memorandum to improve government regulation,<sup>1</sup> OSHA began a series of

rulemakings designed to revise or remove standards that were confusing, outdated, duplicative, or inconsistent. OSHA published the first rulemaking, "Standards Improvement Project, Phase I" (SIP-I) on June 18, 1998 (63 FR 33450).<sup>2</sup> Two additional rounds of SIP rulemaking followed, with final SIP rules published in 2005 (SIP-II) (70 FR 1111) and 2011 (SIP-III) (76 FR 33590).<sup>3</sup>

As stated above, the President's Executive Order 13563 (E.O.), "Improving Regulations and Regulatory Review," sets out the goals and criteria for regulatory review, and requires agencies to review existing standards and regulations to ensure that these standards and regulations continue to protect public health, welfare, and safety effectively, while promoting economic growth and job creation. The E.O. encourages agencies to use the best, least burdensome means to achieve regulatory objectives, to perform periodic reviews of existing standards to identify outmoded, ineffective, or burdensome standards, and to modify, streamline, or repeal such standards when appropriate.

The Agency believes that the SIP rulemaking process is an effective means to improve its standards and advised the Advisory Committee for Construction Safety and Health (ACCSH) at a public meeting held on December 16, 2011 that it intended to review its standards under the SIP criteria, with particular emphasis on construction standards. A transcription of these proceedings (ACCSH Transcript) is available at Docket No. OSHA-2011-0124-0026.

<sup>2</sup> Revisions made by the SIP-I rulemaking included adjustments to the medical-surveillance and emergency-response provisions of the Coke Oven Emissions, Inorganic Arsenic, and Vinyl Chloride standards, and removal of unnecessary provisions from the Temporary Labor Camps standard and the textile industry standards.

<sup>3</sup> In the final SIP-II rulemaking published in 2005 (70 FR 1111), OSHA revised a number of provisions in its health and safety standards identified as needing improvement either by the Agency or by commenters during the SIP-I rulemaking. These included updating or removing notification requirements from several standards, updating requirements for first aid kits to reflect newer consensus standards, updating requirements for laboratories analyzing samples under the vinyl chloride standard, making worker exposure monitoring frequencies consistent under certain health standards, among other things. The final SIP-III rule, published in 2011 (76 FR 33590), updated consensus standards incorporated by reference in several OSHA rules, deleted provisions in a number of OSHA standards that required employers to prepare and maintain written training-certification records for personal protective equipment, revised several sanitation standards to permit hand drying by high-velocity dryers, and modified OSHA's sling standards to require that employers use only appropriately marked or tagged slings for lifting capacities.

Recognizing the importance of public participation in the SIP process, the Agency published a Request for Information (RFI) on December 6, 2012 (77 FR 72781) asking the public to identify standards that were in need of revision or removal, and to explain how such action would reduce regulatory burden while maintaining or increasing the protection afforded to employees. The Agency received 26 comments in response to the RFI. As discussed below, several of the proposed amendments contained in this proposed rule were recommended in the public comments received in response to the RFI. Other proposed SIP amendments were identified by the Agency's own internal review and by ACCSH.

## III. Summary and Explanation of the Proposed Rule

OSHA is proposing a number of actions amending its standards, including revisions to its general industry, maritime, and construction standards. A detailed discussion of each of the proposed revisions follows, including a discussion of comments the Agency received in response to the RFI. Some of the proposed revisions affect more than one industry (*i.e.*, general industry, construction). When proposed revisions to a general industry standard would affect additional industries, OSHA will discuss the revisions fully in the general industry section and then reference the provisions affected in the sections covering the other industries.

### A. Proposed Revision in Occupational Injuries and Illnesses Recording and Reporting Standards (29 CFR Part 1904)

Subpart C—Recording Forms and Recording Criteria, Recording Criteria for Cases Involving Occupational Hearing Loss in 29 CFR 1904.10

The provisions of 29 CFR part 1904 provide for the recording and reporting of occupational injuries and illnesses. Section 1904.10 sets out the recordkeeping criteria for recording cases involving occupational hearing loss. Current § 1904.10(b)(6) provides that "[i]f a physician or other licensed health care professional determines that a hearing loss is not work-related or has not been significantly aggravated by occupational noise exposure, [the employer is] not required to consider the case work-related or to record the case on the OSHA 300 log." Section 1904.5 provides the requirements for determining whether an injury or illness is work-related.

To clarify the relationship between §§ 1904.10(b)(6) and 1904.5, OSHA incorporated the following language

<sup>1</sup> Clinton, W.J. Memorandum for Heads of Departments and Agencies. Subject: Regulatory Reinvention Initiative. March 4, 1995.

into the recordkeeping compliance directive:

Physician or other licensed health care professional (PLHCP) must follow the rules set out in 1904.5 to determine if the hearing loss is work-related. If an event or exposure in the work environment either caused or contributed to the hearing loss, or significantly aggravated a pre-existing hearing loss, the PLHCP must consider the case to be work-related. It is not necessary for work to be the sole cause, or the predominant cause, or even a substantial cause of the hearing loss; any contribution from work makes the case work-related. The employer is responsible for ensuring that the PLHCP applies the analysis in Section 1904.5 when evaluating work-related hearing loss, if the employer chooses to rely on the PLHCP's opinion in determining recordability.

(CPL 02-00-135, Chapter 5, Section IX, Question 10-4, 01/12/2012.)

In this rulemaking, OSHA is proposing to add a specific cross reference to § 1904.5 in paragraph § 1904.10(b)(6) to make the language in § 1904.10(b)(6) consistent with the above-quoted language from the compliance directive. The reference specifies that employers must comply with the provisions of § 1904.5 when making a determination of whether a worker's hearing loss is work-related. OSHA believes the proposed revision will assist employers in complying with the hearing-loss recording requirement.

*B. Proposed Revisions in General Industry Standards, Shipyard Standards, and Construction Standards (29 CFR Parts 1910, 1915, and 1926)*

1. Subpart J of 1910—General Environmental Controls, Control of Hazardous Energy (Lockout/Tagout) in 29 CFR 1910.147

The Control of Hazardous Energy (Lockout/Tagout) standard, 29 CFR 1910.147, establishes requirements for the control of hazardous energy, including electrical, pneumatic, mechanical, hydraulic, chemical or thermal energy, during the servicing and maintenance of machinery and equipment. Workers who service equipment without preventing the discharge of this energy can be electrocuted or suffer burns, amputations, lacerations, bone fractures, or crushing injuries, among others.

According to its terms, the lockout/tagout standard applies to servicing and maintenance operations “in which the *unexpected* energization or startup of the machines or equipment, or the release of stored energy could cause injury to employees” (§ 1910.147(a)(1)(i) (emphasis in original)). Because OSHA believes the term “unexpected” has been misinterpreted to exclude some

operations where employees are subject to injury from startup or the release of stored energy, the Agency is proposing to remove the word from § 1910.147(a)(1) and several other places it appears in the standard (§§ 1910.147(a)(2)(iii)(A), (a)(3)(i), (b), (c)(1), (c)(4)(i), (f)(4), and in Appendix A). The lockout/tagout standard was designed to protect workers from being injured if a machine or other piece of equipment they are servicing releases stored energy, for example, by starting or moving during the servicing. The standard protects these employees by requiring that machines or equipment be de-energized and locked or tagged out *by the worker performing the servicing or maintenance* before the work is performed. The essence of the standard's protection is that a de-energized machine or piece of equipment *cannot* be restarted unless the worker servicing it personally removes the lockout or tagout device he or she has applied.

Thus, OSHA intended the phrase “unexpected energization” to mean any re-energization or startup that occurs before the servicing employee removes the lockout/tagout device from the energy isolation device or equivalent energy control mechanism.

In line with this intent, OSHA has historically interpreted the term “unexpected energization” to mean energization that is unintended or unplanned *by the servicing employee* (72 FR 72452, 72496, December 20, 2007; CPL 02-00-147). OSHA believes that preventing this type of unintended or unplanned energization during servicing is necessary to fully effectuate the standard's purpose of protecting workers through the control of hazardous energy. (See CPL 02-00-147, *The Control of Hazardous Energy—Enforcement Policy and Inspection Procedures at 3-1* (Feb. 11, 2008) (“Quite simply, the [lockout/tagout] standard is violated when an employee is, or may be, exposed to hazardous energy that has not been isolated, even if the employee knows that the energy has not been controlled and continues to constitute a hazard.”))

Several decisions of the Occupational Safety and Health Review Commission (OSHRC) support this interpretation. In *Burkes Mechanical, Inc.*, 21 BNA OSHC 2136, 2139 & n.4 (No. 04-0475, 2007), OSHRC rejected an argument that the lockout/tagout standard did not apply to employees who were servicing conveyor equipment that was operating. The fact that they knew the equipment was moving did not mean that the hazard fell outside the scope of the standard. Similarly, OSHRC found the standard

applied in *Otis Elevator Co.*, 24 BNA OSHC 1081 (No. 09-1278, 2013), *aff'd*, 762 F.3d 116 (D.C. Cir. 2014), where an employee was trying to unjam the stuck gate assembly of an elevator car without proper energy control measures in place. The energization was unexpected because, although the worker knew the gate assembly would start to move when unjammed, he could not predict when it would become unjammed. The United States Court of Appeals for the District of Columbia Circuit affirmed OSHRC's decision for the same reason. *Otis Elevator Co. v. Secretary of Labor*, 762 F.3d 116, 122 (D.C. Cir. 2014).

On the other hand, OSHA's understanding of the standard has not always been accepted. In *Reich v. General Motors Corp., Delco Chassis Div. (GMC Delco)*, 17 BNA OSHC 1217 (Nos. 91-2973, 91-3116, 91-3117, 1995); *aff'd* 89 F.3d 313 (6th Cir. 1996), both OSHRC and the United States Court of Appeals for the Sixth Circuit rejected OSHA's interpretation. Instead they held that the lockout/tagout standard did not apply where a startup procedure for a machine provided a warning to a worker servicing it that it was about to start. In that case, workers were servicing machines that used an eight-to-twelve-step startup procedure, including time delays, and audible or visual warnings. The court and OSHRC held that, because these features would warn the servicing employees that the machines were about to start, the startup would not be “unexpected.” According to the Sixth Circuit, “the plain language of the lockout standard unambiguously renders the rule inapplicable where an employee is alerted or warned that the machine being serviced is about to activate.” 89 F.3d at 315.

OSHA believes that the *GMC Delco* decisions fundamentally misconstrue the “unexpected” language of the lockout/tagout standard by allowing employers to use warning and delay systems as alternatives to following the requirements of the standard. Warning devices are not as protective as a lockout/tagout program, and the standard does not allow them to be used as an alternative to a lockout/tagout program. Indeed, the exclusive use of warning devices subverts the intent of the standard by removing control over the hazardous energy from individual authorized employees and instead placing the burden on those exposed employees to become cognizant of and to recognize the warnings, so that they can attempt to escape danger zones before they are injured. In adopting the standard, OSHA considered this approach to be impractical and dangerous. Instead, OSHA intended to

protect employees effectively from all forms of hazardous energy by isolating machines from their energy sources during servicing and/or maintenance and providing the workers who were servicing them with control over the energy isolation devices (see CPL 02–00–147 at 3–3 & ch. 4).

In addition, by holding that work on a device that gives warning before startup does not fall within the standard, the *GMC Delco* decisions, in essence, require a case-by-case assessment of various warning schemes to determine the applicability of the standard. To enforce the standard consistent with those decisions, OSHA has provided its compliance officers with 11 different factors to evaluate to determine whether particular warning devices are adequate and reliable enough to allow all employees to escape all types of hazardous energy in all circumstances that may occur (see CPL 02–00–147 at 3–5 to 3–6). This creates a degree of uncertainty about the applicability of the standard for the regulated community that OSHA did not intend.

As a result of the *GMC Delco* decisions, OSHA is proposing to remove the term “unexpected” from the lockout/tagout standard to revert to its original understanding of the standard. The proposal is intended to make clear that the lockout/tagout standard covers all equipment servicing activities in which there are energization, startup, or stored energy hazards.

This proposal is consistent with the court’s recognition that the rulemaking process provides OSHA with the opportunity to change the application of the lockout/tagout standard. *GMC Delco*, 89 F.3d at 316. It will also make the standard consistent with OSHA’s shipyard lockout/tagout standard, which is almost identical to the general industry standard except that it omits the word “unexpected” from the scope provision. 29 CFR 1915.89. The shipyard lockout/tagout proposal gave the same reasons for deleting the word as are provided here (72 FR 72452, 72496, December 20, 2007), and OSHA finalized the rule after failing to receive any comments addressing the issue. (76 FR 24576, 24704, May 2, 2011).

Removing the word “unexpected” will improve protection of workers under the standard, eliminate the confusion regarding applicability of the standard caused by the *GMC Delco* decisions, and make the lockout/tagout standard consistent with the lockout/tagout provisions in the General Working Conditions in Shipyard Employment standard.

2. Subpart Z of 1910, 1915, and 1926—Toxic and Hazardous Substances, Asbestos in 29 CFR 1910.1001, Inorganic Arsenic in 29 CFR 1910.1018, Cadmium in 29 CFR 1910.27, Coke Oven Emissions in 29 CFR 1910.29, Acrylonitrile in 29 CFR 1910.1045, Asbestos in 29 CFR 1915.1001, Asbestos in 29 CFR 1926.1101, Cadmium in 29 CFR 1926.1127

OSHA is proposing a series of revisions to requirements addressing employee chest X-rays in the Agency’s health standards. In particular, OSHA is proposing to remove the requirement in several of its standards that employers provide periodic chest X-rays to screen for lung cancer; to allow employers to use digital films and other reasonably-sized standard films for X-rays; and to update terminology and references to ILO guidelines included in its asbestos standards.

#### Removing Periodic Chest X-Ray Requirements for Lung-Cancer Screening

OSHA requires medical surveillance in its health standards to detect early indications of adverse health effects in exposed workers before symptoms occur, so that appropriate interventional measures can be taken. Several OSHA standards currently require periodic chest X-rays (CXR), also referred to as posterior-anterior CXR, radiographs, or roentgenograms (a term no longer used). When the Agency published these standards, routine screening for lung cancer with CXR was appropriate clinical practice. However, since then, large studies with many years of follow-up have not shown a benefit to CXR screening, either on lung cancer incidence or mortality. Therefore, OSHA is proposing to remove the requirement for periodic CXR in the following standards: §§ 1910.1018, Inorganic Arsenic; 1910.1029, Coke Oven Emissions; and 1910.1045, Acrylonitrile. OSHA is not proposing to remove the requirement for a baseline CXR in these, or any other, standards. OSHA is also not proposing to remove the CXR requirements in standards where it is used for purposes other than periodic screening for lung cancer. For example, the proposal does not affect periodic CXRs required by OSHA’s standards to detect or monitor the progression of pneumoconiosis.

Similarly, OSHA is proposing to amend Appendix H of the asbestos standard, § 1910.1001.<sup>4</sup> Appendix H

<sup>4</sup> OSHA is also proposing the same change for the parallel appendices in the Maritime and Construction Asbestos standards, 29 CFR 1915.1001 Appendix I and 1926.1101 Appendix I.

provides non-mandatory guidelines for asbestos medical exposure, and OSHA proposes to include the text “Plural plaques and thickening may be observed on chest X-rays.” OSHA is retaining CXRs in the asbestos standard to continue screening for asbestosis, and the proposed text notes the changes related to asbestosis that can be seen on CXRs. The change thus explains the purpose of the CXR.

Section 6(b)(7) of the Occupational Safety and Health Act, 29 U.S.C. 655(b)(7), allows OSHA to modify medical examination requirements in existing standards when “warranted by experience, information, or medical or technological developments.” OSHA has used this authority on several occasions. For example, when contemporary evidence indicated that sputum cytology did not improve lung-cancer survival rates, OSHA removed the sputum-cytology-examination requirements from the Coke Oven and Inorganic Arsenic standards in the SIP–I rulemaking (63 FR 33450, 33458–59, June 18, 1998). In addition, OSHA also reduced CXR frequencies from semi-annual to annual for some workers exposed to inorganic arsenic and coke oven emissions in SIP–I. The Agency based this reduction on data available at the time indicating that semi-annual x-rays provided no additional protection, when compared to annual x-rays, in improving the detection of, and survival from, lung cancer for higher risk persons (63 FR 33459–60). This eliminated unnecessary radiation exposure for employees and reduced the burden on employers. OSHA retained the medical history and physical-examination requirements in these standards.

For the reasons discussed below, OSHA has made a preliminary determination that the current literature shows that there is no evidence of benefit, either in lung cancer incidence or mortality, from screening with CXR in the general population. The primary goal of population-based screening is to detect disease at an early stage when cure or control is possible, thereby decreasing the number of people who die from the disease (Black and Welch, 1997; U.S. Preventive Services Task Force (USPSTF), 2013; Mazzone, 2012).<sup>5</sup> Several large-scale, randomized controlled trials have been conducted over the years to determine whether

<sup>5</sup> Materials referenced are posted on <http://regulations.gov>, Docket No. OSHA–2012–0007, and are accessible at OSHA’s Docket Office, U.S. Department of Labor, 200 Constitution Avenue NW., Room N2625, Washington, DC 20210; telephone (202) 693–2350. (OSHA’s TTY number is (877) 889–5627.) OSHA Docket Office hours of operation are 8:15 a.m. to 4:45 p.m., E.T.

screening with chest x-rays, with or without the addition of sputum cytology tests, was effective in reducing mortality from lung cancer. These studies are discussed below. The Mayo Lung Project compared participants in an “intervention” group, who were offered chest radiography and sputum cytology every four months, with those in a “control” group offered standard medical care. Participants were middle-aged and older men who were chronic heavy cigarette smokers and thus at high risk of developing lung cancer. After the initial prevalence screening, 9,211 male smokers aged 45 and older who completed the prevalence screening with negative results and who qualified for incidence rescreening were randomized to either of the two groups. The more screening-intensive intervention group was encouraged (and reminded) to undergo free chest x-rays and free sputum cytology tests every four months for six years. While the “controls” were offered standard medical care, they also were advised to undergo annual chest x-rays and sputum cytology tests, resulting in significant contamination of the control group by CXR performed off protocol. Follow-up ranged from one to five years, and averaged three years.

At the end of the follow-up (July 1, 1983), the Mayo Clinic study observed no difference in lung cancer mortality between the intervention and control groups, but observed an excess of 46 cases in the intervention group, a possible indication of over-diagnosis in lung cancer screening. The excess number of cases also could have resulted from short follow-up time (that is, additional cases may have been observed in the control group if the study lasted longer). In summary, this trial demonstrated significantly increased lung cancer detection, resectability, and survivorship after detection in the group offered screening every four months compared with the control group. However, there was no significant difference in lung cancer mortality rate between the two groups. Contamination of the control group, together with 25 percent non-compliance in the screened group, limited the statistical power of this trial. The authors concluded that “results do not justify recommending large-scale radiologic or cytologic screening for early lung cancer at this time (Fontana, *et al.*, 1984; Fontana, *et al.*, 1991).”

The term “over-diagnosis” refers to identifying through screening a disease that would otherwise remain undiagnosed during an individual’s lifetime (*i.e.*, because symptoms do not present). Over-diagnosis is a serious

potential risk of screening, as the evaluation and treatment of over-diagnosed cancer can lead to morbidity, and even to premature mortality (Black, 2000).

In order to assess whether over-diagnosis accompanies lung cancer CXR screening, Marcus *et al.* (2006) extended the follow-up of the same Mayo Clinic population studied by Fontana *et al.* for an additional 16 years using a randomized controlled trial with a stop-screen feature. A stop-screen study design (*i.e.*, one in which screening is terminated after a prespecified number of years but follow-up continues for ascertainment of cases of disease and deaths) provides the best setting in which to assess whether over-diagnosis accompanies screening (Marcus *et al.*, 2006). If over-diagnosis does not occur, the cumulative number of cases in each group will be equal after screening stops and the number of cancers in the control group identified through symptoms catches up with those identified earlier through screening (Marcus *et al.*, 2006).

At the start of the study in 1983, information on lung cancer status was available for 6,101 participants. From 1971 through the end of 1999, 585 participants in the more frequently screened group and 500 in the usual-care group were diagnosed with lung cancer. Because the number of lung cancers in the usual care group did not equalize with those in the more frequently screened group at the end of the study period, the study investigators concluded that “the persistence of excess cases in the intervention [group] after 16 years of additional follow-up provides continued support for over-diagnosis in lung cancer screening” (Marcus *et al.*, 2006).

OSHA identified one study that included men who were younger than 45. A Czech study, Kubik and Polak (1986), enrolled 6,364 smokers aged 40 to 64 years. This study compared semi-annual screening using x-ray and sputum cytology to screening at three-year intervals, and to no screening. Although it found more earlier-stage lung cancers in both screened groups, this study also found no significant difference in mortality rates. In 1993, the Prostate, Lung, Colorectal, and Ovarian (PLCO) Randomized Trial examined the question whether screening would reduce mortality rates from PLCO cancers. In a randomized controlled study conducted in ten screening centers in the US, 154,901 participants aged 55 through 74 years were assigned either to the group that received annual CXR for three or four years, or to the “usual care” (no radiographic intervention) group; 51.6

percent of the participants were current or former smokers. All diagnosed cancers, deaths, and causes of death were ascertained through 13 years of follow-up or until December 31, 2009, whichever event occurred earlier (Oken *et al.*, 2011). The study found no statistically significant differences in lung cancer mortality or incidence rates between the intervention and “usual care” groups, despite finding a higher proportion of early stage (potentially curable) lung cancers in the screened group (Hocking *et al.*, 2010). Of particular note is the rate of false positives in the study; of 13,038 participants with at least one positive CXR, 12,730, or 97.6 percent, did not test positive for lung cancer. Furthermore, 121 participants without cancer underwent an invasive surgical procedure (Hocking *et al.*, 2013).

An effective screening measure should detect a disease in its early stages before clinical signs and symptoms appear (Herman, 2006). Patients who are diagnosed while they are still asymptomatic tend to have better outcomes than those who are symptomatic (In, *et al.*, 2008). It is well documented in the radiology literature that initial CXR misses 19–50 percent of lung cancers (Quekel, 1999). In the past decades, several technological innovations have shown improved sensitivity in detecting lung cancer. Several small studies have shown that newer techniques (*e.g.*, dual-energy subtraction radiology, electronic bone suppression, temporal subtraction) may result in fewer missed diagnoses of pulmonary nodules. However, no large-scale randomized or non-randomized studies are available that assess the sensitivity of these radiological techniques.

Baseline screening of general populations for unsuspected lung cancer with CXR yields only a small fraction—less than one percent—of lung cancer cases (Hocking *et al.*, 2010; Kubik and Polak, 1986; Fontana *et al.*, 1984). Currently, the majority (approximately 85 percent) of patients with lung cancer present for clinical evaluation with symptoms (Mazzone, *et al.*, 2014); detection of lung cancer in the remaining (asymptomatic) patients frequently occurs when an x-ray or CT scan is done for another reason (Mazzone *et al.*, 2014; PubMed Health).

Several authoritative sources of health-information do not recommend CXR for wide-scale screening. For example, the National Cancer Institute (NCI) in its online Lung Cancer Screening PDQ (Physician’s Data Query) concluded, “Based on solid evidence, screening with chest x-ray and/or

sputum cytology does not reduce mortality from lung cancer in the general population or in ever-smokers.” The NCI PDQ goes on to discuss the harm associated with false-positive screenings: “Based on solid evidence, at least 95 percent of all positive chest x-ray screening exams (but not all) do not result in a lung cancer diagnosis. False-positive exams result in unnecessary invasive diagnostic procedures.” The NCI PDQ refers to the Oken (2011) and Marcus (2006) studies when estimating the magnitude of over-diagnosis at 6 percent to 17 percent. The Cochrane Collaboration, a non-profit group that reviews health-care literature for the purpose of making empirical recommendations, updated its original review article, “Screening for lung cancer,” in 2013. This latest review included nine trials (eight randomized controlled studies and one controlled trial) with a total of 453,965 subjects. The review includes many of the studies discussed here. The authors concluded:

The current evidence does not support screening for lung cancer with chest radiography or sputum cytology. Annual low-dose CT screening is associated with a reduction in lung cancer mortality in high-risk smokers but further data are required on the cost effectiveness of screening and the relative harms and benefits of screening across a range of different risk groups and settings.

(Manser *et al.*, 2013).

Screening workers exposed to lung carcinogens is a complex issue. Current tools, particularly CXR, have not been shown to be effective in reducing mortality in high-risk smoking populations, and have not been studied in worker populations (Fontana, 1984; Oken, 2011; Marcus *et al.*, 2011; Hocking *et al.*, 2010). However, workers exposed to lung carcinogens are at a higher risk for lung cancer than the general population. OSHA conducts risk analyses as part of its regulatory requirements, and has determined that occupational exposure to each of these: Inorganic arsenic, coke oven emissions, and acrylonitrile, was found to be associated with a “significant risk” of lung cancer (§§ 1910.1018, Inorganic Arsenic; 1910.1029, Coke Oven Emissions; and 1910.1045, Acrylonitrile).

OSHA has also preliminarily determined that the existing evidence is insufficient to justify using alternative screening methods to CXR. While the National Institute for Occupational Safety and Health (NIOSH) is currently evaluating the applicability of Low-Dose Computed Tomographic (LDCT) as a screening tool for workers exposed to lung carcinogens, it may be years before

this research can provide a recommendation on the efficacy of LDCT. Additionally, research is needed on the risks associated with LDCT-associated radiation exposure occurring during a screening protocol for workers exposed to lung carcinogens in the workplace.

As noted earlier in this discussion, OSHA is proposing to remove the requirement to use periodic CXR as a screening tool for lung cancer from the following standards: §§ 1910.1018, Inorganic Arsenic; 1910.1029, Coke Oven Emissions; and 1910.1045, Acrylonitrile.

Although OSHA is proposing to remove periodic CXR requirements from the medical-surveillance sections of these three standards, the Agency emphasizes that the Access to Medical and Exposure Records standard (29 CFR 1910.1020) would still require employers to maintain all medical records, including records of CXRs previously administered. That is, this proposed rule would not relieve employers in general industry, maritime, and construction of the duty to maintain records of CXRs already administered under the requirements of §§ 1910.1018, 1910.1029, 1910.1045, 1915.1018, 1915.1045, 1926.1118, and 1926.1145<sup>6</sup> in accordance with § 1910.1020.

OSHA is not proposing to remove the initial, baseline CXR requirement in these three standards. The Agency recognizes that requiring initial, baseline CXR at pre-placement or at the initiation of a medical-surveillance program provides benefits to workers exposed to lung carcinogens, their employers, and health-care professionals evaluating those workers. For example, even with known limitations, CXR can serve to document the absence of disease. Baseline CXR also can be useful in preventing additional testing after detecting an abnormality at a future date. In this regard, the PLCO Screening Trial found that “evaluation stopped after comparison of the screening radiograph with a prior CXR in about one-third” of those participants presenting with an abnormal follow-up CXR (Hocking *et al.*, 2013). When a worker receives a CXR prompted by symptoms, physical examination, or other indicator, and has an abnormality on that CXR, a baseline CXR from years before with the same lesion would reduce the need for

additional evaluation (*e.g.*, CT scans, biopsy); such evaluations can be invasive, and lead to unnecessary irradiation for workers and additional costs for employers. However, workers receiving baseline CXR also may undergo invasive, potentially unnecessary work-ups and diagnostic testing for CXR-detectable lesions that may never progress to clinical significance. OSHA will continue to monitor the literature on baseline chest X-rays.

#### Updating Other Chest X-Ray Requirements

In recent years, improvements in medical technology permit screening with digital CXRs, also referred to as digital radiographs, in addition to traditional film-based CXRs. The medical community is rapidly adopting the technology, and both the International Labor Organization (ILO) and NIOSH recently published guidelines for digital radiographs (ILO, 2011; NIOSH, 2011).

OSHA is proposing to update the CXR requirements to allow the use of digital radiograph in the medical surveillance provisions of its Coke Oven Emissions, Acrylonitrile, and Inorganic Arsenic standards discussed above, and in its three asbestos standards and two cadmium standards. The latter standards are: §§ 1910.1001, Asbestos (General Industry); 1915.1001, Asbestos (Maritime); 1926.1101, Asbestos (Construction); 1910.1027, Cadmium (General Industry); and 1926.1127 Cadmium (Construction).<sup>7</sup> As noted previously, OSHA is proposing to add the option of digital radiography standards to its existing standards because digital radiography systems are rapidly replacing traditional analog film-based systems in medical facilities. Another Department of Labor Program, the Office of Workers’ Compensation Programs, published a final rule allowing the submission of digital radiographs in connection with benefit claims, and set out quality standards for administering and interpreting digital radiographs. (See 79 FR 21606; April 17, 2014). OSHA’s proposal will codify current Agency policy as stated in a Letter of Interpretation dated September 24, 2012 to Dr. Michael Hodgson, in which OSHA confirmed that it “will allow, but will not require, digital radiography in place of traditional chest roentgenograms for medical surveillance exams under the Asbestos Standards for

<sup>6</sup> The Construction and Maritime Inorganic Arsenic and Acrylonitrile standards, §§ 1915.1018, 1915.1045, 1926.1118, and 1926.1145, merely reference the respective general industry standards (§§ 1910.1018 and 1910.1045), so OSHA is not proposing to revise them.

<sup>7</sup> The Maritime Cadmium standard, § 1915.1027, is a reference to the general industry standard (§ 1910.1027), so OSHA is not proposing to revise it.

general industry, construction, and shipyards.”

Radiographic facilities and the physicians that are required by OSHA standards to classify CXR according to ILO’s classification guidelines and that employ digital radiographs in their practice should follow the NIOSH Guidelines, “Application of Digital Radiography for the Detection and Classification of Pneumoconiosis,” or the most recent NIOSH guidance on using digital radiography to detect pneumoconiosis. In its current guidelines, NIOSH recommends that “only authorized ILO standard digital images should be used for classifying digital chest images for pneumoconiosis.” NIOSH does not recommend using film-based ILO reference radiographs for comparison with digital chest images or printed hard copies of the images. In this revision of the chest x-ray requirements, OSHA is also proposing to allow other reasonably-sized standard x-rays films, such as the 16 inch by 17 inch size, to be used in addition to the 14 inch by 17 inch film specified in some standards. In these standards, the phrase “A 14- by 17-inch film or digital posterior-anterior chest X-ray” (or similar) would be replaced by “A 14- by 17-inch or other reasonably-sized standard film or digital posterior-anterior chest X-ray.” This proposed change will affect the acrylonitrile standard (§ 1910.1045); the inorganic arsenic standard (§ 1910.1018); the coke oven standard (§ 1910.1029); and the asbestos standards (§§ 1910.1001, 1915.1001, and 1926.1101).<sup>8</sup> Updating this requirement ensures consistency across standards as well as conformance with current medical practice. This proposed change also would codify existing Agency policy outlined in a Letter of Interpretation (February 16, 1993 to David Lee Sirott) confirming that 16 inch by 17 inch X-rays are generally acceptable for the purpose of complying with OSHA standards.

Proposed updates also include replacement of “roentgenogram” with “X-ray” to reflect current terminology and corrections to remove references to semi-annual exams for certain employees in Coke Ovens Emissions appendices, § 1910.1029 App. A(VI) and App. B(II)(A), as these exams were eliminated in the second SIP rulemaking (70 FR 1112). In addition, the proposal makes changes to conform to the language used in the ILO’s “Guidelines for the use of the ILO

International Classification of Radiographs of Pneumoconioses,” which specifically refers to a classification system as applying to CXR, while interpretation refers to the information translated by the physician to the employer. Finally, the proposed revisions include updating the version of the ILO Classification of Radiographs of Pneumoconioses to the 2011 version (from the 1980 version), and clarifying that classification must be accordance with the ILO classification system (rather than “a professionally accepted Classification system”) in Appendix E of each of the three asbestos standards.

#### Statement of Reasonable Availability

As noted above, OSHA is incorporating the ILO Classification of Radiographs of Pneumoconioses, Revised Edition 2011, by reference. OSHA believes that this classification document is reasonably available to interested parties. It is available for purchase from the International Labour Organization (ILO), 4 route des Morillons, CH-1211 Genève 22, Switzerland; telephone: +41 (0) 22 799 6111; fax: +41 (0) 22 798 8685; Web site: <http://www.ilo.org/>. In addition, it is available in the docket for this rulemaking and in OSHA’s docket office for review. If OSHA ultimately finalizes this rule, the classification document will be maintained in OSHA’s national and regional offices for review by the public.

#### References

- Aberle, R., Adams, A., Berg, C., Black, W., Clapp, J., Fagerstrom, R., *et al.* (2011). Reduced Lung-Cancer Mortality with Low-Dose Computed Tomographic Screening. *N. Engl. J. Med.* 365(5): 395–409.
- Bach, P.B., Mirkin, J.N., Oliver, T.K., Azzoli, C.G., Berry, D.A., Brawley, O.W., . . . and Detterbeck, F.C. (2012). Benefits and Harms of CT Screening for Lung Cancer: A Systematic Review. *JAMA*, 307(22): 2418–2429.
- Black, W.C. (2000). Overdiagnosis: An Underrecognized Cause of Confusion and Harm in Cancer Screening. *Journal of the National Cancer Institute*, Vol 92 (16): 1280
- Fasola, G., Belvedere, O., Aita, M., Zanin, T., Follador, A., Cassetti, P., *et al.* (2007). Low-Dose Computed Tomography Screening for Lung Cancer and Pleural Mesothelioma in an Asbestos-Exposed Population: Baseline Results of a Prospective, Nonrandomized Feasibility Trial—An Alpe-Adria Thoracic Oncology Multidisciplinary Group Study (ATOM 002). *The Oncologist*, 12: 1215–1224.
- Fontana, R.S., Sanderson, D.R., Taylor, W.F., Woolner, L.B., Miller, W.E., Muhm, J.R., and Uhlenhopp, M.A. (1984). Early Lung Cancer Detection: Results of the Initial (Prevalence) Radiologic and Cytologic Screening in the Mayo Clinic study. *Am. Rev. Resp. Dis.*, 130(4): 561. Abstract only.
- Fontana, R.S., Sanderson, D.R., Woolner, L.B., Taylor, W.F., Miller, W.E., Muhm, J.R., Bernatz, P.E., Payne, W.S., and Pairolero, P.C. and Bergstralh, E.J., (1991). Screening for Lung Cancer, A Critique of the Mayo Lung Project. *Cancer*, 67(supplement): 1155–1164).
- Herman, C. (2006). What Makes a Screening Exam “Good”? *AMA Virtual Mentor*, 8(1):34–7.
- Hocking, W.G., Hu, P., Oken, M.M., Winslow, S.D., Kvale, P.A., Prorok, P.C., Ragard, L.R., *et al.* (2010). Lung Cancer Screening in the Randomized Prostate, Lung, Colorectal, and Ovarian (PLCO) cancer screening trial. *J. Nat. Cancer Inst.*, 102(10): 722–731.
- Hocking, W.G., Tammemagi, M.C., Commins, J., Oken, M.M., Kvale, P.A., Hu, P., . . . and Prorok, P.C. (2013). Diagnostic Evaluation Following a Positive Lung Screening Chest Radiograph in the Prostate, Lung, Colorectal, Ovarian (PLCO) Cancer Screening Trial. *Lung Cancer*. 82(2): 238.
- In, K.H., Kwon, Y.S., Oh, I.J., Kim, K.S., Jung, M.H., Lee, K.H., Kim, S.Y., Ryu, J.S., Lee, S.Y., Jeong, E.T., Lee, S.Y., . . . Kim, Y.C. (2009). Lung cancer patients who are asymptomatic at diagnosis show favorable prognosis: a Korean Lung Cancer Registry Study. *Lung Cancer*. 64(2): 232–7. Abstract only.
- [ILO] International Labour Organization (2011). Guidelines for the Use of the ILO International Classification of Radiographs of Pneumoconioses, Revised Edition 2011. Geneva, Switzerland: ILO.
- Kubik, A., and Polak, J. (1986). Lung Cancer Detection Results of a Randomized Prospective Study in Czechoslovakia. *Cancer*, 57(12): 2427–2437.
- Manser, R., Lethaby, A., Irving, L., Stone, C., Brynes, G., Abramson, M., and Campbell, D. (2013). Screening for Lung Cancer. *Cochrane Database Syst. Rev.*, *The Cochrane Library*, 6.
- Marcus, P., Bergstralh, E.J., Zweig, M., Harris, A., Offord, K.P., and Fontana, R.S. (2006). Extended Lung Cancer Incidence Follow-up in the Mayo Lung Project and Overdiagnosis. *J. Nat. Cancer Inst.*, 98(11).
- Mazzone, P.J., Choi, H.K., and Ha, D. (2014) Lung Cancer. Cleveland Clinic Center for Continuing Education, The Disease Management Project, Chapter on Pulmonary Disease.
- Moyer, V.A. (2014). Screening for Lung Cancer: U.S. Preventive Services Task Force Recommendation Statement. *Annals Internal Med*, 160 (5).
- [NCI] National Cancer Institute (Last modified 2/2014). Screening for Lung Cancer With Chest X-Ray and/or Sputum Cytology. Retrieved from: <http://www.cancer.gov/cancertopics/pdq/screening/lung/HealthProfessional> on September 16, 2014.
- Oken, M., Hocking, W., Kvale, P., Andriole, G., Buys, S., Church, T., *et al.* (2011). Screening by Chest Radiograph and Lung Cancer Mortality: The Prostate, Lung, Colorectal, and Ovarian (PLCO) Randomized Trial. *JAMA*, 306(17): 1865–1873.
- PubMed Health, Retrieved 9/16/2014 from: <http://www.ncbi.nlm.nih.gov/>

<sup>8</sup> And minor rewording to conform to the proposed language in the cadmium standards (1910.1027 and 1926.1127).

[pubmedhealth/PMH0004529/](http://pubmedhealth/PMH0004529/) on September 16, 2014.

Quekel, L.G., Kessels, A.G., Goei, R, and van Engelshoven, J.M. (1999). Miss rate of lung cancer on the chest radiograph in clinical practice. *Chest*. 115(3):720–4.

Toyoda, Y., Nakayama, T., Kusunoki, Y., Iso, H., and Suzuki, T. (2008). *Brit. J. Cancer*, 98: 1602–1607.

Screening for Lung Cancer, Topic Page (2013). U.S. Preventive Services Task Force. (2013). U.S. Preventive Services Task Force. Retrieved on September 16, 2014 from: <http://www.uspreventiveservicestaskforce.org/uspstf/uspplung.htm>.

### 3. Subpart Z of 1910—Toxic and Hazardous Substances, Pulmonary-Function Testing Requirements for Cotton Dust in 29 CFR 1910.1043

#### Background

In 1978, OSHA promulgated the standard for occupational exposure to cotton dust at 29 CFR 1910.1043 because workers exposed to cotton dust are at risk of developing the respiratory disease, byssinosis (43 FR 27350, June 23, 1978). As described in the preambles to the proposed and final rules, byssinosis is characterized by a continuum of effects (41 FR 56497, 56500–56501, December 28, 1976; 43 FR 27352–27354). Generally, workers who develop byssinosis first experience an acute stage (also called the reactor state), with mild and apparently reversible symptoms that occur on the first day of the work week, after one or more days away from the workplace. Symptoms include chest tightness, difficulty breathing, coughing, and possibly wheezing. Some of those workers also experience temporary acute declines in lung function over the course of a workshift as measured by pulmonary-function testing. As the disease progresses, workers may begin to experience symptoms on other days of the work week. Sometimes the disease progresses into a chronic, irreversible stage that involves permanent narrowing of bronchial tubes. Symptoms during the chronic stage are similar to symptoms observed with emphysema and chronic bronchitis, and include chronic cough with phlegm production and progressive shortness of breath. At this stage, impaired lung function associated with the disease is clearly detectable by pulmonary function testing. Byssinosis can lead to disability or death. Rates of progression depend on exposure levels and susceptibility of workers.

The Cotton Dust Standard contains medical-surveillance provisions at 29 CFR 1910.1043(h). These provisions require initial and periodic medical-surveillance examinations that include

administration of a medical questionnaire to determine if workers are experiencing symptoms (§§ 1910.1043(h)(2)(ii) and (h)(3)(i)). Medical surveillance requirements also include pulmonary function testing (*i.e.*, spirometry testing) to objectively measure lung function and to assess changes in lung function (§ 1910.1043(h)(2)(iii)).

The preamble for the final Cotton Dust standard noted the poor accuracy and high variability of pulmonary function tests in the past, resulting from lack of uniform specifications for equipment calibration checks, test procedures, and personnel training (43 FR 27391). To improve the accuracy and consistency of pulmonary function testing, OSHA mandated specific requirements in the Cotton Dust Standard based on recommendations from the American Thoracic Society (ATS) and the National Institute for Occupational Safety and Health (NIOSH) (43 FR 27391; 29 CFR 1910.1043, Appendix D). Since 1978, pulmonary function testing procedures and technology have evolved significantly, and some of the mandates in the Cotton Dust Standard now are outdated. OSHA is proposing to update the lung function testing requirements for the Cotton Dust Standard to make them consistent with current practices and technology.

#### Proposed Revisions

OSHA based the proposed revisions to the Cotton Dust Standard pulmonary function testing requirements on current recommendations from the American Thoracic Society/European Respiratory Society (ATS/ERS), NIOSH, and the American College of Occupational and Environmental Medicine (ACOEM). Each of these organizations is a recognized authority on generally accepted practices in pulmonary function testing. In the following discussion, references to generally accepted practices refer to only those practices recommended by ATS/ERS, NIOSH, or ACOEM.

Like other respiratory diseases, byssinosis can slow the speed of expired air and/or reduce the volume of air that can be inspired and then exhaled. To detect and monitor these impairments, spirometry measures the maximal volume and speed of air that is forcibly exhaled after taking a maximal inspiration. Forced Vital Capacity (FVC) is defined as total exhaled volume after full inspiration. Speed of expired air is determined by dividing the volume of air exhaled in the first second, *i.e.*, the Forced Expiratory Volume in One Second (FEV1), by the total FVC to give

the FEV1/FVC ratio. Values obtained from accurate and repeatable spirometry testing are then compared to reference predicted values, which are averages expected for a person of the same gender, age, height, and race as the employee being tested. A spirometry result that is 100 percent of the predicted value for a person of the same gender, age, and height and race indicates that the individual being tested has average lung function (OSHA, 2013). Depending upon the race of the individual and the reference value group being used, an adjustment may need to be made on the basis of race. This issue is discussed at greater length later in this discussion. Values are also compared to the employees' previous measurements.

Currently, § 1910.1043(h)(2)(iii) requires that health care providers conducting medical surveillance compare the employees' values to the predicted values in Appendix C of the standard. Appendix C currently contains predicted values derived from equations published by Knudson *et al.* (1976).

OSHA is proposing to revise this provision to specify use of the third National Health and Nutrition Examination Survey (NHANES III) reference data set and to replace the values currently in Appendix C with the NHANES III values, derived from Spirometric Reference Values from a Sample of the General U.S. Population (Hankinson *et al.*, 1999), which will be incorporated by reference. Currently, NIOSH (CDC/NIOSH, 2003), ATS/ERS (Pellegrino *et al.*, 2005), and ACOEM (Townsend, 2011) all recommend NHANES III as the most appropriate reference data set for assessing spirometry results for individuals in the U.S. population. The data set from NHANES III is the most recent and most representative of the U.S. population (Hankinson *et al.*, 1999). It lists reference values for non-smoking, asymptomatic male and female Caucasians, African Americans, and Mexican Americans aged 8- to 80-years old. Strict adherence to ATS quality control standards ensured optimal accuracy in developing this data set of spirometry values (Hankinson *et al.*, 1999).

OSHA also proposes to make a correction to § 1910.1043, Appendix B—II, Section B, “Occupational History Table”. The table’s column titled “Tenure of Employment” contains boxes in which dates of employment are entered. To allow the entry of dates that occurred later than 1999, OSHA would change the column’s two sub-headers to

read as follows: “From 19\_\_ or 20\_\_” and “To 19\_\_ or 20\_\_”.

#### Statement of Reasonable Availability

As noted above, OSHA is incorporating the Spirometric Reference Values from a Sample of the General U.S. Population (Hankinson JL, Odencrantz JR, Fedan KB. *American Journal of Respiratory and Critical Care Medicine*, 159(1):179–187, January 1999). These values are also available to interested parties at <http://www.cdc.gov/niosh/topics/spirometry/nhanes.htm>. In addition, they are available at [www.regulations.gov](http://www.regulations.gov) in the docket for this rulemaking and in OSHA’s docket office for review. If OSHA ultimately finalizes this rule, the data set will be maintained in OSHA’s national and regional offices for review by the public.

Section 1910.1043(h)(2)(iii) currently specifies that FEV1 and FVC predicted values be multiplied by 0.85 to obtain reference values for blacks because the Knudson data set contains reference values only for Caucasians. However, such an adjustment for that race/ethnic group is no longer necessary because the NHANES III data set contains reference values for African Americans. However, the NHANES III data set does not contain reference values for Asian Americans, who typically have smaller lung volumes compared to Caucasians of the same age, height, and gender (Pellegrino *et al.*, 2005). To obtain Asian American reference values, ATS/ERS (Redlich *et al.*, 2014) and ACOEM (Townsend, 2011) recommend that Caucasian reference values for FVC and FEV1 be multiplied by a factor of 0.88. Therefore, OSHA is proposing use of a 0.88 correction factor to obtain Asian American reference values for the FVC and FEV1. Because race does not appear to affect FEV1/FVC (ratio), OSHA is not proposing to apply a correction factor to Caucasian values to derive a ratio for Asian Americans. If the NHANES data set is updated to include Asian American values in the future, and generally accepted practices endorse that data set for use in the U.S., OSHA will consider revising § 1910.1043(h)(2)(iii).

OSHA’s proposal to replace the Knudson values currently in Appendix C with the NHANES III data set would simplify interpretation of spirometry results by providing reference values for more race/ethnic groups; however, neither the NHANES III nor the proposed correction factor addresses every race/ethnic group. Therefore, OSHA is proposing text that indicates comparison to “appropriate” race/ethnicity values for groups not included in NHANES III. For example, using

Mexican-American values for non-Mexican-American Hispanic workers may be appropriate. Designations of race/ethnicity are self-reported by workers, and bi-racial or multi-racial workers should select the race category that best describes them. OSHA’s guidance document provides some additional guidance on this topic, including a recommendation to use Caucasian reference values for Native American Indians (OSHA, 2013).

The software for most spirometers includes the NHANES III data set, which is identified as the Hankinson 1999 data set on some spirometers. If software for older spirometers does not include the NHANES III data set, users of those spirometers would be able to access the NHANES III values online through the NIOSH calculator (CDC/NIOSH, 2010). Tables of the NHANES III values are also available in an appendix to OSHA’s spirometry guidance for healthcare professionals that is available online (OSHA, 2013). Therefore, NHANES III values are widely available to spirometry providers, including those providers using older spirometers.

Currently, paragraph (h)(2)(iii) requires an evaluation of pulmonary function testing values using predicted values of FVC and FEV1, which are the only reference values listed in the tables in current Appendix C. The NHANES III reference data set includes the lower limit of normal (LLN) as well as predicted values for FEV1, FVC, and the FEV1/FVC ratio. The LLN for these spirometry measurements represents the lower fifth percentile of a healthy (normal) population. That is, 95 percent of a healthy (normal) population should have spirometry values above the LLN, and spirometry values below the LLN could be abnormal (OSHA, 2013). Generally accepted practices by ATS/ERS, NIOSH, and ACOEM currently compare spirometry values to the LLN values to identify impaired pulmonary function.

In particular, ATS/ERS (Pellegrino *et al.*, 2005) defines airways obstruction as an FEV1/vital capacity (VC) below the LLN. ACOEM (Townsend, 2011) and NIOSH (CDC/NIOSH, 2003) define borderline airway obstruction as an FEV1/FVC below the LLN, with an FEV1 between the LLN and the predicted value; they define airways obstruction as both FEV1/FVC and an FEV1 below the LLN. ATS/ERS, NIOSH, and ACOEM indicate that an FVC or VC less than the LLN could indicate possible restrictive impairment (Pellegrino *et al.*, 2005; Townsend, 2011; CDC/NIOSH, 2003).

Therefore, OSHA is proposing to update (h)(2)(iii) to require an evaluation of FEV1, FVC, and FEV1/FVC against the LLN and percent predicted values to fully characterize possible pulmonary impairment in exposed workers, which is consistent with generally accepted current practices described above. OSHA’s proposal to evaluate the FEV1/FVC ratio in addition to FEV1 and FVC will not affect triggers for changes in medical surveillance frequency or referral for a detailed pulmonary examination, because the standard bases those triggers solely on FEV1 values.

However, OSHA is also proposing to change the triggers for the frequency of medical surveillance. Currently, paragraphs (h)(3)(ii)(A) and (B) of the standard require frequency of medical surveillance based in part on whether the FEV1 is above or below 80 percent of the predicted value. OSHA is proposing that the basis for frequency of medical surveillance be whether the FEV1 is above or below the LLN. As noted above, generally accepted practices currently use the LLN as the basis for classifying possibly abnormal lung function. Pulmonary function normally declines with age, and the LLN better accounts for age-related declines than the current standard (Townsend *et al.*, 2011). There is evidence that the cut-off point used by the standard, 80 percent of the predicted value, can result in erroneous lung function interpretation in adults (Pellegrino *et al.*, 2005). Therefore, OSHA is proposing to use the LLN to determine the frequency of lung-function testing.

Section 1910.1043, Appendix D, sets standards for spirometric measurements of pulmonary function. OSHA is basing the proposed changes to Appendix D on the most recent spirometry recommendations from ATS/ERS (Miller *et al.*, 2005). Many of the proposed changes reflect advances in spirometry procedures or methods of interpretation.<sup>9</sup> Other proposed changes reflect technological changes associated with the current widespread use of flow-type spirometers, in addition to volume-type spirometers, which were in widespread use in 1978 when OSHA published the current standard, and remain in use today. The proposed

<sup>9</sup> Appendix D provides minimal standards that must be employed when making spirometry measurements. Users of Appendix D should also consult generally accepted practices from ATS/ERS (Pellegrino *et al.*, 2005; Miller *et al.*, 2005), NIOSH (CDC/NIOSH, 2003), and ACOEM (Townsend, 2011) for a complete list of current spirometry standards. OSHA’s spirometry guidance also outlines those practices (OSHA, 2013).

changes would apply only to equipment purchased one year after OSHA publishes the final standard in the **Federal Register**. This would give time for distributors to exhaust existing stocks and allow medical providers to continue using the older spirometers until they buy new ones in the normal course of business.

Current Appendix D(I)(b) specifies volume capacity for spirometers, and the proposed revision would change it from seven to eight liters. Current Appendix D(I)(e) specifies flow rates for flow-type spirometers, and the proposed revision would change it from 12 to 14 liters per second. These proposed revisions to Appendix D(I)(b) and (e) reflect current recommendations by ATS/ERS (Miller *et al.*, 2005).

Current Appendix D(I)(g) requires either a tracing or display, and OSHA is proposing to revise this language to “paper tracing or real-time display.” When OSHA published the current standard in 1978, a pen linked to a physical strip chart generated tracings of expiration curves on graph paper during pulmonary testing. In contrast, most current flow-type and volume-type spirometers use computer-generated displays of expiration curves projected on the spirometer or on an attached computer screen.

OSHA is proposing to add size specifications for computer-generated displays, the technology most often used today (Miller *et al.*, 2005). An issue that was critical for tracings in 1978, and remains critical for both tracings and displays today, is that they be large enough to allow a technician to easily evaluate the technical acceptability of the expiration during testing. A large real-time display allows the technician to easily view a technically unacceptable expiration and coach the worker to achieve optimal expirations in subsequent attempts. Current Appendix D(I)(g) also specifies requirements for paper tracings of the expiration curve, and requires that the tracings be of sufficient size for hand measurements to conform to Appendix D(I)(a). OSHA is proposing to revise paragraph D(I)(g) to indicate “If hand measurements will be made.” OSHA is proposing these changes because hand measurements are currently rarely used, and the values currently shown in the expiration curve are usually computer generated today.

Appendix D(I)(g) also requires the spirometer to display flow versus volume or volume versus time tracings. The proposed revision would require the spirometer to display both flow-volume and volume-time curves or tracings during testing. The flow-volume curve emphasizes early

expiration and allows the technician to detect problems early in the maneuver (OSHA, 2013). The volume-time curve emphasizes the end of the expiration and allows the technician to coach the patient to achieve a complete expiration (OSHA, 2013). OSHA is also proposing to update the paragraph to indicate that both types of curves or tracings must be stored and available for recall. This requirement to store curves will allow the assessment of results for acceptability and repeatability, once testing is concluded, and it will also make it possible to include the curves in reports to health care providers who interpret the results (OSHA, 2013).

Current Appendix D(I)(h) requires that instruments be capable of accumulating volume for a minimum of 10 seconds and not stop accumulating volume before (1) the volume change for a 0.5-second interval is less than 25 millimeters, or (2) the flow is less than 50 milliliters per second for a 0.5-second interval. As noted by ATS in 1987, these end-of-test criteria, which were first included in the 1979 ATS statement, caused premature termination of exhalation and FVCs that were falsely reduced by as much as 9 percent (ATS, 1987). To avoid such falsely reduced FVCs, ATS defined end-of-test criteria only according to volume change from 1987 onward (ATS 1987, 1994, 2005). Therefore, OSHA is proposing to update the first clause by specifying the currently recommended volume change of less than 25 milliliters for a 1-second interval (Miller *et al.*, 2005) and is also proposing to remove the latter clause, *i.e.*, that the instrument shall not stop accumulating volume before the flow is less than 50 milliliters per second for a 0.5-second interval. The proposed changes make Appendix D consistent with current ATS/ERS recommendations for expiratory end-of-test criteria using volume increment only, since flow rate criteria were abandoned in 1987 (ATS, 1987; Miller *et al.*, 2005). OSHA is also proposing to update this provision by revising the time for which the instrument must be capable of accumulating volume to 15 seconds, the maximum time for which an exhalation should be done according to ATS/ERS (Miller *et al.*, 2005). In 1987, ATS stated that they encourage spirometer designs that allowed patients to continue exhaling for as long as possible (ATS, 1987).

Current Appendix D(I)(j), (II)(b), and (IV)(b) provide requirements for the calibration of spirometers, and the proposal updates several of these requirements. The proposed revisions to Appendix D(I)(j), (II)(b), and (IV)(b) clarify that the technician must always

check the calibration of spirometers, and recalibrate them only if the spirometer requires the technician to do so. That change is consistent with recommendations by ATS/ERS (Miller *et al.*, 2005). The reason for the proposed change is that while technicians cannot recalibrate many spirometer models in current use, they nevertheless must check all spirometers regularly when in use to ensure that the spirometers are operating within calibration limits, *i.e.*, that the spirometers are accurate (OSHA, 2013).

OSHA is proposing to delete the following text from Appendix D(I)(j) because it is ambiguous and provides no useful information: “. . . with respect to the FEV1 and FVC. This calibration of the FEV1 and FVC may be either directly or indirectly through volume and time base measurements.” OSHA also is proposing to update paragraph D(I)(j) to include the current ATS/ERS requirements for calibration-syringe accuracy and volume displacement (Miller *et al.*, 2005). As noted above, OSHA is proposing to revise the term “calibration” to “calibration check.” Another proposed change to paragraph D(I)(j) is to revise the term “calibration source” to “calibration syringe” because a syringe is the only type of calibration source currently used, so specifying a syringe instead of a source would clarify the requirement.

In addition, OSHA proposes to change the word “should” in D(I)(j) to “shall,” so the new D(I)(j)(2) would read, “the volume-calibration syringe shall provide a volume displacement of at least 3 liters and shall be accurate to within  $\pm$  0.5 percent of 3 liters (15 milliliters).” The phrase “should” sounds advisory, and the current practices that OSHA proposes to adopt are based on the 3 liter size of the syringe. OSHA seeks comment on this change to “shall.”

Current Appendix D(II)(b) provides that technicians should perform calibrations using a syringe or other source of at least two liters. The proposed change in the syringe volume to three liters is consistent with current practices. OSHA also is proposing to change the term “syringe or other volume source” to “syringe” for the reasons described above in the discussion of paragraph D(I)(j). Another proposed change to Appendix D(II)(b) would be to delete the phrase “or method.” The meaning of that phrase is unclear; the sentence is addressing calibration checks of an instrument (*i.e.*, spirometer), not a method. OSHA also is proposing calibration check procedures for flow-type and volume-type spirometers to determine whether a spirometer is recording 3 liters of air  $\pm$

3.5 percent (Miller *et al.*, 2005; OSHA, 2013). The check of flow-type spirometers would involve the injection of air at three different speeds, and the check of volume-type spirometers would involve a single injection of air and a check for spirometer leakage. Users should refer to generally accepted practices and other guidance for complete details about calibration checks (see, *e.g.*, Miller *et al.*, 2005; Townsend, 2011; OSHA, 2013). OSHA also proposes to change the term “recalibration” in this provision to “calibration checks” for the reasons stated above in the discussion of paragraph D(I)(j). Finally, OSHA proposes to change “should” to “shall” in the first sentence of D(II)(B) for the same reasons as discussed above regarding paragraph D(I)(j).

Appendix D(II)(a) currently contains requirements for measuring forced expirations, including having the patient make at least three forced expirations. OSHA is proposing to update this paragraph to have the patient perform at least three, but no more than eight, forced expirations during testing. This proposed change would clarify that up to eight forced expirations can be attempted to obtain three acceptable forced expirations (Miller *et al.*, 2005). The same paragraph currently states that “The subject may sit, . . .” OSHA proposes that “subject” be changed to “patient” because “subject” implies someone in an experimental trial, while patient is the more appropriate term for someone undergoing screening at a medical facility, and “patient” is the term used most often in the standard. OSHA also is proposing to clarify the text in paragraph D(II)(a) to indicate that the expiration must be repeatable. The term “repeatability,” now used by ATS/ERS, would be an update to the existing term “reproducibility”; paragraph D(II)(a)(7) lists the criteria for repeatable (formerly, reproducible) results. In addition, Appendix D(II)(a) lists elements of “unacceptable” efforts in paragraphs (a)(1)–(a)(7); OSHA proposes to revise this language to “technically unacceptable” to make clear that the problem is not with the worker’s lungs but with the flaws in how the test is conducted.

Appendix D(II)(a)(3) currently specifies that a worker’s efforts during testing are unacceptable when the expiration does not continue for at least five seconds or until an obvious plateau in the volume-time curve occurs. The proposed revision to this paragraph clarifies that results may be acceptable if the worker *attempted to exhale* (versus actually exhaled) for at least six

seconds *and* until an obvious plateau in the volume-time curve occurs (Miller *et al.*, 2005). Therefore, the expiration must meet both of these criteria for a spirometry result to be technically acceptable. Many workers who are young or have small lung volumes can complete an expiration in less than six seconds, and their results may be acceptable if the technician observes an obvious plateau in the volume-time curve (OSHA, 2013).

Appendix D(II)(a)(4) provides that the results are unacceptable when the worker coughs or closes the glottis during forced expiration. This proposed change clarifies that the results are unacceptable if coughing occurs in the first second of expiration, a condition that is consistent with current ATS/ERS recommendations (Miller *et al.*, 2005). Coughing in the first second interferes with measurement of the FEV1 (Miller *et al.*, 2005), but coughing toward the end of the expiration does not affect test results (OSHA, 2013). Glottis closure at any time may result in premature termination of the expiration (Miller *et al.*, 2005).

Appendix D(II)(a)(6) provides that the results are unacceptable when there is an unsatisfactory start to expiration characterized by excessive hesitation, *i.e.*, one with an extrapolated volume greater than 10 percent of the FVC on the volume-time curve. As noted in the 1987 ATS statement, a criterion of 10 percent could result in a falsely elevated FEV1 from a suboptimal effort (ATS, 1987). The proposed change would indicate that extrapolated volume must be less than 150 milliliters or 5 percent of the FVC, whichever is greater, to be unacceptable. It would update the provision to be consistent with the most recent ATS/ERS recommendation on criteria for start-of-test so that an accurate time zero is set (Miller *et al.*, 2005). All ATS or ATS/ERS statements define acceptable start-of-test criteria according to volume, as well as percent FVC, using whichever criterion is larger for a given patient (ATS, 1979, 1987, 1994; Miller *et al.*, 2005), and it is not clear why the volume value was excluded from the current cotton dust standard. OSHA is proposing to include the 2005 ATS/ERS recommendations for volume, in addition to percentage of FVC, for consistency with ATS/ERS. Expressing the values as both percentage of FVC and as a volume, and using whichever approach gives the larger allowed extrapolated volume, aids in the interpretation of results for individuals with very small or very large lung volumes. For example, since 5 percent of FVC will be less than 150 milliliters in individuals with FVC <

3.00 L, the 150 milliliter criterion would be used for those patients. But 5 percent of FVC would exceed 150 milliliters in individuals with FVC > 3.00 L, so in that case the 5 percent of FVC criterion would be used to evaluate the start-of-test for these patients.

As stated above, Appendix D(II)(a)(7) contains criteria for acceptable repeatability. Editorial changes proposed in Appendix D(II)(a)(7) are for clarification. Notably, OSHA would remove the word “three” because technicians can examine up to eight acceptable curves to select the two highest FEV1 and FVC values (Miller *et al.*, 2005). OSHA is also proposing to change “variation” to “difference” because “difference” is the more appropriate mathematical term to use when comparing only two numbers.

In Appendix D(II)(a)(7), OSHA also is proposing to revise the maximum difference between the two largest FVC values and the two largest FEV1 values of a satisfactory test to 150 milliliters, a change from the current maximum difference of 10 percent or  $\pm 100$  milliliters, whichever is greater. This proposed revision to the criteria for acceptable repeatability reflects current ATS/ERS recommendations (Miller *et al.*, 2005). In 2005, ATS/ERS stated that many patients are able to achieve repeatability of FEV1 and FVC to within 150 milliliters (Miller *et al.*, 2005). In 1994, the ATS changed its repeatability criterion from a volume and a percentage difference between values to a volume difference only, so that the criterion was equally stringent for all lung sizes, and also so that it was easy to compute during the test if hand-measurements were made (ATS, 1994). OSHA is also proposing editorial changes to make it clear that the difference between the two largest acceptable FVC values should not exceed 150 milliliters and the two largest acceptable FEV1 values should not exceed 150 milliliters.

The Agency discussed proposed changes to Appendix D(II)(b) above.

OSHA is proposing to remove Appendix D(III)(b). The paragraph refers to a NIOSH guideline that specifies an outdated evaluation criterion of FEV1/FVC ratio of 0.75 percent, and OSHA is unaware of an updated NIOSH cotton dust guideline that more appropriately compares the FEV1/FVC ratio to LLN. As noted above, generally accepted practices use the LLN as the basis for classifying possibly abnormal lung function because it accounts for age-related declines in lung function (Townsend, 2011). Appendix D(III)(b) also refers to a table that OSHA never included in the final Cotton Dust

Standard. That table was most likely Table XII–12 in the NIOSH criteria document for cotton dust (CDC/NIOSH, 1974). The lack of the table does not appear to be a pressing issue since no user complained about the missing table after OSHA promulgated the standard. In addition, the information is available to users in the NIOSH criteria document.

The proposed updates to paragraphs D(IV)(a) and (d) would change “reproducibility” to “repeatability” to conform to the terminology now used by ATS/ERS (Miller *et al.*, 2005). “Repeatability” would have the same meaning as “reproducibility.” OSHA also is proposing to change the term “calibration” in paragraph D(IV)(b) to “calibration checks” for the reasons stated above in the discussion of paragraph D(I)(j). OSHA also proposes to change “subject” to “patient” in paragraph D(IV)(c) for the reason discussed above in the discussion of paragraph D(II)(a).

#### References

- ATS (American Thoracic Society). Medical Section of the American Lung Association (1979). ATS Statement—Snowbird Workshop on Standardization of Spirometry. *American Review of Respiratory Disease*, 119, 831–838.
- ATS (American Thoracic Society). Medical Section of the American Lung Association (1987). Standardization of Spirometry—1987 Update. *Am Rev Respir Dis*, 136, 1285–1298.
- ATS (American Thoracic Society). Medical Section of the American Lung Association (1994). Standardization of Spirometry—1994 Update. *Am Resp Crit Care Med*, 152, 1107–1136.
- CDC/NIOSH (Centers for Disease Control/ National Institute for Occupational Safety and Health) (1974). Criteria for a Recommended Standard: Occupational Exposure to Cotton Dust. Chapter XII: Tables and Figures. <http://www.cdc.gov/niosh/pdfs/75-118f.pdf>.
- CDC/NIOSH (Centers for Disease Control/ National Institute for Occupational Safety and Health) (2003). Spirometry training guide. December 1, 2003. <http://www.cdc.gov/niosh/docs/2004-154c/pdfs/2004-154c.pdf>.
- CDC/NIOSH (Centers for Disease Control/ National Institute for Occupational Safety and Health) (2010). *Spirometry reference value calculator*. <http://www.cdc.gov/niosh/topics/spirometry/RefCalculator.html>.
- Hankinson, J. L., Odencrantz, J. R. and Fedan, K. B. (1999). Spirometric reference values from a sample of the general US population. *Am J Respir Crit Care Med*, 159, 179–87.
- Hankinson, J. H., Kawut, S. M. and Shahar, E. (2010). Performance of American Thoracic Society-recommended spirometry reference values in a multiethnic sample of adults. *Chest*, 137, 138–145.
- Knudson, R. J., Slatin, R. C., Lebowitz, M. D. and Burrows, B. (1976). The maximal expiratory flow-volume curve. Normal standards, variability, and effects of age. *Am Rev Respir Dis*, 113, 587–600.
- Miller, M. R., Hankinson, J., Brusasco, V., Burgos, F., Casaburi, R., Coates, A. . . . Wanger, J. (2005). American Thoracic Society/European Respiratory Society (ATS/ERS) Task Force: Standardisation of Spirometry. *Eur Respir J*, 26, 319–33. <http://www.thoracic.org/statements/resources/pfet/PFT2.pdf>.
- OSHA (Occupational Safety and Health Administration) (2013). Spirometry testing in occupational health programs. Best practices for healthcare professionals. US Department of Labor. <http://www.osha.gov/Publications/OSHA3637.pdf>.
- Pellegrino, R., Viegi, G., Brusasco, V., Crapo, R. O., Burgos, F., Casaburi, R. . . . Wanger, J. (2005). ATS/ERS standardisation of lung function testing. Interpretative strategies for lung function tests. *Eur Respir J*, 26, 948–968.
- Redlich, C. A., Tarlo, S.M., Hankinson, J.L., Townsend, M. C., Eschenbacher, W. L., Von Essen, S. G., Sigsgaard, T. and Weissman, D.N. (2014). American Thoracic Society Committee on Spirometry in the Occupational Setting. Official American Thoracic Society technical standards: Spirometry in the occupational setting. *Am J Respir Crit Care Med*, 189(8), 983–93.
- Sanders, C. L., Yesupriya, A. J., and Curtin, L. R. (undated). Analysis of Population Structure and Stratification in NHANES III Self-Reported Race/Ethnicities. [http://www.cdc.gov/genomics/events/file/print/10year/08\\_pop\\_struct\\_ab.pdf](http://www.cdc.gov/genomics/events/file/print/10year/08_pop_struct_ab.pdf).
- Townsend, M. C. (2011). American College of Occupational and Environmental Medicine (ACOEM) Occupational and Environmental Lung Disorders Committee. Spirometry in the occupational health setting—2011 update. *J Occup Environ Med*, 53, 569–584. [http://www.acoem.org/uploadedFiles/Public\\_Affairs/Policies\\_And\\_Position\\_Statements/ACOEM%20Spirometry%20Statement.pdf](http://www.acoem.org/uploadedFiles/Public_Affairs/Policies_And_Position_Statements/ACOEM%20Spirometry%20Statement.pdf).

#### 4. Subpart F of 1915—General Working Conditions, Definitions in 29 CFR 1915.80

Existing requirements in the sanitation standard for Shipyard Employment, § 1915.88(j)(1) and (j)(2), specify that employers must, to the extent reasonably practicable, clean and maintain workplaces in a manner that prevents vermin infestation. When employers detect vermin, they must implement and maintain an effective vermin-control program.

Paragraph (b)(33) of § 1915.80 defines the term “vermin” as “insects, birds, and other animals, such as rodents and feral cats, that may create safety and health hazards for employees.” OSHA included this definition in the proposal for 29 CFR part 1915, subpart F, General Working Conditions in Shipyard Employment, on December 20, 2007 (72 FR 72452). In that NPRM, OSHA

requested comment on the proposed vermin-control provisions, as well as examples of vermin that are present and the types of controls employers use to prevent the harborage of vermin in shipyard worksites. *Id.* at 72484. The Agency cited the hazards associated with exposure to insects, birds, and rodents in the preamble discussion, but did not mention any hazards associated with feral cats. *Id.* The Agency received two comments on these provisions. One commenter stated that vermin did not pose a serious hazard to workers and that OSHA should remove these provisions from the rulemaking (Ex. 197.1, Docket No. OSHA–S049–2006–0675). The other commenter explained that the number and types of vermin are greater than OSHA indicated in the proposed discussion, and that “[t]o ‘implement and maintain an effective control program’ as required in this section would probably be very expensive, near impossible or even illegal” (Ex. 121.1, Docket No. OSHA–S049–2006–0675). Based on the general industry sanitation standard that applied to shipyard employment prior to the subpart F rulemaking, and these limited comments, the final standard adopted the proposed definition 76 FR 24576 (May 2, 2011). The final rule preamble also did not identify any hazards associated with feral cats. *Id.* at 24616.

Recently, stakeholders raised concerns about including feral cats in the definition of vermin. These stakeholders argue that while the possibility exists for feral cats to pose safety and health hazards for employees (e.g., bites, scratches, fecal contamination), the threat is minor as the cats tend to avoid human contact. Further, these stakeholders expressed concern that including the term “feral cats” in the definition of vermin encourages cruel and unnecessary extermination. OSHA recognizes these concerns and, therefore, is proposing to remove the term “feral cats” from the definition in § 1915.80(b)(33). The revised provision would define the term “vermin” as “insects, birds, rodents and other animals that may create safety and health hazards for employees.” The Washington State Plan also removed the term “feral cats” from its definition of vermin, which is equivalent to OSHA’s definition in § 1915.80(b)(33) (WAC 296–304–01001). The proposed revision also is consistent with the general industry sanitation standard provision on vermin, which describes vermin as “rodents, insects, and other vermin” (§ 1910.141(a)(5)). OSHA does not believe that removing the term “feral

cats” from the definition will reduce worker health and safety, and notes that feral cats may help reduce the presence of other vermin. To the extent feral cats pose a safety or health hazard at any particular shipyard, OSHA would consider the cats to be “other animals” under the standard.

5. Subpart D of 1926—Occupational Health and Environmental Controls, Medical Services and First Aid in 29 CFR 1926.50

Under 29 CFR 1926.50, employers must provide specified medical services and first aid to employees to address serious injuries that may occur on the job. Existing § 1926.50(f) requires the posting of telephone numbers of physicians, hospitals, or ambulances for worksites located in areas where 911 emergency service is not available. OSHA adopted this requirement in 1979 when 911 emergency service was still a relatively new concept, and was available only in certain parts of the country.

Today, 911 emergency service is available almost everywhere in North America. In nearly all locations in the United States and Canada, a 911 call over a land-line telephone will link the caller to an emergency-dispatch center. In the United States, most localities with 911 service also have so-called “Enhanced 911,” which will not only connect the land-line caller to a dispatcher, but also will automatically provide the caller’s location to the emergency dispatcher. This automatic-location information is critical for emergency responders in cases when the 911 caller does not know his/her exact location, or does not have sufficient time to provide such information.

Although the automatic transmission of location information to emergency dispatchers is customary for land-line telephones, the task of automatically transmitting location information is more complex when the emergency call originates from a wireless telephone. Since 1996, the Federal Communications Commission (FCC) has been phasing in the requirement that wireless carriers adopt technologies that provide 911 caller-location information. However, carriers are not likely to complete the phase-in until 2019; consequently, the FCC established a procedure for exempting carriers from the location requirement. As a result, in some remote areas of the country, wireless-telephone carriers still are unable to provide accurate information about the location of the 911 caller to 911 answering centers. The proposed revision to § 1926.50(f) updates the 911

service-posting requirements consistent with the current status of land-line and wireless-telephone technologies.

The proposed standard addresses the problem of locating callers, usually cell-phone callers, in remote areas that do not have automatic-location capability. In such areas, the proposed standard requires employers to post in a conspicuous location either the latitude and longitude of the worksite or other location-identification information that effectively communicates the location of the worksite. OSHA notes that when ACCSH discussed this proposal, one member stated that he had seen a contractor provide latitude and longitude coordinates at a remote site on stickers given to employees. (ACCSH Aug. 23, 2013 transcript, p. 85.) Employers can obtain information about which counties, or portions of counties, are exempted from the 911 location accuracy requirements from FCC PS Docket No. 07–114, which is publicly available on the FCC’s Electronic Comment Filing System (ECFS) Web page: <http://apps.fcc.gov/ecfs/proceeding/view?name=07-114>.

The proposed revision also requires employers to ensure that the communication system they use to contact ambulance service is effective. Under existing § 1926.50(e), employers are required to provide a communication system for contacting ambulance service, or proper equipment for transportation of an injured person. When using wireless telephones as a communication system, however, that system’s availability varies based on the location of the caller. If an employer is relying upon a communication system at a worksite, it must be effective at the worksite. The Agency is retaining the requirement to post telephone numbers of physicians, hospitals, or ambulances for worksites located in areas where 911 emergency service is not available.

6. Subpart D of 1926—Occupational Health and Environmental Controls, Gases, Vapors, Fumes, Dusts, and Mists in 29 CFR 1926.55

The provisions of § 1926.55 establish permissible exposure limits for numerous toxic chemicals used during construction activities. These provisions are the construction counterpart to the general industry standard at § 1910.1000. However, OSHA believes that several of these provisions, notably paragraph (a), paragraph (c), and Appendix A to § 1926.55, need clarification. In this regard, OSHA believes, first, that the use of the phrase “threshold limit values” and the reference to the American Conference of Governmental Industrial Hygienists

(ACGIH), in both paragraph (a) and Appendix A, are confusing. Since these are OSHA standards, the correct terminology to express these limits is “permissible exposure limits,” and the proposed revision makes this revision. Moreover, while OSHA originally adopted these limits from ACGIH recommendations, the limits are OSHA, not ACGIH, requirements. Therefore, the proposed revision deletes the references to ACGIH.

Second, the phrase “shall be avoided” in paragraph (a) has an advisory, rather than a mandatory, connotation and, therefore, is not appropriate in regulatory text. OSHA is proposing to revise this language to read, “An employee’s exposure . . . must at no time exceed the exposure limit given for that substance.”

Third, the words “inhalation, ingestion, skin absorption, or contact” in paragraph (a) are redundant and confusing. In addition, the concentrations listed are airborne values, and the standard addresses exposure through any route. Therefore, the proposed language deletes these words.

Fourth, Appendix A is not an appendix but an integral part of the standard. The proposal, therefore, would acknowledge this relationship by revising the heading to read, “Table A.”

Fifth, Appendix A (proposed Table A) has a column labelled “Skin Designation” under which an “X” demarcates certain substances, although the appendix provides no definition of “X.” The 1970 ACGIH publication, however, notes that the “X” identifies substances that present a dermal hazard. The proposed revision adds a footnote to the proposed table that clarifies the meaning of this designation.

Sixth, Appendix A (proposed Table A) has two footnotes designated by asterisks. However, there are no asterisks in the body of the appendix referencing these footnotes. The first footnote, consisting of a single asterisk, says, “The PELs are 8-hour TWAs unless otherwise noted; a (C) designation denotes a ceiling limit.” The second footnote, consisting of two asterisks, states, “As determined from breathing-zone air samples.” The proposed revision deletes these two footnotes, and moves the content of the footnotes to proposed paragraphs (a)(1) and (a)(2) of § 1926.55.

Finally, OSHA is proposing to correct the cross-references to OSHA’s construction asbestos standard in paragraph (c) and in Appendix A (proposed Table A). The correct cross reference is: § 1926.1101.

7. Subpart D of 1926—Occupational Health and Environmental Controls, Process Safety Management of Highly Hazardous Chemicals in 29 CFR 1926.64

To avoid unnecessary duplication, OSHA is proposing to replace the entire 31 pages of regulatory text for the Process Safety Management of Highly Hazardous Chemicals (PSM) Standard for construction at § 1926.64 with a cross reference to the identical general industry standard at § 1910.119. Other construction standards have similar cross references to corresponding general industry standards; for example, the Respiratory Protection Standard for construction at § 1926.103 refers to the general industry Respiratory Protection Standard at § 1910.134.

OSHA believes that it is unnecessary to reproduce the entire PSM Standard in 29 CFR part 1926 because construction employers rarely have a PSM program at their worksites. The PSM standard affects construction employers mainly through paragraph (h), *Contractors*, when they perform construction work at refineries or chemical-manufacturing plants; in these cases, the host employer generally will have a copy of the standard available. Should construction employers require a copy of the PSM Standard, they can obtain a copy readily at OSHA's Web page.

8. Subpart E of 1926—Personal Protective and Life Saving Equipment, Criteria for Personal Protective Equipment in 29 CFR 1926.95

Current § 1926.95(a) of the construction personal protective equipment (PPE) standard states that PPE “shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary.” PPE must fit properly in order to provide adequate protection to employees. This can be a particular issue for small-stature construction workers, including some females, who may not be able to use standard-size PPE. Section 1926.95(c)'s requirement that PPE to be “of safe design” implicitly precludes the use of ill-fitting equipment. However, OSHA's construction standard does not contain an explicit requirement for PPE used in construction to fit each affected employee, like the general industry PPE standard does (see 29 CFR 1910.132(d)(1)(iii)).

Several commenters responding to the request for information for this rulemaking, including the AFL-CIO and the International Safety Equipment Association, recommended that the Agency revise its construction PPE standards to ensure that PPE fits all

construction employees (Exs. OSHA-2012-0007-0012 and -0018).

Revising § 1926.95(c) to require employers to select PPE that properly fits each employee will clarify the construction PPE requirements on this point and make them consistent with general industry PPE requirements. The Agency believes that providing clear and explicit language on this point will help ensure employers provide employees with properly fitting PPE, thereby adequately protecting employees exposed to hazards requiring PPE. The proposed language, therefore, merely clarifies, and makes explicit, the requirement that all PPE used in construction fit properly.

9. Subpart E of 1926—Personal Protective and Life Saving Equipment, Safety Belts, Lifelines, and Lanyards in 29 CFR 1926.104

OSHA is proposing to revise the minimum breaking-strength requirement for lifelines in the Safety belts, lifelines, and lanyards standard, § 1926.104(c), to 5,000 pounds. This proposed revision will bring § 1926.104(c) into conformity with the breaking-strength requirements for lanyards and vertical lifelines in the Fall protection systems criteria and practices (“Fall Protection”) standard at § 1926.502(d)(9). The Agency concludes that making identical specifications for the same equipment will avoid confusion and, thereby, improve compliance.

The breaking strength of a lifeline is the maximum load that it can carry without failing or breaking. Under existing § 1926.104(c), the minimum breaking-strength requirement is 5,400 pounds. As noted by OSHA in the proposed Fall Protection standard published on November 25, 1986 (51 FR 42718, 42726), the Agency based the 5,400-pound requirement on the breaking strength of the then-available 3/4-inch diameter manila rope used for body-belt systems and not on the forces generated in a fall. The basis for the revised requirement of 5,000 pounds adopted in the final Fall Protection standard and proposed now for § 1926.104(c) is the force generated by a 250-pound employee experiencing a force 10 times the force of gravity, plus a two-fold margin of safety. *Id.* This proposed revision also is consistent with the most recent ANSI/ASSE standards Z359.1 2007 and A10.32.

10. Subpart G of 1926—Signs, Signals, and Barricades

The provisions regarding accident prevention signs, signals, and barricades in 29 CFR 1926.200(g), 201 and 202,

subpart G (Signs, Signals, and Barricades), contain requirements for employers' use of accident prevention signs, tags, signaling and barricades. These provisions require that traffic control signs and devices used for the protection of workers, barricades used for the protection of workers, and signaling by flaggers and the use of flaggers, including warning garments worn by flaggers, comply with the mandatory provisions of either of two versions of Part VI of the MUTCD. Employers may comply with Part VI of the 1988 Edition, Revision 3, September 3, 1993, MUTCD (“1988 Edition”) or the Millennium Edition, December 2000 MUTCD (“Millennium Edition”).

Several commenters to the SIP-IV Request for Information (77 FR 72781), including the AFL-CIO (OSHA-2012-0007-0012), the Laborers' Health and Safety Fund of North America (OSHA-2012-0007-0011), and the American Road and Transportation Builders Association (OSHA-2012-0007-0025), asked OSHA to update subpart G because the Department of Transportation (DOT) updated the MUTCD in 2009. These revisions aimed to expedite traffic, promote uniformity, improve safety, and incorporate technology advances in traffic control device application (74 FR 66730). In addition, DOT issued two revisions to the MUTCD in 2012 (77 FR 28455 and 77 FR 28460).

OSHA is proposing revisions to Subpart G, including an update to the references to the MUTCD to the November 4, 2009 MUTCD (“2009 Edition”), including Revision 1 dated May 2012 and Revision 2 dated May 2012. Updating the reference to the 2009 Edition MUTCD will eliminate confusion as to which edition employers must comply with, and will inform employers that compliance with DOT regulations will not conflict with outdated OSHA regulations.

Statement of Reasonable Availability

OSHA believes that the Manual on Uniform Traffic Control Devices is reasonably available to interested parties. It is available from the Federal Highway Administration, United States Department of Transportation, 1200 New Jersey Ave. SE., Washington, DC 20590; telephone: 202-366-4000; Web site: <http://www.fhwa.dot.gov/>. In addition, it is available in the docket for this rulemaking and in OSHA's docket office for review. If OSHA ultimately finalizes this rule, the standards will be maintained in OSHA's national and regional offices for review by the public. DOT requires that traffic control signs or devices conform to the 2009 Edition

(see 23 CFR 655.601 to .603). DOT regulations recognize that the MUTCD is the national standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel (§ 655.603(a)). DOT requires compliance with the 2009 Edition for all federal-aid construction areas (§ 655.603(d)(3)). In addition, each State must have a highway safety program that complies with DOT's designated national standard, and where State or other federal agency MUTCDs or supplements are required, they shall be in substantial conformance with the 2009 Edition (23 U.S.C. 402(a); 23 CFR 655.603(b)(1)). Substantial conformance means that the State MUTCD or supplement shall conform as a minimum to the standard statements included in the 2009 Edition (§ 655.603(b)).

The differences between OSHA's standards that reference the 1988 Edition and the Millennium Edition MUTCDs and DOT's regulations cause potential industry confusion and inefficiency, without advancing worker safety. Accordingly, in Directive CPL 02-01-054, dated October 16, 2012, OSHA stated that it would accept compliance with the 2009 Edition in lieu of compliance with the 1988 Edition or Millennium Edition MUTCDs referenced in § 1926.200(g) through its *de minimis* policy.

OSHA reviewed the differences between the 1988 Edition, the Millennium Edition, and the 2009 Edition, and concluded that the more recently published manual will provide greater employee safety benefits than the older versions. The 2009 revisions to the MUTCD largely make the document more accessible and account for advances in technology. A comparison of the 1988 and 2009 Editions shows few new requirements; rather, the document is easier to use, with more guidance and supporting material available. The MUTCD is a complex document comprised of standards, guidance, and supporting material. Under § 1926.6(a), OSHA's Subpart G provisions incorporate by reference only the mandatory provisions of the MUTCD, *i.e.*, those provisions containing the word "shall" or other mandatory language, and only those provisions that affect worker safety with regard to the use of signs, devices, barricades, flaggers and points of hazard. Often, it was difficult to locate these provisions, but the 2009 Edition clearly labels them "standards."

The revisions to the 1988 and Millennium Editions that affect worker safety are minimal. DOT identified the following areas as significant revisions

that relate to work safety in the final rule (74 FR 66730):

- The needs and control of all road users through a temporary traffic-control (TTC) zone apply to all public facilities and private property open to public travel, in addition to highways.

- Federal Highway Administration (FHWA) allows non-compliant devices on existing highways and bikeways to be brought into compliance with the current edition of the MUTCD as part of the systematic upgrading of substandard traffic control devices (and installation of new required traffic control devices) required pursuant to the Highway Safety Program, 23 U.S.C. 402(a). If the FHWA establishes a target compliance date for upgrading such devices, traffic control devices shall be in compliance by that date. (These target compliance dates established by the FHWA are shown in Table I-2 of the 2009 Edition.)

- Workers within the public right-of-way must use high-visibility safety apparel.

- There is a new section titled "Automated Flagger Assistance Devices" (AFAD). These optional devices enable a flagger to assume a position out of the lane of traffic when controlling road users through TTC zones.

- New requirements that flaggers shall use a "STOP/SLOW" paddle, flag, or AFAD to control road users; the 2009 Edition prohibits the use of hand movements alone. In the previous editions, it was not clear that hand signals alone were insufficient.

- All devices used for lane channelization (*i.e.*, directing vehicles in a particular direction) must be crashworthy.

- Temporary traffic barriers, including their end treatments (such as an impact attenuator), must be crashworthy.

There was one major revision to the MUTCD, the 2003 Edition, between the Millennium Edition and the 2009 Edition. OSHA is providing a list of the changes between the 2003 Edition and the 2009 Edition in the record (find 2009 Edition figure changes at [regulations.gov](http://regulations.gov) in Docket No. OSHA-2012-0007).

**Section 1926.200(g)—Traffic signs.** Current paragraph (g)(1) of § 1926.200 states, "[c]onstruction areas shall be posted with legible traffic control signs at points of hazard." Accordingly, current paragraph (g)(1) does not explicitly require protection by traffic control devices. However, existing paragraph (g)(1) requires legible signs at points of hazard and paragraph (g)(2) prohibits misuse of both signs *and devices*, by requiring their use to

conform to the MUTCD. Not requiring employers to use, but prohibiting the *misuse* of, protective devices at points of hazard is an anomaly that causes unnecessary confusion. Additionally, current enforcement procedures allow OSHA to cite an employer for a violation under paragraph (g)(1) when the employer exposes an employee to a hazard resulting from the lack of protective devices at points of hazard when the devices (*i.e.*, channelization devices and warning devices) would essentially serve as signs. (CPL 02-01-054, Paragraph XIII.F.2).

The proposed revision explicitly requires that employers use traffic control devices at points of hazard. Accordingly, OSHA is proposing to revise paragraph (g)(1) to require employers to use both signs and devices at points of hazard. While paragraph (g)(2) would still cover the misuse of signs and devices, the proposal would revise this paragraph too. Proposed paragraph 200(g)(2) would clarify that it covers the design and use of traffic-control devices, and would add a list of those devices: Signs, signals, markings, barricades, and other devices.

Consistent with these revisions, OSHA would also revise the headings of § 1926.200 and paragraph (g) by adding the term "devices" to these headings. The Agency would retain the requirement that signs be legible. These changes would clarify the requirements for signs and devices.

**Section 1926.201—Signaling.** The Agency is limiting proposed revisions to § 1926.201 to the 2009 Edition update discussed above.

**Section 1926.202—Barricades.** OSHA is proposing to delete this section because it would duplicate the requirements in the proposed revisions to paragraph (g)(1), which also would require the use of barricades as traffic control devices at points of hazard, and paragraph (g)(2), which would require that the design and use of barricades conform to the updated MUTCD.

**Section 1926.203—Definitions applicable to this subpart.** OSHA is proposing to delete this section because the MUTCD defines or describes most of the words defined in this section (*e.g.*, barricade, signs, signals). If OSHA retained this section, it would need to update these definitions to conform to the MUTCD. To the extent that other provisions of subpart G use the defined words but do not reference the MUTCD, OSHA believes that providing definitions for these words is unnecessary because the meanings of the words are either obvious or defined clearly in applicable consensus standards or in other OSHA standards;

for example, an adequate description of a “tag” is in § 1926.200(h).

In summary, OSHA is proposing to amend the safety and health regulations for construction to adopt and incorporate the 2009 Edition of the MUTCD and clarify the regulatory text. The revisions would delete the references in §§ 1926.200(g)(2) and 1926.201(a) to the 1988 Edition and Millennium Edition of the MUTCD and insert references to the 2009 Edition. The revisions also would amend the regulatory text of paragraphs (g)(1) and (g)(2) of § 1926.200 to eliminate confusion regarding OSHA’s interpretation of the current text. The proposal deletes § 1926.202 because it duplicates the requirements in the proposed revisions to § 1926.200(g) and § 1926.203 because the proposed revisions make this section unnecessary.

11. Subpart H of Part 1926—Materials Handling, Storage, Use, and Disposal, General Requirements for Storage in 29 CFR 1926.250

Subpart H of OSHA’s construction standards governs the handling, storage, use, and disposal of construction materials on a work site. Section 1926.250 addresses safe storage of building materials inside buildings under construction, and § 1926.250(a)(2) requires employers to post maximum safe load limits of floors in storage areas. This requirement is important in large buildings under construction because employers store large, heavy quantities of building materials in these structures to accommodate construction staging and schedules. However, requiring employers to post safe load limits is unnecessary in single-family home construction because employers do not use these structures for storing heavy materials that could endanger employees working at lower levels should the floor collapse. Therefore, OSHA is proposing to exclude detached, single-family residences and townhouses from the posting requirement.

OSHA finds that the proposed revision will lessen the compliance burden of employers without jeopardizing the safety of employees. While OSHA believes that employers involved in residential-building construction do not place heavy loads on the floors of these structures, the proposed revision does not relieve these employers of the duty to ensure that any loads placed on these floors do not exceed the maximum safe loads of the floors.

12. Subpart P of 1926—Excavations, Specific Excavation Requirements in 29 CFR 1926.651

Paragraphs (j)(1) and (j)(2) of § 1926.651 specify requirements for employers to protect employees from (1) loose rock or soil in excavations, and (2) excavated or other materials or equipment that could fall or roll into an excavation. Similar provisions were part of OSHA’s subpart P Excavation standard originally issued under the Construction Safety Act in 1971 as 29 CFR 1518.651(h) and (i) (36 FR 7340, 7389, April 17, 1971), and OSHA retained them when it revised the standard in 1989 (54 FR 45894, Oct. 31, 1989). The original 1971 standard placed the burden on employers to ensure employees’ safety from loose rock and soil, and excavated or other materials, in or around excavations (36 FR 7340, 7389). The 1989 revision added to the paragraphs (j)(1) and (j)(2) the phrase “that could pose a hazard” when referring to loose rock or soil and excavated or other materials or equipment (54 FR 45894, 45924–45925).

A number of decisions by administrative law judges of the Occupational Safety and Health Review Commission (OSHRC) have interpreted the added phrase in the standard as placing the burden on OSHA to establish that loose rock or soil or excavated or other material or equipment poses a hazard to employees before it can establish a violation of §§ 1926.651(j)(1) and (j)(2). (See, e.g., *Black Construction Corp.*, 19 BNA OSHC 1043 (2000) (ALJ) ((j)(1)); *Schaer Development of Central Florida, Inc.*, No. 11–0371, 2011 WL 3394942 (OSHRC ALJ June 2, 2011) ((j)(2))). These decisions are contrary to most of OSHA’s standards, which presume that a hazard exists unless the employer can demonstrate otherwise (see, e.g., *Austin Bridge Co.*, 7 BNA OSHC 1761 (1979)). Moreover, the preamble to the 1989 revision does not indicate that OSHA intended to shift the burden when it revised the 1971 provisions, but only to clarify the language of the provisions (54 FR 45894, 45924). Thus, OSHA is proposing to remove the phrase “that could pose a hazard” from § 1926.651(j)(1) and (j)(2). This revision would clarify, as originally intended, employers must protect their employees from loose rock or soil and excavated or other materials or equipment, and that OSHA does not have the burden of demonstrating the existence of a hazard. Therefore, the standards presume a hazard unless an employer complied with the protections required by §§ 1926.651(j)(1) and (j)(2).

Section 1926.651(j)(1) applies to loose rock or soil that can fall from the face of the excavation. The preamble to the 1989 revision states that this provision does not apply to all excavations, only those excavations with loose rock or soil of “sufficient volume [to] endanger an employee” (54 FR 45894, 45924). It is the employer’s duty to assess whether (1) the rock or soil is loose and (2) of sufficient volume to potentially endanger or injure employees in the excavation. The proposed revision would remove the phrase “that could pose a hazard,” but would keep the language limiting this provision to loose rock or soil. As noted in the previous paragraph, removing the language “that could pose a hazard” from the provision would preserve the duty of employers to protect workers from the hazard, while relieving OSHA of the initial burden of demonstrating that a hazard exists. OSHA also is proposing to remove the language “by falling or rolling from an” from the provision as that language is unnecessary to describe the hazard; however, OSHA is proposing to retain the term “excavation face” in the provision to clarify the location of the hazard.

Section 1926.651(j)(2) applies to excavated materials (“spoil piles”) or other materials or equipment that are on the surface near the excavation. Employers must keep these piles, and other materials or equipment, at least two feet from the edge of the excavation, or prevent them from moving by using retaining devices. Excavated soil is loose and may present a hazard to workers in an excavation. As explained in the preamble to the 1989 revision:

The intent of this requirement is to protect employees from materials, equipment, and spoil piles which might fall into excavations. Obviously, materials such as excavated soil and stored construction supplies can superimpose loads on the walls of an excavation. Such loads can be the cause of cave-ins and must be considered when determining what protection is necessary to safeguard employees.

(54 FR 45894, 45925).

The proposed revision would remove the phrase “that could pose a hazard by falling or rolling into excavations,” but would retain the language “excavated or other materials or equipment,” from the first sentence in paragraph (j)(2). The proposed language would keep the remaining language in the paragraph, including the two-foot rule, and would remove from OSHA the burden of demonstrating that a hazard exists, while retaining the employers’ duty to protect employees from the hazards of excavated or other materials or

equipment placed less than 2 feet from the edge of the excavation.

13. Subpart S of 1926—Underground Construction, Caissons, Cofferdams and Compressed Air, Underground Construction in 29 CFR 1926.800

Existing regulatory language in § 1926.800(k)(10)(ii) requires that mobile diesel-powered equipment used in “other than gassy operations” underground be approved by the Mine Safety and Health Administration (MSHA) in accordance with the provisions of 30 CFR part 32, or that the employer that demonstrate the equipment is “fully equivalent” to MSHA-approved equipment. In 1996, MSHA revoked part 32 and replaced it with updated provisions in 30 CFR part 7, subpart E and 30 CFR 75.1909 Non-permissible diesel-powered equipment;<sup>10</sup> design and performance requirements, 75.1910 Non-permissible diesel-powered equipment; electrical system design and performance requirements, and 75.1911 Fire suppression systems for diesel-powered equipment and fuel transportation units (61 FR 55411). In 2001, MSHA issued 30 CFR 57.5067, which permits operators to use engines that meet Environmental Protection Administration (EPA) requirements for engines as an alternative to seeking MSHA approval under part 7, subpart E (66 FR 5706). The Agency proposes to update the regulatory language in § 1926.800(k)(10)(ii) to cross-reference these updated provisions.

OSHA’s existing regulatory language in § 1926.800(i)(2) requires that mobile diesel powered equipment used in “gassy operations” underground be approved by MSHA in accordance with the provisions of 30 CFR part 36, or that the employer demonstrate that the equipment is “fully equivalent” to MSHA-approved equipment. MSHA has also updated part 36. However, the reference in § 1926.800(i)(2) remains correct, and OSHA does not need to change the language to ensure employers are following MSHA’s updated requirements.

Under 30 CFR 57.5067, all engines used in underground mines must have an affixed plate evidencing approval of the engine pursuant to 30 CFR part 7, subpart E or meet or exceed the applicable requirements of the EPA listed in MSHA Table 57.5067–1. To use equipment with non-permissible engines in non-gassy operations, the employer must ensure it meets the requirements listed in 30 CFR 75.1909,

75.1910, and 75.1911 for other machine features. If the employer wishes to use equipment with permissible engines, in gassy operations, it must ensure the equipment meets the requirements listed in 30 CFR part 36 for other machine features.

When MSHA revoked 30 CFR part 32 in 1996, it directed state and federal agencies that reference 30 CFR part 32 to 30 CFR part 7, subpart E and 30 CFR 75.1909 and 75.1910 (61 FR 55416). Accordingly, the proposal substitutes references to those sections for the reference to part 32. OSHA has also proposed including 30 CFR 75.1911(a)–(i) in the cross-reference because § 75.1909 requires certain equipment to have fire suppression systems in accordance with § 75.1911. To maintain the scope of 29 CFR 800(k)(10)(ii), OSHA is not proposing to incorporate § 75.1911 paragraphs (j) and (k) (regarding fire suppression systems on diesel-powered equipment), which are training and recordkeeping requirements that were not contained in the original 30 CFR part 32. In addition, OSHA is not proposing to incorporate § 75.1911(l), which addresses the interaction of that section with other MSHA requirements not relevant here. Thus, OSHA has not included paragraphs (j)–(l) in the cross reference.

If adopted, these changes will allow employers to use diesel-powered engines on mobile equipment in underground construction that meets current MSHA requirements.

The existing OSHA standard allows employers to use non-MSHA approved engines if they can demonstrate that they are fully equivalent. The existing standard and OSHA give no guidance how employers can make such a demonstration. OSHA believes that the allowance for engines that meet or exceed EPA requirements in MSHA Table 57.067–1 is a much more effective and simple way to allow the use of non-MSHA approved engines. OSHA solicits comments on whether employers do make such demonstrations and whether the use of EPA requirements will better effectuate a safe and healthful workplace.

For other machine features, the proposal requires that equipment with non-approved engines meeting the applicable EPA requirements must also meet the requirements of 30 CFR 75.1909, 75.1910, and 75.1911(a)–(i) for non-permissible engines used in “other than gassy” operations. Because these requirements list features, the only way for an employer to demonstrate equivalency is to show that the equipment has the required features, rendering the “fully equivalent” clause

unnecessary as to “other machine features.” Therefore, because OSHA believes that the function of the current “fully equivalent” clause is captured by the updates to the referenced MSHA regulations, the Agency has not retained the language in the proposal.

Based on available information, OSHA has determined that currently manufactured equipment meets the proposed requirements and is generally compliant with the more stringent EPA Tier 3 and Tier 4 emission requirements (ERG, 2015). The Agency has therefore preliminarily concluded that all applicable new equipment currently available for in the market meets the proposed requirements. OSHA recognizes that there may be some employers using equipment that predates the newer MSHA standards, and the EPA requirements referenced in them. To avoid the costs of replacing existing equipment in use and are complaint with the current Standard, the Agency proposes to allow equipment purchased before the effective date of the final rule to continue to comply with the terms of existing § 1926.800(k)(10)(ii) (including having been approved by MSHA under 30 CFR part 32 (1995) or be determined to be equivalent to such MSHA-approved equipment). OSHA solicits comment on whether there are engines in use that meet the existing standard but will not meet the requirements of current MSHA standard and, if so, whether continued use of such equipment presents a serious safety or health hazard. OSHA also seeks comment on whether this proposed grandfathering is workable.

14. Subpart S in 1926—Underground Construction, Caissons, Cofferdams and Compressed Air, Compressed Air in 29 CFR 1926.803

OSHA is proposing to revise subpart S—Underground Construction, Caissons, Cofferdams, and Compressed Air by replacing the decompression tables currently found in Appendix A to subpart S with the 1992 French Air and Oxygen decompression tables. OSHA is also requesting comment on whether the following decompression tables should also be permitted as substitutes for the existing tables in Appendix A: The Edel-Kindwall (NIOSH) tables, the Blackpool (British) tables, and the German Standard Decompression tables. OSHA has preliminarily concluded that the French tables provide safer decompression practices than the OSHA decompression tables currently found in Appendix A to subpart S. OSHA proposes to revise § 1926.803(f)(1) to require employers to follow the 1992

<sup>10</sup> Non-permissible equipment may not be used in gassy operations.

French Air and Oxygen decompression tables to decompress employees exposed to compressed air environments. OSHA proposes to adopt the French tables with an incorporation by reference, while deleting Appendix A.

The current decompression tables in OSHA's subpart S standard were developed by Washington state. According to a NIOSH Request for Information (77 FR 74193), the Washington state Decompression Tables were used by several states prior to 1971, when OSHA adopted them as the federal requirement in Appendix A to subpart S. These tables were adopted under section 6(a) of the OSH Act, which permitted the Agency, for a two-year period, to adopt then-current consensus standards as its own without notice and comment rulemaking. The tables in Appendix A prescribe decompression by reducing the pressure that workers are exposed to at intervals in accordance with the schedule in the tables. The current tables address exposures ranging from half an hour to over eight hours, with only one decompression schedule for exposures of greater than eight hours. Subpart S prohibits employee exposures to compressed air environments of greater than 50 pounds per square inch (p.s.i.) (§ 1926.803(e)(5)).

Employers in the tunneling construction industry have requested variances from the underground construction standards in subpart S from federal OSHA as well as states with State Plans. The requests seek a variance to use decompression tables other than those found in Appendix A to subpart S as well as other provisions in the underground standards. In their requests, employers in the industry assert that using other decompression tables is safer than using OSHA's current decompression tables. Also of note, many of the tunneling projects have working pressures ahead of the drill head higher than 50 p.s.i.—so none of the tables in Appendix A would be appropriate or safe. The variance requests suggest that using tables that provide for decompression from environments under pressure greater than 50 p.s.i. and provide staged decompression (stopping workers at set depths and pressures to prevent decompression illness (DCI)), with an enriched oxygen atmosphere, provide greater protection to employees from DCI. The decompression tables that were developed after the 1970s use elevated levels of oxygen to aid in the decompression process.

The ineffectiveness of the current OSHA tables for preventing DCI is

discussed in a 1986 study by Gregory J. Downs and Edel P. Kindwall. During a tunneling project in Milwaukee where pressures ranged from 28 psig to 43 psig and the current OSHA tables were used for decompression, 33 percent of tunneling workers examined experienced aseptic necrosis, a form of DCI also known as dysbaric osteonecrosis that causes portions of the bone tissue to die.<sup>11</sup> The study explains that parts of the current OSHA tables “poorly facilitates total nitrogen elimination,” resulting in instances of aseptic necrosis for a substantial number of workers decompressed in accordance with the tables at the Milwaukee tunneling project.<sup>12</sup> Downs and Kindwall concluded that the OSHA tables are “considered inadequate in efficiently eliminating nitrogen from the body, and allow bone disease at pressures in excess of 36.5 psig.”<sup>13</sup> Kindwall mentioned in a subsequent study that there were inconsistencies in the OSHA tables. For example, the decompression times at 26 and 44 psig are the same for six and eight hour exposures. He believes that this is the result of a mistake made during the transcription of the tables.<sup>14</sup>

On May 23, 2014 OSHA granted a permanent variance to an underground construction contractor allowing, among other things, the employer to use the 1992 French decompression tables (79 FR 29809). In granting this variance, OSHA found that if the employer followed the requirements of the variance, including the French decompression tables, the working conditions for employees would be at least as safe as following OSHA's standard (79 FR 29816). OSHA granted similar variances for other projects on March 27, 2015 (80 FR 16440), and August 20, 2015 (80 FR 50652). On July 27, 2015, OSHA published a **Federal Register** notice seeking comment on an employer's variance request to use the 1992 French decompression tables for all future tunneling projects it performs, subject to certain conditions (80 FR 44386). (Note that “at least as safe” is the main criterion OSHA follows to evaluate variance requests.)

On December 15, 2011, the Seattle Tunnel and Tail Team gave a presentation to the Advisory Committee on Construction Safety and Health

<sup>11</sup> Downs GJ, Kindwall EP (1986) “Aseptic necrosis in caisson workers: A new set of decompression tables,” p. 570.

<sup>12</sup> *Id.*

<sup>13</sup> *Id.*

<sup>14</sup> Kindwall, EP (1997). Compressed air tunneling and caisson work decompression procedures: Development, problems, and solutions. *Undersea and Hyperbaric Medicine*, 24(4), p. 342.

(ACCSH), titled *Tunnel Advances* (OSHA–2011–0124–0066). The presentation discussed how technology and work practices have changed in the underground construction industry, particularly since the promulgation of subpart S. They illustrated this point by showing the number of variances that were needed to complete underground construction projects safely, as many of the requirements of subpart S have become outdated. One of the common variance requests asks to use decompression tables other than the current OSHA decompression tables.

#### 1992 French Air and Oxygen Decompression Tables

The 1992 French decompression tables replaced an older series of tables from 1974. The French Ministry of Labor revised the earlier tables when a number of cases of DCI occurred during an underground construction project.<sup>15</sup> OSHA conducted a review of the scientific literature on DCI during work under higher air pressure to determine whether use of the decompression methods in the 1992 French Decompression Tables was more effective or safer than following the tables currently in the standard. Based on this review, OSHA has preliminarily concluded that decompression recoveries performed with these tables will result in a fewer cases of DCI than the decompression tables specified by the current standard.

The review conducted by OSHA found several studies supporting the determination that the 1992 French Decompression Tables result in a lower rate of DCI than the decompression tables specified by the standard. For example, H. L. Andersen studied the occurrence of DCI at maximum hyperbaric pressures ranging from 4 p.s.i.g. to 43 p.s.i.g. during construction of the Great Belt Tunnel in Denmark in 1992–1996.<sup>16</sup> This project used the 1992 French Decompression Tables to decompress the workers during part of the construction. Anderson observed 6 DCI cases out of 7,220 decompression events, or a frequency of 0.0008 (0.08 percent). The DCI incidence in the study by Andersen is substantially less than the DCI incidence reported by Eric Kindwall for the decompression tables specified in Appendix A of the current standard. In his study, Kindwall reported 60 treated cases of DCI among

<sup>15</sup> Le Pechon, JC, Barre, P, Baudi, JP, Ollivier, F (1992). Compressed Air Work—French Tables 1992 Operational Results. p. 285.

<sup>16</sup> Anderson HL (2002). Decompression sickness during construction of the Great Belt tunnel, Denmark. *Undersea and Hyperbaric Medicine*, 29(3), pp. 172–188.

4,168 exposures between 19 and 31 p.s.i.g., resulting in a DCI incidence of 1.44 percent using the current OSHA tables.<sup>17</sup> OSHA found no studies in which the DCI incidence reported for the 1992 French Decompression Tables were higher than the DCI incidence reported for the OSHA decompression tables. The results of these studies show that the French tables do a better job of minimizing the significant risks of decompression illness than the current OSHA tables.

During decompressions under the May 23, 2014 variance to Tully/OHL USA Joint Venture, which allowed use of the French decompression tables during hyperbaric operations, the Tully/OHL reported no instances of DCI using the French tables.<sup>18</sup> Likewise, during decompressions under the variance to Traylor/Skanska/Jay Dee Joint Venture, which also allowed use of the French decompression tables, Traylor/Skanska/Jay Dee reported no instances of DCI. (Traylor 2015). The French tables also address decompression at greater pressures than 50 p.s.i and for durations longer than eight hours.

State-Plan states have also granted variances to entities asking to use the 1992 French Air and Oxygen Decompression tables. On June 25, 2007, Washington state granted a permanent variance to VCGP/Parsons RCI/Frontier-Kemper, JV that allowed, among other things, the use of the 1992 French Air and Oxygen decompression tables. Based on its research, the state of Washington determined that “decompression using oxygen is much more effective in purging the body of residual nitrogen,” concluding that the French tables were at least as effective as the decompression tables in their standard (OSHA–2012–0036–0009). Similarly, Nevada (OSHA–2012–0036–0006) and Oregon (OSHA–2012–0036–0007) approved variance requests to use the French tables.

Based on a review of available evidence, the experience of State-Plan states (discussed above) that granted variances (Nevada, Oregon, and Washington) for hyperbaric exposures occurring during similar subaqueous tunnel-construction work, and OSHA’s previously issued variance allowing use of the French Decompression Tables, OSHA is proposing to replace the tables in Appendix A with the 1992 French Decompression Tables, which will be

incorporated by reference into § 1926.803(f)(1).

#### Other Tables

In 2003, Valerie Flook published “*A comparison of oxygen decompression tables for use in compressed air work*,” a Health and Safety Executive study comparing several oxygen decompression tables, including the British, French, German, and Edel-Kindwall tables. The study “was commissioned to compare a number of tables used for oxygen decompression from compressed air work in order to identify the safest set of tables. . . .” The study used a mathematical model to predict the maximum gas volume in bubbles in the central venous blood at the end of decompression using each set of tables. The report noted that the model used had been verified by comparison to actual nitrogen gas bubble counts (measured using Doppler technology) after various compression decompression trials in both animal and human subjects. As explained by NIOSH, nitrogen gas bubbles in the body are a precursor to DCI.<sup>19</sup>

The Flook study concluded that “[t]he range of gas volumes predicted for most exposures is small and it is unlikely that the different [decompression] profiles could be distinguished. . . .” (Flook, 2003, 34). The British, French, Edel-Kindwall, and German tables, among others, all achieved a quantity of nitrogen gas bubbles that was within the same range. Similar to the French tables, the British and German tables also address decompression at greater pressures than 50 p.s.i. and for durations longer than eight hours, while the Edel-Kindwall tables do not. OSHA is seeking comment on whether the Edel-Kindwall, British, and/or German tables should be included as options in the OSHA standard. OSHA also seeks any scientific information beyond the Flook study demonstrating the effectiveness of these tables in preventing DCI. If OSHA were to add any of these tables (British, Edel-Kindwall, and/or German) to § 1926.803 in addition to the French tables, then employers would be able choose any of the added tables to decompress employees. OSHA provides more information about each below.

#### Edel-Kindwall Tables

OSHA asks for comment on whether the Edel-Kindwall decompression tables should (also) be included as a replacement for the tables in Appendix

A of subpart S. The Edel-Kindwall tables were developed in response to several tunneling workers experiencing DCI using the current OSHA decompression tables. Between 1971 and 1973 during a tunneling project in Milwaukee, Wisconsin, workers experienced aseptic necrosis, when using the current OSHA decompression tables. This incident prompted NIOSH to determine if alternate decompression tables could be developed.<sup>20</sup>

NIOSH awarded a contract to Eric Kindwall to develop staged decompression tables. The tables, later known as the Edel-Kindwall decompression tables, included the use of oxygen because it shortened decompression time considerably, from over 10 hours to less than four hours. A 1986 study by Kindwall and Gregory J. Downs tested the effectiveness of the Edel-Kindwall tables to eliminate nitrogen from the body and reduce instances of DCI. Six human subjects were compressed for this experiment. While compressed, each subject simulated work conditions for four hours. After performing many activities to establish baseline information for each subject, they were decompressed in accordance with the OSHA or Edel-Kindwall air and oxygen tables. The comparison of the OSHA tables and the Edel-Kindwall air table ability to eliminate nitrogen from the body resulted in “no statistical difference” between the two tables. The comparison of the OSHA tables and the Edel-Kindwall oxygen table showed that the Edel-Kindwall oxygen table was “more efficient in eliminating nitrogen” than the OSHA tables. Kindwall and Downs concluded that their “data is definitive enough to for immediate acceptance of this table for use by the construction industry.” Although Kindwall and Downs expressed some concerns regarding the cost of equipment, oxygen toxicity and flammability, they did not believe these potential concerns outweighed the “shorter decompression times and reduced morbidity” offered by the Edel-Kindwall tables.<sup>21</sup>

The Edel-Kindwall tables have been approved as part of variance requests in some State Plan states. In its December 15, 2011 presentation, the Seattle Tunnel and Tail Team presented permanent variances—one from Oregon in 2004 and another from Washington in 2007—that approved the use of the Edel-Kindwall tables for underground

<sup>17</sup> Kindwall, EP (1997). Compressed air tunneling and caisson work decompression procedures: Development, problems, and solutions. *Undersea and Hyperbaric Medicine*, 24(4), pp. 337–345.

<sup>18</sup> Email from Luis Alonso to Stefan Weisz, RE: Tully Variance End of Project Effectiveness Evaluation Report—Reminder, January 21, 2015.

<sup>19</sup> CDC—Decompression Sickness and Tunnel Workers, <http://www.cdc.gov/niosh/topics/decompression/default.html>.

<sup>20</sup> CDC—Decompression Sickness and Tunnel Workers, <http://www.cdc.gov/niosh/topics/decompression/history.html>.

<sup>21</sup> Downs GJ, Kindwall EP “Aseptic necrosis in caisson workers: A new set of decompression tables,” 1986.

construction projects within those states (OSHA–2011–0124–0066).

#### German Decompression Tables

OSHA asks for comment on whether to (also) include the German decompression tables as a replacement for the tables in Appendix A of subpart S. These decompression tables were developed by Dr. Max Hahn.<sup>22</sup> These tables were approved for use in Oregon, along with the French tables, in 2006 (OSHA–2012–0036–0007). The information from the Flook study discussed above resulted in the German decompression tables being approved by the Health and Safety Executive for use in the United Kingdom, “the first time non-UK tables had been used on a UK contract.”<sup>23</sup>

#### British Blackpool Tables

OSHA asks for comment on whether the British Blackpool decompression tables should (also) be included as a replacement for the tables in Appendix A of subpart S. The Blackpool decompression tables were published in 1973 with air as the breathing gas for decompression.<sup>24</sup> The Blackpool decompression tables are included in the United Kingdom’s Health and Safety Executive’s “A Guide to Compressed Air Work 1996.” The Guide updated the “Work in Compressed Air Special Regulations 1958.”<sup>25</sup> In 2001, oxygen decompression became mandatory in the United Kingdom, using a modified Blackpool table that required “oxygen breathing from 0.6 bar downwards.”<sup>26</sup> A year later, the Health and Safety Executive reprinted “A Guide to Compressed Air Work 1996” to reflect the change in policy. The modified Blackpool Tables were compared to other oxygen decompression tables in the Flook study discussed above.

Insofar as the Agency can find, underground projects which incorporate new tunneling technology have not followed OSHA’s existing decompression tables, but have followed more recently developed tables. In each case, federal OSHA or a State Plan state has been persuaded by the available research and studies on the matter that the newer decompression

methods better protect underground workers. (The states have either granted variances (discussed above) or promulgated a new standard (California<sup>27</sup>)). Many of these tunneling projects also require work in atmospheres above the 50 p.s.i. limit in OSHA’s construction subpart S, as current tunneling technology, when there are gaseous or wet underground conditions particularly, require higher pressures. (OSHA is not proposing to change the 50 p.s.i. limit in the SIP–IV rulemaking.)

#### SIP–IV Request for Information

Given the evidence suggesting that other decompression tables are at least as safe and in many cases safer than OSHA’s current decompression tables, OSHA asked for comment on this topic in its Standards Improvement Project—Phase IV, Request for Information (77 FR 72781; Dec. 6, 2012). OSHA received comments from various groups requesting that OSHA update or revise its decompression tables (OSHA–2012–0007–0011, –0016, –0017). All of the commenters stated that OSHA’s current decompression tables were outdated and did not address the hazard of DCI as well as more recently developed decompression tables. NIOSH argues that updating the decompression tables in Appendix A will shorten the time needed for decompression and reduce the instances of decompression sickness (OSHA–2012–0007–0017). NIOSH recommended that OSHA take the following steps when updating its decompression tables: Require staged decompression, allow 100 percent oxygen use during decompression, vary the decompression schedule based on exposure time, and allow for greater pressures in underground construction projects. NIOSH also recommended that OSHA adopt the Edel-Kindwall tables. The Laborers’ Health and Safety Fund of North America recommended that OSHA adopt the French and Tri-mix<sup>28</sup> tables, with a certifying physician and variances from OSHA above 8 bars (116 p.s.i.) of pressure (OSHA–2012–0007–0011).

OSHA must set safety standards that provide a high degree of worker protection (*Int’l Union, UAW v. OSHA*, 37 F.3d 665,669 (D.C. Cir. 1994); 58 FR 16612, 16615 (Mar. 30, 1993)). Such

standards must also be feasible and cost-effective. Based on the evidence discussed above, OSHA preliminarily determines that the best available evidence shows that the decompression tables in Appendix A to subpart S are not highly protective and that the French tables are more protective of worker health. OSHA is seeking comment on whether the Edel-Kindwall, British, and German tables should be included as options in the OSHA standard. In addition, OSHA requests comment on NIOSH’s statement that staged decompression will shorten the time needed for decompression.

Therefore, OSHA proposes to remove the decompression tables found in Appendix A of Subpart S and replace them with the 1992 French Air and Oxygen decompression tables. The French tables have been used most often in the U.S., and the Agency has collected more information on their safety. Regarding the request for comment on other identified tables, OSHA also asks whether it would be less confusing and easier for the tunneling industry to use one set of tables, rather than include more alternatives in the OSHA standard?

The tables will be posted in the docket of this proposal for commenters to view.

#### Alternative Regulatory Structure

OSHA seeks comment on an alternative regulatory structure for regulating which decompression tables will be used to decompress workers from a compressed air environment. Under this structure, in addition to removing its current decompression tables, OSHA would also revise § 1926.803(f) to allow employers to use any decompression table that a qualified person determines will protect workers from instances of DCI on the project. The table used would have to meet accepted industry practices for prevent DCI in workers.

As discussed earlier, OSHA adopted the Washington state decompression tables into its regulations under section 6(a) of the Occupational Safety and Health Act. Although used by several states prior to their adoption, few, if any, studies regarding the effectiveness of the Washington state decompression tables were done prior to their adoption by OSHA. Instances of DCI using the current OSHA tables led NIOSH to support research that resulted in the creation of the Edel-Kindwall tables. Since then, several other tables have been developed that when used result in a lower incidence of DCI.

<sup>22</sup> Huggins, Karl E “The Dynamics of Decompression Workbook”, 1992.

<sup>23</sup> Lamont, DR, Flook, V “A Comparison of Oxygen Decompression Tables for Use in Hyperbaric Tunnelling”.

<sup>24</sup> Lamont, DR, Flook, V “A Comparison of Oxygen Decompression Tables for Use in Hyperbaric Tunnelling”.

<sup>25</sup> A guide to the Work In Compressed Air Regulations 1996, Health and Safety Executive.

<sup>26</sup> Lamont, DR, Flook, V “A Comparison of Oxygen Decompression Tables for Use in Hyperbaric Tunnelling”.

<sup>27</sup> California incorporates the Navy Diving Manual by reference. Because these tables are specifically for diving, conversions are necessary to use the tables in a non-diving application. See <http://www.dir.ca.gov/title8/6085.html>. For this reason, OSHA is not proposing to add, or seeking comment on, the Navy Diving Manual.

<sup>28</sup> Tri-mix is a mixture of three breathing gases: Oxygen, nitrogen, and helium. The mixture of the gases is usually proprietary.

OSHA has granted variance requests from members of the underground construction industry asking, among other things, to use decompression tables that they believe are at least as effective as the current OSHA tables found in Appendix A of subpart S. On May 23, 2014, OSHA granted the variance request of Tully/OHL USA Joint Venture (79 FR 29809). Tully/OHL USA requested to use the 1992 French decompression tables, which permit both air and oxygen decompression. OSHA granted a variance to Traylor/Skanska/Jay Dee Joint Venture in which they also requested to use the 1992 French decompression tables, as well as the proprietary Trimix tables, in their variance application (80 FR 16440).<sup>29</sup> OSHA also granted a permanent variance to Impreglio Healy Parsons Joint Venture on August 20, 2015 (80 FR 50652). Their variance application also requested to use the 1992 French decompression tables (OSHA–2014–0011–0001). Several occupational safety and health programs have approved of various decompression tables for underground construction work. In the Seattle Tunnel and Tail Team’s presentation to ACCSH, they included variances from Washington that approved the use of the 1992 French decompression tables, Trimix tables, and modified NIOSH (Edel-Kindwall) tables (OSHA–2011–0124–0066). The presentation also included a variance from Oregon that approved the use of the DCIEM Oxygen Decompression tables, also known as the Canadian Navy Tables, the 1992 French Decompression Tables, and the NIOSH (Edel-Kindwall) Oxygen Decompression tables (OSHA–2011–0124–0066). In their comment to the Request for Information, the Laborer’s health and Safety Fund of North America recommended OSHA adopt the French tables, but listed four other decompression tables—the Edel-Kindwall tables, the U.S. Navy Tables (Revision 6), the Canadian Navy Tables (1992), and the Trimix tables (for pressures over 4.8 bar)—that had been approved by variance in several states. (OSHA–2012–0007–0011). Furthermore, the Flook study suggests that many of the oxygen decompression tables provide virtually the same protection from DCI.

<sup>29</sup> Although Traylor/Skanska/Jay Dee Joint Venture requested the use of Trimix tables in their variance application for the Blue Plains Tunneling (BPT) project, they later explained to OSHA that “[a]t the Blue Plains Tunnel, Traylor will not experience hyperbaric pressures greater than 3.6 bar. Therefore we do not plan on using trimix at the BPT project.” OSHA–2012–0035–0013.

Given the numerous decompression tables that employers requests to use in variance applications, it appears that the industry does not believe there is one table that is applicable for all underground construction projects where workers may need to be decompressed. OSHA believes using a performance standard rather than specifying which table an employer must use may allow employers greater flexibility in providing safe decompression for their workers. OSHA requests comment on this regulatory approach.

#### Statement of Reasonable Availability

OSHA believes that the 1992 French Decompression Tables included in this proposal are reasonably available to interested parties. The tables are published in the Official Journal of the French Republic, titled “Travaux en milieu hyperbare, mesures particulières de prevention” (Work in hyperbaric environment, specific prevention measures). J. O. Rep. Franç. Brochure n° 1636, June 1992. The tables are available for purchase from the French government at <http://www.journal-officiel.gouv.fr/>. In addition, it is available in the docket for this rulemaking and in OSHA’s docket office for review. If OSHA ultimately finalizes this rule, the tables will be maintained in OSHA’s national and regional offices for review by the public.

Subpart S—Underground Construction, Caissons, Cofferdams and Compressed Air also has several provisions that limit the quantities of oxygen that may be taken below ground and kept there. OSHA asks for comment on providing an exception to those requirements for purposes of maintaining oxygen on hand for decompression purposes, which would be necessary in a final rule as the updated tables discussed above require the use of oxygen.

#### 15. Subpart W of 1926—Rollover Protective Structures; Overhead Protection

Provisions in subpart W specify minimum performance criteria for rollover protective structures (ROPS) and overhead protection on construction equipment. The Agency is proposing to amend the existing standards 29 CFR 1926.1000, 1926.1001, 1926.1002 and 1926.1003 by removing the provisions that specify the test procedures and performance requirements, and replacing those provisions with references to the underlying consensus standards from which they were derived. The substantive differences between the

consensus standards and OSHA’s standards are minimal. The Agency is also proposing to remove irrelevant text from § 1926.1000.

The original source standards for the current subpart W requirements are the Society of Automotive Engineers Standards (“SAE”) J320a–1971, J394–1971, J395–1971, J396–1971, J334a–1970, J167–1970, J168–1970, and J397–1969. The American National Standards Institute and SAE subsequently canceled these standards. To design and develop new equipment the industry now uses the most recent International Organization for Standardization (“ISO”) standards: ISO 3471–2008; ISO 5700–2013; and ISO 27850–2013. Though the names of the construction equipment covered by the consensus standards have changed over time, OSHA believes that all the equipment listed in current § 1926.1001(a) is covered by one of those ISO standards. A comment from a representative of Caterpillar, Inc. stated that the SAE standards have either been cancelled or superseded by new ISO standards (OSHA–2012–0007–0009). OSHA reviewed the relevant standards and believes that the standards identified in the proposed revisions reflect the current design and development of ROPS for equipment covered by subpart W. OSHA preliminarily concludes that using the proposed ISO standards will be as protective as using the current OSHA standards. Therefore, OSHA is proposing that, for new equipment manufactured after the effective date of the revised standard, the performance measures for testing ROPS meet the ISO standards. This proposed incorporation by reference will eliminate over 20 pages of text and diagrams in the CFR.

OSHA proposes to rename § 1926.1000 as “Scope” because this more accurately describes what follows in this section. Proposed paragraph (a) lists the types of equipment currently covered by subpart W. It also adds compactors and rubber-tired skid-steer equipment manufactured after the effective date of the final rule, which existing § 1926.1000(a)(2) anticipates as a possible expansion of the scope. The most recent ISO standards apply to compactors and skid-steer loaders as well as the equipment included in the current standard, and based on interviews with several manufacturers OSHA preliminarily concludes that all compactors and skid steer loaders currently produced meet those requirements. Proposed paragraph (b) states which standards apply to equipment manufactured before the publication of a final rule. Proposed paragraph (c) states which standards

apply to equipment manufactured after the publication of a final rule. Paragraphs (d) through (f) remain unchanged in the proposal, but OSHA solicits comment on whether paragraphs (d), “*Remounting*,” (e), “*Labeling*,” and (f), “*Machines meeting certain existing governmental requirements*” are necessary or are obsolete (due to adoption of modern consensus standards) and should be deleted.

Currently, § 1926.1000(c) limits the application of the requirements of §§ 1926.1001 and 1926.1002 to equipment manufactured after July 1, 1969. The proposal eliminates this limitation because it is OSHA’s understanding that there are not any pieces of covered equipment in operation today that are more than 45 years old and do not meet the SAE standards. OSHA seeks comment on whether this is so, and any data on the types and numbers of pre-1969, non-SAE compliant equipment currently in use.

Current § 1926.1001 provides ROPS requirements for rubber-tired self-propelled scrapers, rubber-tired front end loaders, rubber-tired dozers, crawler tractors, crawler-type loaders, and motor graders. The proposed rule deletes the current ROPS specifications for this equipment, and replaces it with a requirement that covered equipment manufactured before the effective date of the final rule comply with SAE J397–1969—Critical Zone—Characteristics and Dimensions for Operators of Construction and Industrial Machinery, SAE 320a–1970—Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired, Self-Propelled Scrapers, SAE J394–1970—Minimum Performance Criteria for Roll-Over Protective Structures for Rubber-Tired Front End Loaders and Rubber-Tired Dozers, SAE J395–1970—Minimum Performance Criteria for Roll-Over Protective Structure for Crawler Tractors and Crawler-Type Loaders, and SAE J396–1970—Minimum Performance Criteria for Roll-Over Protective Structure for Motor Graders, as applicable. The proposal requires equipment manufactured after the effective date of the final rule (including compactors and rubber-tired skid steer equipment) to meet the requirements of ISO 3471–2008, Earth-moving machinery—Roll-over protective structures—Laboratory tests and performance requirements. This standard contains specifications for ROPS to protect employees. Because, as noted above, OSHA believes that covered equipment is already being manufactured to the requirements of ISO 3471–2008, the proposal provides

the option for equipment manufactured before the effective date of the final rule to comply with the ISO standard rather than the SAE standards.

Current § 1926.1002 provides ROPS requirements for wheel-type agricultural equipment and industrial tractors used in construction. The proposed rule deletes the current ROPS specifications for this equipment, and replaces it with a requirement that covered equipment manufactured before the effective date of the final rule comply with SAE J168–1970—Protective Enclosures—Test Procedures and Performance Requirement and SAE J334a–1970—Protective Frame Test Procedures and Performance Requirements, as applicable. The proposal requires equipment manufactured after the effective date of the final rule meet the requirements of ISO 5700–2013, Tractors for agriculture and forestry—Roll-over protective structures—Static test method and acceptance conditions. This standard contains specifications for ROPS to protect employees. Because, as noted above, OSHA believes that covered equipment is already being manufactured to the requirements of ISO 5700–2013, the proposal provides the option for equipment manufactured before the effective date of the final rule to comply with the ISO standard rather than the SAE standards.

OSHA solicits comment on whether any equipment covered by § 1926.1002 that complies with ISO 3471–2008, the standard for earth-moving machinery should be considered in compliance for ROPS. OSHA asks this because ISO 3471–2008 requires testing at higher levels of energy than ISO–5700.

Current § 1926.1003 provides design and installation requirements for the use of overhead protection for operators of agricultural and industrial tractors used in construction. The proposed rule deletes the current overhead protection specifications for this equipment, and replaces it with a requirement that covered equipment manufactured before the effective date of the final rule comply with SAE J167–1970—Overhead Protection for Agricultural Tractors—Test Procedures and Performance Requirements when using overhead protection. The proposal requires equipment manufactured after the effective date of the final rule meet the requirements of ISO 27850–2013, Tractors for agriculture and forestry—Falling object protective structures—Test procedures and performance requirements when using overhead protection. This standard contains specifications for overhead protection to protect employees. Because, as noted above, OSHA preliminarily concludes

that overhead protection, when used, is manufactured to the requirements of ISO 27850–2013, the proposal provides the option for equipment manufactured before the effective date of the final rule to comply with the ISO standard rather than the SAE standards.

#### Statement of Reasonable Availability

As noted above, OSHA is continuing to incorporate by reference Society of Automotive Engineers (SAE) standards. OSHA believes that these standards are reasonably available to interested parties. They are available for purchase from the Society of Automotive Engineers (SAE), 400 Commonwealth Drive, Warrendale, PA 15096; telephone: 1–877–606–7323; fax: 724–776–0790; Web site: <http://www.sae.org/>. OSHA proposes to incorporate by reference International Organization for Standardization (ISO) standards. OSHA believes that these standards are reasonably available to interested parties. They are available for purchase from the International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, Case postale 56, CH–1211 Geneva 20, Switzerland; telephone: +41 22 749 01 11; fax: +41 22 733 34 30; Web site: <http://www.iso.org/>. In addition, it is available in the docket for this rulemaking and in OSHA’s docket office for review. If OSHA ultimately finalizes this rule, the standards will be maintained in OSHA’s national and regional offices for review by the public.

#### 16. Subpart Z of 1926—Toxic and Hazardous Substances, Coke Oven Emissions in 29 CFR 1926.1129.

Section 1926.1129 regulates exposure to coke oven emissions in construction. OSHA incorporated this standard into part 1926 in 1993 (58 FR 35256, June 30, 1993) and revised it to be just a reference to the identical general industry standard in 1996 (61 FR 31428, June 20, 1996). In neither rulemaking did OSHA discuss, in particular, the application of the coke oven standard to construction, as it was only one of many standards involved in each rulemaking.

However, the provisions of this standard do not fit construction work. Much of the standard regulates exposure in the “regulated area.” (See 29 CFR 1910.1029(d)). But this “regulated area” is limited, including only “[t]he coke oven battery including topside and its machinery, pushside and its machinery, coke side and its machinery, and the battery ends; the wharf; and the screening station [and the] beehive oven and its machinery” (§ 1910.1029(d)(2)(i) and (ii)). As stated in an interpretation issued nearly contemporaneously with the general industry coke oven

emissions standard, “[t]he ground level around the base of the coke oven battery is not generally considered in the regulated area unless work related to coke oven operations take place. The coke oven regulation, 29 CFR 1910.1029, does not apply to employees walking past coke ovens or between them.” (Interpretation memorandum to White, May 17, 1977). Any work operating the coke ovens would be general industry work, and it is unlikely that any workers doing construction work, even if within a facility with an operating coke oven, would be so close to the coke oven as to be covered under the standard. OSHA recognized this issue in the 1990s, when it stated that the coke oven construction standard was “invalid,” and would be removed from the Code of Federal Regulations. (Interpretation letter to Katz, June 22, 1999). OSHA also advised its Regional Offices of this interpretation and that they should not enforce § 1926.1129 in 2005. OSHA’s inspection database contains no record of a citation under this standard since 1997.<sup>30</sup>

Since, in effect, the standard does not address construction worker exposures to coke oven emissions, there would be no reduction in the level of protection. To the extent any construction workers would in the future be exposed to coke oven emissions, OSHA could cite the employer under the General Duty Clause (29 U.S.C. 654(a)(1)). Thus, OSHA is now proposing to delete § 1926.1129. OSHA is also proposing to delete the reference to § 1926.1129 in § 1926.55, Appendix A (proposed Table A).

#### 17. Additional Proposed Revisions to Paragraphs and Appendices in 29 CFR Parts 1910, 1915, and 1926 To Remove Social Security Number Collection Requirements

In addition to the revisions described above, OSHA is proposing a series of revisions to various standards in 29 CFR parts 1910, 1915, and 1926, to remove the requirements that employers include an employee’s social security number (SSN) on exposure monitoring, medical surveillance, and other records. OSHA believes that these revisions will protect employees’ privacy and prevent identity fraud.

Many of OSHA’s standards—particularly, its substance-specific standards—require that exposure monitoring, medical surveillance, and other records include the employee’s SSN. OSHA has historically required SSNs on these records because SSNs,

which are assigned at birth and do not change over time, are unique and constant personal identifiers that offer a useful method for linking records with individual employees. OSHA explained in a 1999 letter of interpretation regarding the asbestos standard for construction that only using an employee’s name to match a record with an employee is undesirable because “[m]any employees have identical or similar names.” (Mr. Shawn T. Christon, April 16, 1999). Similarly, in the preamble to the final methylene chloride standard (62 FR 1494, January 10, 1997), OSHA explained that a SSN is a more useful identifier than an employer-generated employee identification number because each SSN is “unique to an individual for a lifetime and does not change as an employee changes employers.” (62 FR 1494, 1598).

However, increasingly widespread concerns about identity theft have prompted OSHA to reexamine whether requiring SSNs on records is still appropriate. Identity theft has emerged as one of the fastest growing crimes in the United States, and the Social Security Administration (SSA) has alerted the public that repetitive use and disclosure of SSNs in organizational recordkeeping systems should be avoided, as doing so multiplies the susceptibility of persons to potential identity theft (SSA, *Identity Theft and Social Security*, SSA Publication No. 05–10064 (Sept. 2015)), available at: <https://www.ssa.gov/pubs/EN-05-10064.pdf>). OSHA recognizes that limiting the use and transmission of SSNs is a key strategy for preventing identity theft, and acknowledges that requiring employers to include employee SSNs on exposure monitoring, medical surveillance, and other records does not further that effort.

OSHA previously requested public comments on its SSN collection requirements in the Standards Improvement Project Phase II (SIP II) proposal (67 FR 66494–66501, October 31, 2002), and the comments that the Agency received reflected mixed opinions on the usefulness of, and the privacy risks created by, including employee SSNs on monitoring and surveillance records. As discussed in the SIP II final rule (70 FR 1112, January 5, 2005), several commenters supported maintaining the requirements to collect employee SSNs, citing, among other reasons, SSNs’ common use in other employee records and their suitability for tracking employees in large epidemiological studies of workplace populations (e.g., Exs. 3–9, 3–16, 3–14,

OSHA Docket No. S–778–A). Several other commenters, however, expressed interest in replacing SSNs with alternative identification numbers that would pose a less serious risk to employee privacy and security if acquired by a third party (e.g., Exs. 3–1, 3–7, 3–28, 4–7, OSHA Docket No. S–778–A). OSHA ultimately decided not to take action in the SIP II final rule concerning the use of SSNs in its standards, concluding that the Agency needed to further investigate the issue (70 FR 1112, 1126–27).

OSHA subsequently clarified in two letters of interpretation that employers are permitted under its current standards to maintain a second set of records that use alternative identification numbers in place of SSNs (Mr. Sutherland, Feb. 5, 2007; Mr. Mayo, March 27, 2008). In the 2008 letter, which responded to an inquiry about the SSN requirements in the recordkeeping provisions of the lead standard (29 CFR 1910.1025(d)(5)), OSHA clarified that employers are permitted to keep a second set of records with alternative identification numbers in place of SSNs so long as “those unique identification numbers [can] be easily cross referenced to the employee’s SSN,” because “such a system would ensure that the employees’ privacy is maintained, while also satisfying the intent of the Lead Standard” (Mr. Mayo, March 27, 2008). The letter also emphasized that the lead standard only requires employers to assure access to complete exposure records that contain SSNs when requested by an employee, a designated employee representative, or a representative of OSHA or NIOSH.

OSHA also considered its SSN collection requirements after it published the Notice of Proposed Rulemaking for Occupational Exposure to Respirable Crystalline Silica (78 FR 56273, September 12, 2013). OSHA received many comments on the recordkeeping provisions in the proposed paragraphs (j)(1)(ii)(G) (Air monitoring data) and (j)(3)(i)(A) (Medical surveillance) which, consistent with the recordkeeping requirements in OSHA’s other health standards, required the employer to include the employee’s SSN in the standard’s monitoring and surveillance records. More than a dozen commenters addressed the SSN collection requirements and all of those commenters expressed opposition to including the requirements in the standard (e.g., Document ID 1772, p. 1; 1785, pp. 9–10; 2185, pp. 8; 2267, p. 7; 2270, p. 3; 2291, p. 26; 2301, Attachment 1, pp. 80–81; 2311, p. 3; 2315, p. 7; 2348, Attachment 1, p. 39;

<sup>30</sup> There were a few citations between 1993 and 1997.

2357, pp. 36–37; 2363, p. 7; 2379, Appendix 1, p. 73; 2107, p. 4; 1963, p. 3, Docket No. OSHA–2010–0034). Commenters generally viewed the inclusion of a SSN on the records as creating an unnecessary risk to employee privacy and security, and sought the flexibility to use alternate personal identifiers in place of SSNs. Several commenters explained that companies currently use alternative identifiers—such as employee identification numbers—to link monitoring and surveillance records with specific employees, and stated that these identifiers can be internally linked back to an employee's SSN if that information is needed (e.g., Docket ID 2379, Appendix 1, p. 73; 2357, pp. 36–37; 2270, p.3, 2348, Attachment 1, p. 39; 2301, Attachment 1, pp. 80–81; 2291, p. 26, Docket No. OSHA–2010–0034). Commenters acknowledged that SSNs must be used on some government reports (e.g., payroll reports to the IRS) and are therefore present in some employer records, but stated that access to those records is usually more restricted than to air monitoring records.

OSHA ultimately decided to retain the requirements to include the employee's SSN in the recordkeeping paragraphs of the silica final rule, stating that including the employee SSNs on such records is “long-standing OSHA practice, based on the fact that it is a number that is both unique to an individual and is retained for a lifetime, and does not change as an employee changes employers” (81 FR 16285, 16852, March 25, 2016). OSHA acknowledged the commenters' concerns about employee privacy and identity theft, but explained that any change to the Agency's requirements for including employee SSNs on exposure records should be done comprehensively, rather than on a standard-by-standard basis. OSHA stated that it intended to examine the SSN requirements in all of its substance-specific health standards in a future rulemaking.

OSHA originally required collection of employee SSNs in its standards because SSNs are assigned at birth and do not change over time, which makes SSNs useful for linking records with individual employees. As unique and constant personal identifiers, SSNs are also suitable for researchers who track employees in large epidemiological studies of workplace populations. However, other tracking methods have emerged that allow researchers to conduct these studies without the use of SSNs.

OMB requires all 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 Personal Identifiable Information (M–01–16), May 22, 2007 (available at: [www.whitehouse.gov/omb/memoranda/fy2007/m07-16.pdf](http://www.whitehouse.gov/omb/memoranda/fy2007/m07-16.pdf)). Recognizing the seriousness of the threat of identity theft and the availability of other methods for tracking employees for research purposes, if needed, OSHA has reexamined the SSN collection requirements in its standards, and now proposes to comprehensively remove all requirements to include employee SSNs on exposure monitoring, medical surveillance, or other records. Specifically, OSHA proposes to delete the requirement to include an employee's SSN in records employers must maintain under the following standards:

- Hazardous Waste Operations and Emergency Response—§§ 1910.120(f)(8)(ii)(A) and 1926.65(f)(8)(ii)(A);
- Asbestos—§§ 1910.1001(m)(1)(ii)(F), (m)(3)(ii)(A), and Appendix D, 1915.1001(n)(2)(ii)(F), (n)(3)(ii)(A), and Appendix D, and 1926.1101(n)(2)(ii)(F), (n)(3)(ii)(A), and Appendix D;
- Vinyl Chloride—§ 1910.1017(m)(1);
- Inorganic Arsenic—§ 1910.1018(q)(1)(ii)(D) and (q)(2)(ii)(A);
- Lead—§§ 1910.1025(d)(5), (n)(1)(ii)(D), (n)(2)(ii)(A), (n)(3)(ii)(A), and Appendix B, and 1926.62(d)(5), (n)(1)(ii)(D), (n)(2)(ii)(A), (n)(3)(ii)(A), and Appendix B;
- Chromium (VI)—§§ 1910.1026(m)(1)(ii)(F) and (m)(4)(ii)(A), 1915.1026(k)(1)(ii)(F) and (k)(4)(ii)(A), and 1926.1126(k)(1)(ii)(F) and (k)(4)(ii)(A);
- Cadmium—§§ 1910.1027(n)(1)(ii)(B), (n)(3)(ii)(A), and Appendix D, and 1926.1127(d)(2)(iv), (n)(1)(ii)(B), and (n)(3)(ii)(A);
- Benzene—§§ 1910.1028(k)(1)(ii)(D) and (k)(2)(ii)(A);
- Coke Oven Emissions—§§ 1910.1029(m)(1)(i)(a) and (m)(2)(i)(a);
- Bloodborne Pathogens—§ 1910.1030(h)(1)(ii)(A);
- Cotton Dust—§§ 1910.1043(k)(1)(ii)(C), (k)(2)(ii)(A), and Appendices B–I, B–II, and B–III;
- 1,2-Dibromo-3-Chloroethane—§§ 1910.1044(p)(1)(ii)(d) and (p)(2)(ii)(a);
- Acrylonitrile—§ 1910.1045(q)(2)(ii)(D);

- Ethylene Oxide—§§ 1910.1047(k)(2)(ii)(F) and (k)(3)(ii)(A);
- Formaldehyde—§§ 1910.1048(o)(1)(vi), (o)(3)(i), (o)(4)(ii)(D), and Appendix D;
- Methylenedianiline—§§ 1910.1050(n)(3)(ii)(D), (n)(4)(ii)(A), and (n)(5)(ii)(A), and 1926.60(o)(4)(ii)(F) and (o)(5)(ii)(A).
- 1,3-Butadiene—§§ 1910.1051(m)(2)(ii)(F), (m)(4)(ii)(A), and Appendix F;
- Methylene Chloride—§§ 1910.1052(m)(2)(ii)(F), (m)(2)(iii)(C), (m)(3)(ii)(A), and Appendix B;
- Respirable crystalline silica—§§ 1910.1053(k)(1)(ii)(G) and (k)(3)(ii)(A), and 1926.1153(j)(1)(ii)(G) and (j)(3)(ii)(A).

The Agency believes that removing these requirements will facilitate employers' efforts to safeguard employee privacy. Based on the comments that it received in response to the SIP II request and the proposed silica rule, OSHA understands that some employers use a unique employee identification number to identify employees, and because these numbers are not used in commerce, they pose a less serious risk to employee privacy than SSNs if they are acquired by an authorized third party. Alternatively, some employers use other personal identifying information, either alone or in combination, to identify employees, such as first and last name, date of birth, government issued identification or driver's license number, passport number, or the last four digits of the SSN. Although some of this personal information, such as date of birth, may be used in commerce, exposure of that information may also be less damaging to employee privacy than exposure of an employee's SSN.

The proposed revisions would not otherwise alter OSHA's requirements for maintaining records, and employers would thus be expected to continue handling previously-generated records that contain SSNs as they currently do. The proposal does not require the deletion of employee SSNs from existing records, and it does not require employers to use an alternative unique employee identifier on those records. The proposal allows employers, who wish to do so, to continue using SSNs on records developed in compliance with the standards noted above. Accordingly, OSHA believes that these proposed revisions will not increase an employer's compliance burden under any of the revised standards.

OSHA sought and received a recommendation from the Advisory Committee on Construction Safety and

Health (ACCSH) to proceed with its proposal to remove the SSN collection requirements from its standards. At a public meeting held on December 2, 2015, ACCSH unanimously recommended that OSHA proceed with the proposal (ACCSH Dec. 2, 2016 transcript, pp. 83–98, available at Docket No. OSHA–2015–0002–0113). However, members of ACCSH also requested that OSHA provide guidance to employers whether they could continue using SSNs, and as noted above the proposal would allow them to do so.

OSHA seeks comments on all aspects of this proposal. In addition, the Agency seeks comments on potential alternative approaches, including a requirement that the employer implement an alternative unique employee identifier, and that the employer remove all employee SSNs from all existing records maintained under the standards noted above. In particular, OSHA seeks comments on whether employers currently use alternatives to SSNs to identify employees in the records required by OSHA's standards, and if so, which alternative identifiers employers use, and whether employers maintain two sets of records or just a single set. OSHA would appreciate detailed information on any alternatives to SSNs. The Agency also requests comments on how removing the SSN requirements from exposure monitoring and surveillance records would affect employers' ability to identify employees on records, and whether the proposed revisions would affect the way that employers conduct business.

Regarding the handling of existing records, OSHA requests information on whether employers currently maintain the records required under OSHA's standards electronically, in hard copy, or both. For those employers that store records electronically, OSHA seeks information on whether employers store those records in a database, and if so, whether OSHA's proposed revisions would require employers to modify or reprogram their databases. OSHA also requests information on the feasibility of removing SSNs from existing records, including any obstacles that might prevent employers from removing SSNs from electronic records, and whether it would be practicable to remove SSNs from existing hard copy records.

This proposal would impact several forms that are contained in appendices to OSHA's standards, and when reviewing those forms to remove their SSN collection requirements, OSHA noticed that several forms from older standards do not comport with OMB's Standards for Maintaining, Collecting,

and Presenting Federal Data on Race and Ethnicity, as updated on October 30, 1997 (62 FR 58782–58790). The Agency is considering revising the forms to either update the language to ensure compliance with OMB's standards or remove the question altogether. For example, Part 1 (“Initial Medical Questionnaire”) of Appendix D of the asbestos standard for general industry (29 CFR 1910.1001) includes a question (currently, #15) that states:

- Race:
1. White \_\_\_\_\_
  2. Black \_\_\_\_\_
  3. Asian \_\_\_\_\_
  4. Hispanic \_\_\_\_\_
  5. Indian \_\_\_\_\_
  6. Other \_\_\_\_\_

To reflect a combined race and ethnicity format (*see* 62 FR 58782, 58789), OSHA is considering revising the language to state:

- Race:
1. White \_\_\_\_\_
  2. Black or African American \_\_\_\_\_
  3. Asian \_\_\_\_\_
  4. Hispanic or Latino \_\_\_\_\_
  5. American Indian or Alaska Native \_\_\_\_\_
  6. Native Hawaiian or Other Pacific Islander \_\_\_\_\_

Other forms impacted by the removal of SSN collection requirements that have questions that would be similarly affected are: Asbestos in Construction (§ 1926.1101, Appendix D) and Maritime (§ 1915.1001 Appendix D); Cotton Dust (§ 1910.1043, Appendix B–1, Appendix B–II, and Appendix B–III) and Methylene Chloride (§ 1910.1052, Appendix B)

OSHA requests comments on revising the appendices as indicated above and particularly on whether revising the language of race and ethnicity questions would impose any additional burden hours or costs on the respondents.

#### IV. Preliminary Economic Analysis and Regulatory Flexibility Act Certification

##### A. Overview

Executive Orders 12866 and 13563 require that OSHA estimate the benefits, costs, and net benefits of proposed regulations. Executive Orders 12866 and 13563, the Regulatory Flexibility Act (5 U.S.C. 601–612), and the Unfunded Mandates Reform Act (UMRA) (2 U.S.C. 1532(a)) also require OSHA to estimate the costs, assess the benefits, and analyze the impacts of certain rules that the Agency promulgates. Executive Order 13563 emphasizes the importance of quantifying both costs and benefits, reducing costs, harmonizing rules, and promoting flexibility.

The proposed rule is not an “economically significant regulatory

action” under Executive Order 12866 or UMRA, and it is not a “major rule” under the Congressional Review Act (5 U.S.C. 801 *et seq.*). This proposed rule has estimated annual costs of \$27,899 and would lead to approximately \$3.2 million per year in cost savings to regulated entities. Thus, neither the benefits nor the costs of this rule exceed \$100 million. In addition, it does not meet any of the other criteria specified by UMRA or the Congressional Review Act for a significant regulatory action or major rule. This Preliminary Economic Analysis (PEA) addresses the costs, cost savings benefits, and potential economic impacts of the proposed rule.

The purpose of the proposed provisions in this standard was to reduce the burden on employers, or provide employers with compliance flexibility, by removing or revising confusing, outdated, duplicative, or inconsistent requirements, while maintaining the same level of protection for employees. This proposed standard deletes and revises a number of provisions in existing OSHA standards. In most instances, the Agency chose to revise outdated provisions to improve clarity, as well as consistency, with standards more recently promulgated by the Agency or current consensus standards. In other instances, the proposed provisions revise standards to improve consistency with current technology or research, and to restore OSHA's original intent to standards. Because of the reduction or removal of current requirements and because many of the updates reflect what is already practiced in the applicable industry, OSHA has preliminarily concluded that the proposed rule is technologically feasible.

##### B. Costs, Cost Savings, and Benefits

###### Work-Related Hearing Loss

OSHA is proposing to add a specific cross-reference to 29 CFR 1904.5—Determination of Work-Relatedness—in § 1904.10—Recording Criteria for Cases Involving Occupational Hearing Loss—paragraph (b)(6). This cross-reference specifies that employers must comply with the provisions of § 1904.5 when making a determination as to whether a worker's hearing loss is work-related. OSHA is not changing any requirements of 29 CFR 1904.10, but merely clarifying the Agency's intent. Since this change does not change the requirements of this standard, OSHA has preliminarily determined that neither new costs nor compliance burdens would be incurred.

## Lockout/Tagout

OSHA is proposing to remove the word “unexpected” from the phrase “unexpected energization” in its general industry standard regulating the control of hazardous energy (lockout/tagout) at 29 CFR 1910.147. As described in the Summary and Explanation, because removing the word “unexpected” from the language of this standard would not represent any revision in OSHA policy, but instead clarify the Agency’s original meaning of the term “energization” in the standard, OSHA preliminary concludes that this action would not result in any costs, compliance burdens, or additional employer responsibility other than what the Final Economic Analysis already considered for original § 1910.147 (OSHA, 1989).

This revision would respond to the interpretation of the lockout/tagout of the Occupational Safety and Health Review Commission and the U.S. Court of Appeals for the Sixth Circuit in *Reich v. General Motors Corp., Delco Chassis Div. (GMC Delco)*, 17 BNA OSHC 1217 (Nos. 91–2973, 91–3116, 91–3117, 1995); *aff’d* 89 F.3d 313 (6th Cir. 1996). In that case, both OSHRC and the Court of Appeals found that a machine with a multi-step procedure, time delays, and a warning system before reenergization was not covered by the standard because its reenergization was not “unexpected.” OSHA does not agree with this decision, and its consistent interpretation of the standard is that such equipment is covered by the standard. As explained in the summary and explanation, the phrase “unexpected energization” was intended to mean any re-energization or startup that was not authorized by the servicing employee removing her personal lockout/tagout device from the energy isolation device or equivalent energy control mechanism. Moreover, to implement the *GMC Delco* decision, OSHA’s directive on the lockout/tagout standard lists 11 different factors for compliance officers to use to evaluate and document whether equipment is covered by the standard or not. This case-by-case analysis creates a degree of uncertainty about the applicability of the standard for the regulated community that OSHA did not intend. Though this proposed revision may change the frequency or number of violations cited and the amount of fines assessed due to improved employer understanding of the revised language, these are not material effects that would serve as a basis for estimating new costs to comply with the standard, and such costs can be avoided by adherence to

the standard, whose costs OSHA has already estimated.

In addition, removing the word “unexpected” from the text of § 1910.147 also would harmonize this standard with a recent OSHA lockout/tagout standard which does not include the term “unexpected.” See OSHA’s General Working Conditions in Shipyard Employment standard at 29 CFR 1915.89.

## Chest X-Ray Requirements

Medical surveillance requirements in health standards are designed primarily to detect the early onset of adverse health effects so that appropriate interventions can be taken. In certain OSHA standards, the Agency currently requires periodic chest X-rays (CXRs) as a form of early lung cancer detection. At the time these standards were promulgated, routine screening for lung cancer with CXR was considered appropriate; however, recent studies with many years of follow-up have not shown a benefit from CXR screening for either lung cancer incidence or mortality. As a result, OSHA is proposing to remove the requirement for periodic CXR in the following standards: § 1910.1029—Coke Oven Emissions, § 1910.1045—Acrylonitrile, and § 1910.1018—Inorganic Arsenic.

As OSHA has become increasingly aware of the ineffectiveness of CXR in reducing lung cancer mortality, the Agency has moved to decrease CXR requirements to eliminate unnecessary radiation to workers as well as reduce the cost to employers to provide CXR as part of medical examinations, which it did previously in the first phase of the Standards Improvement Process (63 FR 33450, June 18, 1998). Not only does OSHA preliminarily conclude that the removal of this requirement would result in a cost savings to employers, but the Agency also believes it would prove to be beneficial to employees by decreasing their exposure to radiation as well as decreasing the rate of false positive results. Although OSHA has not attempted to quantify these benefits in this preliminary analysis, the Agency invites comment from the public on these issues.

To estimate the annual cost savings to employers if the requirement for periodic CXRs were removed from the listed standards, OSHA, with the assistance of Eastern Research Group (ERG), estimated the number of unnecessary CXRs that would be eliminated by this proposed change by drawing on estimates of the affected number of workers for each standard in the Agency’s most recent Information Collection Requests for each affected

standard (ERG, 2015). OSHA then analyzed data from the Centers for Medicare and Medicaid Services’ (CMS) Physician Fee Schedule. Summarizing data from around the United States indicated a national average price of \$68.42 for a CXR (ERG, 2015). Finally, the Agency multiplied the average price of a CXR by the number of CXRs to be eliminated, providing an estimate of \$245,148 of exam cost savings. This information is detailed as follows:

Coke Oven Emissions (§ 1910.1029):  
 Reduced Exam Costs: 2,324 exams × \$68.42  
 CXR cost per exam = \$159,008  
 Acrylonitrile (§ 1910.1045):  
 Reduced Exam Costs: 467 exams × \$68.42  
 CXR cost per exam = \$31,952  
 Inorganic Arsenic (§ 1910.1018):  
 Reduced Exam Costs: 792 exams × \$68.42  
 CXR cost per exam = \$54,188  
 Total Reduced Exam Cost:  
 \$159,008+\$31,952+\$54,188 = \$245,148

Reducing the time of the medical exam, by removing the CXR requirement, would also save employers money because the employee is away from work for a shorter period of time. Based on information from RadiologyInfo.org, the Agency conservatively estimates that the time employees would be away from work is reduced by 15 minutes when the CXR component of the exam is eliminated (ERG, 2015). OSHA seeks comment on this time estimate. As indicated, OSHA estimates this change would save 896 hours of worker time that would have been spent during their recurring exams. Multiplying the reduced exam time by employee hourly wages of \$24.05,<sup>31</sup> the Agency estimates a cost savings of \$21,549 in employee time. This information is detailed as follows:

Coke Oven Emissions (§ 1910.1029):  
 Time saved: 2,324 exams × .25 hours = 581 hours<sup>32</sup>  
 Reduced Cost: 581 hours × \$24.05  
 employee wage = \$13,973  
 Acrylonitrile (§ 1910.1045):  
 Time saved: 467 exams × .25 hours = 117 hours  
 Reduced Cost: 117 hours × \$24.05  
 employee wage = \$2,814  
 Inorganic Arsenic (§ 1910.1018):

<sup>31</sup> Wages are based on data from the May 2013 National Occupational Employment and Wage Estimates for Standard Occupational Classification Code 51–000—Production Operation, which lists average base compensation of \$16.79. A private industry Fringe Benefit rate of 30.20 percent was from Source: Bureau of Labor Statistics. Employer Costs for Employee Compensation—June 2014. ([http://www.bls.gov/news.release/archives/ecec\\_09102014.htm](http://www.bls.gov/news.release/archives/ecec_09102014.htm)). The multiplier applied to base compensation to determine loaded wages is 1.43 [1/(1–30.20 percent)]. Applying the multiplier (1.43) to base compensation (\$16.79) results in loaded wages of \$24.05.

<sup>32</sup> Numbers rounded to the nearest whole dollar here and elsewhere in the Preliminary Economic Analysis.

Time saved: 792 exams × .25 hours = 198 hours  
 Reduced Cost: 198 hours × \$24.05 employee wage = \$4,762  
 Total Employee Time Savings from fewer CXRs:  
 581 hours + 117 hours + 198 hours = 896 hours  
 Total Value of Time Savings from fewer CXRs:  
 \$13,973 + \$2,814 + \$4,762 = \$21,549

Combining the value of saved worker time of \$21,549 with the decreased exam cost of \$245,148 nets a total potential cost savings to employers of \$266,697. OSHA seeks comment on these estimates.

OSHA is also proposing to update other CXR requirements in its Coke Oven Emissions, Acrylonitrile, and Inorganic Arsenic standards discussed above, as well as in its three Asbestos standards—§ 1910.1001 Asbestos (General Industry), § 1915.1001 Asbestos (Maritime), and § 1926.1101 Asbestos (Construction)—and two Cadmium standards—§ 1910.1027 Cadmium (General Industry), and § 1926.1127 Cadmium (Construction).

In recent years, innovation in medical technology has allowed for screening with digital CXRs. Reflecting this, OSHA is proposing to add the option of digital radiography to its existing standards. As a practical matter, digital radiography systems are rapidly replacing traditional analog film-based systems in medical facilities.

There are cost savings to using digital CXRs over analog CXRs. Traditional analog film-based CXRs are much larger than standard-sized office documents and weigh more than a piece of paper of the same size. As such, storing traditional CXRs requires an investment in specialized storage cabinets, which in turn may require reinforcement of the floor. Digital CXRs, however, can be stored on a computer. Due to continuing advances in technology and the emergence of inexpensive and large-capacity storage devices, digital CXRs can be stored for just a fraction of a cent each. Digital CXRs also save time and materials because they can be instantly processed and ready for use as soon as the CXR is taken.

OSHA believes that digital storage of CXRs is so common that most employers are already realizing this cost savings and would thus not incur any additional savings as a result of this proposal. As a practical matter, OSHA already allows digital storage of CXRs as a matter of enforcement discretion. In a letter of interpretation released on September 24, 2012, entitled “OSHA’s position on the acceptability of digital radiography in place of traditional chest

roentgenograms,” OSHA stated: “OSHA would allow, but would not require, digital radiography in place of traditional chest roentgenograms for medical surveillance exams under the Asbestos Standards for general industry, construction, and shipyards.” Although OSHA has not released interpretations specifically allowing for digital storage of CXRs in other standards, it has become the Agency’s practice not to cite or otherwise penalize employers for storing CXRs digitally. Because it is now current OSHA enforcement practice to waive the formal requirement for employers to keep analog copies of CXRs when they store them digitally, the Agency preliminarily concludes that there would be no realized cost savings by changing this requirement. This proposed change simply formalizes and thereby clarifies what the Agency has already accommodated in practice.

Revisions in these standards also include replacements of antiquated terminology such as “roentgenogram,” correction of misspellings in the existing standards, an update to the current ILO classification guidance, and revisions where inaccuracies exist in clinical diagnostic language. OSHA is proposing to update the regulatory text to better distinguish between the appropriate uses of classification and interpretation of CXRs. The Agency believes these changes are merely editorial in nature and reflect current practices, and therefore would not create new costs or cost savings for employers.

#### Cotton Dust—Pulmonary Function Testing

As explained in greater detail in the Summary and Explanation, OSHA is proposing to make revisions to its medical surveillance program requirements—more specifically, its pulmonary function testing requirements of the Cotton Dust standard (29 CFR 1910.1043). Exposure to cotton dust places employees at risk of developing the respiratory disease byssinosis. Since the publication of the Cotton Dust standard in 1978, OSHA has not updated its pulmonary function testing requirements to match those of current technology and practices. As a result, OSHA is basing its proposed revisions on current recommendations from organizations recognized as authorities on generally accepted practices in pulmonary-function testing: The American Thoracic Society/ European Respiratory Society (ATS/ERS), the National Institute for Occupational Safety and Health (NIOSH), and the American College of

Occupational and Environmental Medicine (ACOEM).

OSHA is proposing to revise paragraph (h) and Appendix D of its Cotton Dust standard. Many of the revisions are simply editorial, to clarify existing language, as well as to update outdated pulmonary function measurements. However, for those revisions that may suggest a potential need to upgrade pulmonary testing equipment, OSHA investigated the characteristics of equipment currently available in the United States and whether such equipment met the specifications of OSHA’s proposed revisions.

Paragraphs 1043(h)(2)(iii) and (h)(3)(ii)(A) and (B) give instructions for pulmonary function testing, measuring forced vital capacity (FVC) and forced expiratory volume in one second (FEV1) against the Spirometry Prediction Tables for Normal Males and Females (Appendix C), adjusting those measurements based on ethnicity, and from the outcome of such measurements, determining the frequency of medical surveillance provided to employees. OSHA is proposing to revise this provision to specify use of the National Health and Nutrition Examination Survey (NHANES) III reference data set and to replace the values currently in Appendix C with the NHANES III values.

Software for most spirometers includes the NHANES III data set, which is identified as the Hankinson data set on some spirometers. If software for older spirometers does not include the NHANES III data set, users of those spirometers would be able to access the NHANES III values online through the NIOSH calculator. Tables of the NHANES III values are also available in an appendix of OSHA’s spirometry guidance for healthcare professionals that is also available online. Therefore, NHANES III values are widely available to spirometry providers, including those providers using older spirometers.

OSHA’s proposal to use the NHANES III data set in place of the Knudson values currently in Appendix C would simplify interpretation of spirometry results by providing reference values for more race/ethnic groups, thereby reducing the need to adjust values for race/ethnic groups not included in the Knudson data set. This revision as to how pulmonary functioning should be tested and measured falls in line with current generally accepted practices; therefore OSHA does not believe this proposed revision should pose a compliance burden to affected employers.

OSHA is also proposing to update paragraph (h)(2)(iii) to require an evaluation of FEV1, FVC, and FEV1/FVC against the lower limit of normal (LLN) for each race/ethnic group, by age. Similarly, OSHA is proposing that the basis for frequency of medical surveillance in paragraphs (h)(3)(ii)(A) and (B) be whether the FEV1 is above or below the LLN. This would technically change the required triggers for medical surveillance from the existing standard, but is consistent with generally accepted current practices. The Agency believes the changes would reduce confusion and have little other practical effect. The proposed revision to evaluate the FEV1/FVC ratio in addition to FEV1 and FVC would not affect the triggers for other medical monitoring requirements such as changes in medical-surveillance frequency or referral for a detailed pulmonary examination because the standard bases those triggers solely on FEV1 values.

Proposed revisions to Appendix D address updates to the specifications of spirometry equipment used in performing pulmonary functioning tests. To assess whether current readily available spirometry equipment met the Agency's proposed specifications, OSHA investigated the market for spirometry equipment, with the assistance of its contractor, Eastern Research Group (ERG). OSHA found that the market has been adapting to similar consensus standards in this area as far back as 1994. In its research of spirometry product specifications collected through internet searches, interviews with manufacturers, and the consultation of peer-reviewed literature and voluntary standards published by respiratory health groups, the Agency found that spirometry models currently sold in the United States, Europe and Australia meet the potential specification revisions of spirometry equipment to be used in the cotton dust standard. More specifically, ERG looked at a sample of 12 spirometry models from various manufacturers and found that 11 out of the 12 models were already compliant with the volume, accuracy, and minimum duration requirements of the 2005 spirometry specification standard jointly published by ATS/ERS (ERG, 2015).

The Agency estimates that this spirometry equipment has a working life of approximately ten years. To prevent a potential burden to employers from having to prematurely purchase new equipment, OSHA is proposing that the revised spirometry specifications apply only to equipment newly purchased one year or more after OSHA publishes the

final standard in the **Federal Register**. Combined with evidence that the large majority of the equipment already on the market is already compliant, OSHA does not believe that the proposed revisions to the spirometry equipment specifications would impose additional costs or compliance burdens to employers. OSHA welcomes comment on the possible impacts of these requirements.

#### Shipyard Employment: Feral Cats

As stated in the Summary and Explanation, OSHA is proposing to remove feral cats from its definition of vermin in paragraph (b)(33) of § 1915.80—Subpart F—Shipyard General Working Conditions. 29 CFR 1915.88—Sanitation, paragraphs (j)(1) and (j)(2), specify that employers must, to the extent reasonably practicable, clean and maintain workplaces in a manner that prevents vermin infestation. When employers detect vermin, they must implement and maintain an effective vermin-control program.

OSHA has determined that, although the possibility exists for feral cats to pose safety and health hazards for employees, the threat is minor as the cats tend to avoid human contact. Further, stakeholders have expressed concern that including the term “feral cats” in the definition of vermin encourages cruel and unnecessary extermination. OSHA does not believe that removing the term “feral cats” from the definition would reduce worker health and safety, and notes that feral cats may help reduce the presence of other vermin. To the extent feral cats pose a safety or health hazard at any particular shipyard, OSHA would consider the cats to be “other animals” under the standard. Removing a perceived obligation to exterminate feral cats should not have any costs to employers.

#### 911 Emergency Medical Services

OSHA is proposing to revise paragraph (f) in 29 CFR 1926.50—Medical Services and First Aid. Existing § 1926.50(e) requires employers to provide a communication system for contacting ambulance service, or proper equipment for transportation of an injured person. Existing § 1926.50(f) requires the posting of telephone numbers of physicians, hospitals, or ambulances for work sites located in areas where 911 emergency service is not available. OSHA is proposing to retain both of these requirements. The Agency would add to paragraph (f) a requirement that when an employer uses a communication system for

contacting 911 services, the employer must ensure that the communication system can effectively do so, and, if the system is in an area that does not automatically supply the caller's latitude and longitude to the 911 dispatcher, post or otherwise provide to employees the latitude and longitude of the work site or other information that communicates the location of the worksite.

OSHA has preliminarily concluded that this proposed requirement would result in annual costs of \$27,899 until 2019, when the FCC expects enhanced 911 wireless services to be universal, at which time these costs would disappear.

OSHA calculated the burden hours and wage hour costs for employers to post the latitude and longitude of the work site location based on the number of new construction projects started in a given year. To estimate the number of project sites, OSHA reviewed the most recent data provided by request from Dodge Data and Analytics.<sup>33</sup> The Dodge data show a total of 660,469 new construction projects starts in 2012 of which 537,997 were residential buildings, 58,754 were non-residential buildings, and 63,718 were non-buildings. Of the 537,997 residential buildings, 516,363 were single-family homes, 7,388 were two-family houses, and 14,246 were apartments.<sup>34</sup>

OSHA notes that more than one single-family home may be built at a project site. The Agency determined that construction contractors build approximately one-half of single-family houses at single house project sites and the other half at project sites holding multiple single-family homes. As a result, OSHA estimated the number of single-family homes completed at single house project sites in 2012 to be 258,182, and 129,091 to be the total of project sites holding two single family-homes (one-half of single-family houses at single project sites: 516,363/2 =

<sup>33</sup> For the purpose of this section, in conformance with previous ICRs on this provision, OSHA deems the Dodge data to be the best source of information for new construction projects. This stands in contrast to U.S. Census construction data used later in the PEA in the context of Load Limit Posting provision because OSHA is interested in *all* construction projects started, but not necessarily completed, in a given year. While Census construction data provides lists more detailed information on residential housing starts and completions, and total value of construction put in place, it does not provide information on the total number of construction projects started in a given year.

<sup>34</sup> Dodge defines single-family homes as single-family detached, stand-alone units. Single-family attached structures, including such buildings as condominiums and townhomes, are included in Dodge's multi-family category.

258,182; one-half of single-family homes at project sites holding two houses: 258,182/2 = 129,091).

As shown below in Table IV–1, the total number of construction project sites covered by this provision is: 531,379.

TABLE IV–1—ESTIMATED TOTAL CONSTRUCTION SITES IN THE UNITED STATES, 2012

Type of construction site	Total number of construction projects
Non-Residential Buildings ....	58,754
Non-Buildings Construction Projects .....	63,718
Residential Buildings .....	408,907
One Single-Family Home Per Site .....	258,182
Multiple Single-Family Homes Per Site .....	129,091
Multi-Family Residential Buildings .....	21,634
Two-Family Houses .....	7,388
Apartments .....	14,246
<b>Total Construction Sites ....</b>	<b>531,379</b>

In the United States, when a 9–1–1 call is made from a traditional telephone or wireline, the call is routed to a Public Safety Answering Point (PSAP) that is responsible for assisting people in a particular geographic area or community. Depending on the type of 9–1–1 service available, the telephone number of the caller and the location or address of the emergency is either communicated by the caller to the emergency dispatcher (Basic 9–1–1); or automatically displayed to the dispatcher through the use of equipment and database information (Enhanced 9–1–1). According to a 2001 report produced by the RCN Commission and the National Emergency Number Association (NENA) titled, *Report Card to the Nation: The Effectiveness, Accessibility and Future of America's 9–1–1 Service*,<sup>35</sup> wireline 9–1–1 coverage is available to 97.8 percent of the U.S. population; however only 93 percent of all U.S. counties have either Basic or Enhanced wireline 9–1–1 coverage while 7 percent of U.S. counties are without any 9–1–1 services. NENA reported that these areas without any wireline 9–1–1 coverage are primarily rural in character with sparse population and generally high poverty

<sup>35</sup> Report Card to the Nation (RCN)—An RCN Commission was formed by the National Emergency Number Association (NENA) to review and grade the performance of 9–1–1. NENA serves its members and the greater public safety community as the only professional organization solely focused on 9–1–1 policy, technology, operations, and education issues.

levels; as well as inclusive of Native American lands and military installations (NENA, 2001).

In the December 5, 2014 version of the Federal Communications Commission's (FCC) 911 Wireless Service Guide, it was estimated that about 70 percent of 9–1–1 calls were placed from wireless phones (FCC, 2014). The FCC finds using wireless phones create unique challenges for emergency response personnel because wireless or mobile phones are not associated with one fixed location or address. Although the location of the cell site closest to the 9–1–1 caller may provide a general indication of the caller's location, the FCC finds that the information is not always specific enough for rescue personnel to deliver assistance to the caller quickly (FCC, 2014). As a result, the FCC is now requiring wireless service carriers to implement its wireless Enhanced 9–1–1 program which will provide 9–1–1 dispatchers with additional information on wireless 9–1–1 calls. The FCC is allowing the implementation of its wireless Enhanced 9–1–1 program in two parts—Phase I and Phase II. Phase I requires carriers to provide the PSAP with the telephone number of the 9–1–1 wireless caller as well as the location of the cell site or base station transmitting the call. Phase II however, requires carriers to provide more precise information to the PSAP, such as the latitude and longitude of the caller whereby the accuracy of the geographical coordinates must be within 50 to 300 meters of the caller's location (FCC, 2014).

With the implementation of the wireless Enhanced 9–1–1 program, the total number of U.S. counties with 9–1–1 coverage has increased from 93 percent to nearly 97 percent. As of March 2015, NENA reported a total number of 3,135 U.S. counties, which include parishes, independent cities, boroughs and Census areas. Of these counties, 96.9 percent (3,038) of them are now capable of receiving some<sup>36</sup> Phase I location information and 95.7 percent (3,000) are capable of receiving some Phase II. All wireless carriers, however, are expected to comply with Phase II of the FCC's requirements by 2019.<sup>37</sup>

<sup>36</sup> The term "some," as defined by the National Emergency Number Association, means that some or all wireless carriers have implemented either Phase I or Phase II service in the County or the PSAPs. In order for any carrier to provide service, the County or PSAP must be capable of receiving the service. In most cases, all carriers are implemented in a County or PSAP, but one or more may be in the process of completing the implementation. See <http://www.nena.org/?page=911Statistics>.

<sup>37</sup> See 47 CFR 20.18—911 Service

Since all 9–1–1 emergency calls made are routed to a PSAP or call center based on the geographic location in which the call was made, for the purpose of this analysis, OSHA is interested in those U.S. counties where Enhanced 9–1–1 is neither available by wireline nor wireless device. Using the data provided by NENA, OSHA estimates that of the 3,135 recorded U.S. counties, 4.3 percent (135) neither have wireline nor wireless Enhanced 9–1–1 capabilities. By extension, for this analysis, OSHA further assumes that 4.3 percent of all construction project sites (22,849 of 531,379 construction project sites) are located within those counties without wireline and wireless Enhanced 9–1–1 capabilities and would therefore be covered by this provision whereby employers must either post the latitude and longitude of the work site or other location-identification information that effectively communicates the location of the work site to the 9–1–1 emergency medical service dispatcher. The Agency believes this is likely an overestimate of the number of construction sites affected by this provision of the proposal, as construction activity will generally parallel population concentration. Enhanced cell service, in turn, is more concentrated around population centers. NENA estimates that 98.4 percent of the population now has Phase II wireless service; 98.1 percent of PSAPs have Phase II service. The Agency, however, requests comment on this aspect of analysis, as well as the distribution of wireline and wireless service at construction sites.

OSHA estimates that it takes the average construction employee affected by this requirement 3 minutes (.05 hour) to obtain the latitude and longitude of worksite locations, write the information on material, and then to prominently post the information, as required by proposed § 1926.50(f). This would not pose an issue of technological feasibility as the information could be easily downloaded from the Internet before the crew leaves for the site; in the large majority of cases this information should be also be available onsite via common applications for smartphones. The Bureau of Labor Statistics' (BLS) 2013 Occupational Employment Statistics (OES) data indicate that the most common construction occupation is "construction laborer." Partly for that reason, the Agency believes this occupation is most representative of the workers actually posting the latitude and longitude load requirements at construction project sites. Consistent with that, OSHA, based on the OES

data, estimates a wage of \$16.84 per hour for the average affected construction worker (BLS, 2013a). BLS also estimates in their 2013 Employer Cost for Employee Compensation report that employers pay an additional 45 percent in employee benefits,<sup>38</sup> implying a total employer cost for employee compensation of \$24.42 per hour.

Therefore, the estimated annual burden hours and wage hour cost of this proposed requirement are:

*Burden hours:* 22,849 construction project sites  $\times$  .05 hour = 1,142.45 hours.  
*Cost:* 1,142.45 hours  $\times$  \$24.42 = \$27,899.

Based on these costs, OSHA preliminarily determines that the proposed provision is economically feasible. OSHA notes that a member of ACCSH stated that he had seen a firm provide location information at remote sites. (ACCSH Aug. 23, 2013 transcript, p. 85.) As noted previously, the task of communicating relevant site information to rescue services is gradually being made easier by the spread of advanced telecommunications technology, such that in the near future the existing burden should be eliminated. However, OSHA seeks comments on this estimate and how long the costs will remain in effect.

#### Permissible Exposure Limits Table

As discussed in the Summary and Explanation, 29 CFR 1926.55—Gases, Vapors, Fumes, Dusts, and Mists—is the Construction counterpart to 29 CFR 1910.1000—Air Contaminants, which enumerates hundreds of Permissible Exposure Limits (PELs) in its Z tables. Because 29 CFR 1926.55 is not as clear as its General Industry counterpart, OSHA is proposing to update section 1926.55(a) and Appendix A to help clarify the construction PELs. These proposed changes would: (1) Change the term “Threshold Limit Values” to “Permissible Exposure Limits”; (2) eliminate language that sounds advisory; (3) eliminate confusing language; (4) correct several noted errors in Appendix A; and (5) correct cross-references to the asbestos standard. OSHA deems these changes to be simple clarifications which would not change the substantive effect this rule. Therefore, OSHA has preliminarily

concluded that these revisions would not result in changes to the cost or impact of 29 CFR 1926.55; however, OSHA seeks comment on this preliminary conclusion.

#### Process Safety Management of Highly Hazardous Chemicals

OSHA is proposing to replace the regulatory text of its Process Safety Management (PSM) of Highly Hazardous Chemicals construction regulation, § 1926.64, with a cross-reference to the corresponding general industry regulation in 29 CFR 1910.119. The requirements applicable to construction work in 29 CFR 1926.64 are identical to those set forth in 29 CFR 1910.119. This change would only serve to eliminate duplicative regulatory text and as such, OSHA has preliminarily determined that it has no cost.

#### Personal Protective Equipment Fit

OSHA is proposing to amend Section § 1926.95—Criteria for Personal Protective Equipment (PPE), paragraph (c), to clarify that PPE must properly fit each employee. The existing regulatory text states that PPE “shall be of safe design and construction for the work to be performed” and current paragraph (a) states that PPE “shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary. . . .” It is the agency’s opinion that for PPE to provide protection against the hazards for which it is designed, it must fit properly. OSHA views this change as a clarification of the existing language and thus preliminarily determines that it would not increase costs or compliance burdens to employers.

#### Lanyard/Lifeline Break Strength

OSHA is proposing to lower the minimum breaking strength requirement in § 1926.104—Safety Belts, Lifelines and Lanyards, paragraph (c)—from 5,400 pounds to 5,000 pounds. As discussed in the Summary and Explanation of that section, the Agency believes a 5,000 pound requirement would still provide a more than sufficient safety factor. Because this change lowers the minimum requirement, employers would not be required to purchase new equipment. When employers do replace their equipment, they could continue to purchase lifelines with a breaking strength of 5,400 pounds, or with a breaking strength of 5,000 pound. This proposed revision also would bring § 104(c) into conformance with the lanyard and lifeline breaking strength requirement in the Fall Protection standard, at § 1926.502(d)(9). As a

result, OSHA has preliminarily concluded that this change would not add any new compliance costs for employers.

#### Manual on Uniform Traffic Control Devices

Under 29 CFR part 1926 subpart G—Signs, Signals, and Barricades, OSHA requires that employers comply with the mandatory provisions of Part VI of the Manual on Uniform Traffic Control Devices (MUTCD). Currently, employers comply with Part VI when they use one of two versions of MUTCD: the 1988 Edition, Revision 3, September 3, 1993 MUTCD (“1988 Edition”) or the Millennium Edition, December 2000 MUTCD (“Millennium Edition”). Since OSHA’s last published update to subpart G, requiring employers to follow one of the two MUTCD editions above, the Department of Transportation (DOT) has then updated 23 CFR 655.601 through 655.603 to require adherence to the 2009 Edition, November 4, 2009, MUTCD (“2009 Edition”). The Agency is proposing to update subpart G to require employers to follow the MUTCD 2009 Edition.

23 CFR 655.603 states that the MUTCD is the national standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel. It also requires all States, within two years after a new national MUTCD edition is issued or any national MUTCD amendments are made, to adopt the new MUTCD in the State, adopt the national MUTCD with a State Supplement that is in substantial conformance with the new MUTCD, or adopt a State MUTCD that is in substantial conformance with the new MUTCD.

Each State enacts its own laws regarding compliance with standards for traffic control devices in that State. If the State law has adopted a State Supplement or a State MUTCD that the Federal Highway Administration (FHWA) has found to be in substantial conformance with the national MUTCD, then those State requirements are what the local road agencies (as well as the State DOT) must abide by. The exception is traffic control devices installed on a federally aided project, in which case 23 CFR 655.603(d)(2) specifically requires those devices to comply with the national MUTCD before the road can be opened or reopened to the public for unrestricted use.

The Agency believes any employer costs related to incorporating the updated MUTCD reference into subpart G are very limited because, first, the updated DOT rules are already currently

<sup>38</sup> BLS, 2013b. Employer costs for employee benefits (other than wage and salary) were estimated to be 31 percent of total compensation for workers employed in construction. The fringe benefit factor is calculated by  $1/(1 - \text{percent of total compensation attributable to employee benefits, or } 1/(1 - .3) = 1.45$ . Total employer cost for employee compensation is calculated by multiplying the base wages (\$16.84) by the fringe benefits factor (1.45).

in force for all public roads. Second, even in the limited circumstances of construction on private roads, the MUTCD rules are already likely followed. Finally, the changes from the prior editions are minor and could easily be outweighed by eliminating the burden created by having conflicting DOT and OSHA requirements.

Private roads open to public travel are now subject to the same traffic control standards as public streets and highways. However, the FHWA does not require State and/or local highway agencies to have specific authority or enforcement responsibility for traffic control devices on private roads to ensure compliance with the MUTCD. Owners or parties responsible for such private roads are encouraged to bring the traffic control devices into compliance with the MUTCD and other applicable State Manuals, and those who do not may find themselves exposed to increased tort liability. State and local jurisdictions can encourage MUTCD compliance on private roads by incorporating pertinent language into zoning requirements, building and occupancy permits, and similar controls that they exercise over private properties.

As a practical matter, available data on private road construction indicate that it represents a very small portion of total road construction activity. Data from the Census Construction Spending Survey indicate that it represents less than 1 percent of all funds dedicated to highway and street construction (Census, 2014).<sup>39</sup> This leaves a very limited scope of construction signage not already governed by the updated DOT rules.

Since all contractors engaged in construction of public roads are now required to follow the current MUTCD, only those firms that work exclusively on private roads would incur costs associated with this proposal. Contractors that work on both public and private roads should not see an increased burden because they would already need to be in compliance with the MUTCD to work on public roads. Considering that there is pressure, both from a regulatory and liability perspective, for firms that work exclusively on private roads to follow the MUTCD, OSHA believes the total

number of these firms potentially incurring costs as a result of this proposal would be very small. To better understand how often these situations occur, OSHA seeks comment on the number of contractors that work exclusively on private roads and are therefore not required to follow the MUTCD. To the extent that situation occurs, the Agency also seeks comment on the extent to which such contractors already follow the updated MUTCD.

For any firms not already complying with the updated MUTCD, the cost of compliance would be very limited. As explained in the Summary and Explanation, the revisions to the MUTCD make the document more user friendly and account for advances in technology. A comparison of the 1998 and 2009 updates shows fewer and less burdensome new requirements, but more guidance and support material which makes the document easier to use. This proposed change to the OSHA rule should decrease the burden on employers by eliminating confusion as to which edition they must comply with. It would also inform employers that compliance with DOT regulations would not run afoul of outdated OSHA regulations. Most of the new provisions provide more options to employers, which should either increase safety or reduce the burden to employers.

Nonetheless, the Agency has identified two proposed changes in the 2009 Edition that could have a very small cost for those employers doing construction work exclusively on private roads that are not already following the updated MUTCD for these items.

One change is a requirement to use a new symbol and additional sign for a shoulder drop-off. OSHA has estimated that the average price of a shoulder drop-off sign at \$32.74, depending on size and finish. A second change prohibits contractors from relying on hand-signs alone to control traffic. This burden would only apply to a subset of contractors that use flaggers to control traffic (as opposed to something like automated flagger assistance device) and choose to only use hand signals to accomplish this task. Each of these contractors would need to purchase at least one stop sign or flag. OSHA has determined that a flag would cost, on average, \$7.96 each, dependent on size (ERG, 2015).

The number of signs or flags a contractor needs for these situations would presumably be dependent on the number of simultaneous projects that the road construction firm engages in during a typical season, or how large and complex such projects are. While

smaller contractors may be more likely to engage solely in private road operations, larger, more complex projects demanding more equipment would almost certainly fall to larger contractors also employed in public road construction. Considering the very limited number of contractors and situations that would likely be impacted by this proposal, the Agency believes that most of the potentially affected firms would not need more than a handful of either signs or flags. The Agency seeks comment on what the likely impact of these changes would be, both in terms of the number of signs and/or flags potentially affected contractors might need, as well as whether other changes to MUTCD might have a cost associated with them, or ultimately whether the clarity provided by a government-wide reference to a single set of standards may provide a cost savings to employers.

It is not clear whether any firm would incur new costs as a result of this this proposed update to the 2009 Edition, but as shown, any such costs would be very limited in nature and would be an insignificant portion of a contractor's annual profit. OSHA therefore does not believe these changes would have a significant impact to any firm or raise an issue of economic feasibility. The Agency, however, welcomes comment on this preliminary assessment.

#### Load Limit Postings

OSHA is proposing to remove the load limit posting requirement for single family dwellings or townhouses in 29 CFR 1926.250—General Requirements for Storage, paragraph (a)(2). OSHA has preliminarily estimated that removing the requirement for employers to post maximum safe load limits of floors in storage areas when constructing single family dwellings or townhouses would result in a cost savings to employers engaged in these construction activities of approximately \$2,948,715.

OSHA estimates that it takes the average construction employee affected by this requirement 15 minutes (0.25 hours) to develop and post the currently required signs, assuming the information is readily available from current engineering estimates. The Bureau of Labor Statistics' (BLS) 2013 Occupational Employment Statistics (OES) data indicate that the most common construction occupation is "construction laborer." Partly for that reason, the Agency believes this occupation is most representative of the workers actually posting the load limit requirement at such dwellings. Consistent with that, OSHA, based on the OES data, estimates a wage of \$16.84

<sup>39</sup> Since private spending on Highway and Street construction is relatively small in comparison to other categories of spending, it does not appear as a separate item, but can be derived from subtracting Total Public Construction spending on Highway and Street construction from Total Construction spending on Highway and Street construction. 2013 data indicates private spending was well below 1 percent of total spending in this category. This pattern was consistent at least as far back as 2002.

per hour for the average affected construction worker (BLS, 2013a). BLS also estimates in their 2013 Employer Cost for Employee Compensation report that employers pay an additional 45 percent in employee benefits,<sup>40</sup> implying a total employer cost for employee compensation of \$24.42 per hour. According to the U.S. Census, in 2012 there were 483,000 single family houses constructed, including townhouses (Census, 2012).<sup>41</sup> OSHA estimates, that on average, each project would have one storage area, producing one required posting. Using this data, OSHA preliminarily estimates that the yearly burden on employers affected by this proposed revision would be reduced by \$6.105 (\$24.42/hour × 0.25 hours) for a total cost savings of \$2,948,715 (\$6.105 cost per posting × 483,000 single family homes) to the industry. Therefore, the estimated reduction in burden hours and wage hour costs of this proposed requirement are:

*Reduced burden hours:* 483,000

houses × .25 hours = 120,750 hours.

*Reduced cost:* 120,750 hours × \$24.42 = \$2,948,715.

#### Excavation Hazards

In 1989, OSHA updated § 1926.651(j)—Specific Excavation Requirements—Protection of Employees from Loose Rock or Soil, to add the phrase “that could pose a hazard” when referring to loose rock or soil and excavated or other materials or equipment. A number of Administrative Law Judges of the Occupational Safety and Health Review Commission (OSHRC) later ruled that the added phrase in the standard shifts the burden

of determining whether loose rock or soil and excavated or other material or equipment poses a hazard to employees to OSHA, before OSHA can establish a violation. These rulings are inconsistent with what OSHA intended, as the preamble to the 1989 revision does not indicate that OSHA intended to shift the burden when it revised the 1971 provisions, but rather intended to clarify the language of the provisions. Thus, the Agency is proposing to remove the phrase “that could pose a hazard” from § 1926.651(j)(1) and (j)(2).

OSHA believes that this revision would clarify its original intent that the burden is on employers to protect their employees from loose rock or soil and excavated or other materials or equipment, and that OSHA does not have the initial burden of demonstrating the existence of a hazard. Consistent with the Agency’s intent, no estimated costs or cost savings were attributed to this additional language in the 1989 update to the original 1971 rule (54 FR 45894). Hence, OSHA has preliminarily determined that no cost or compliance burdens would be associated with the proposed removal of this language.

#### Decompression Tables

OSHA is proposing to replace the current decompression tables found in Appendix A to subpart S of part 1926—Underground Construction, Caissons, Cofferdams and Compressed Air—with the 1992 French Air and Oxygen decompression tables, which are an updated industry standard, and are therefore preferred over the Agency’s existing tables. The information available to the Agency currently indicates that underground projects which incorporate new tunneling technology have not followed OSHA’s existing decompression tables, but instead, have followed the French or other updated tables. In each case, federal OSHA or a state plan state had been persuaded by the available research and studies that the new decompression methods provide better protection for underground workers and has issued a variance.

Since underground tunneling projects currently already use these proposed tables, OSHA has preliminary determined that the replacement of its existing Decompression Tables in Appendix A to subpart S of part 1926 with the French tables would not result in an increase of cost to affected employers. OSHA seeks comment regarding any establishment that does not currently use the French tables and/or uses any other updated tables. This should provide some relief for employers who currently wish to use

the newer tables, in that they would no longer need to apply for a variance from the Agency. The Agency however, has not quantified a cost savings associated with this reduced burden to employers.

#### Rollover Protective Structures

OSHA is proposing to amend the existing standards in 29 CFR part 1926 subpart W—Rollover Protective Structures; Overhead Protection (§ 1926.1001, 1002, and 1003). The existing standards, which are based on consensus standards from 1970, will be amended to remove the provisions that specify test procedures and performance requirements. The revised provisions will reference the 1970 consensus standards for equipment manufactured prior to the effective date of the final rule. They will also reference the most recent ISO standards: ISO 3471–2008, ISO 5700–2013 and ISO 3449–2005, for new equipment manufactured after the effective date of the final rule. It is OSHA’s understanding that all industries affected by this change are already following the new ISO standards, and therefore has preliminarily concluded that this change would not create any new costs for employers. However, OSHA seeks comments on this conclusion and on current adherence to the ISO standards in the affected industries.

The Agency also proposes to expand the existing regulatory language of § 1926.1000 and 1001 to cover compactors and skid-steer loaders, as telegraphed previously by reserving existing paragraph 1000(a)(2). OSHA believes that this new equipment, as with the equipment currently covered by the existing standard, already adheres to the minimum performance criteria for ROPS as set forth in the recent ISO standards, but seeks further comment. If OSHA is correct about the current compliance for this new equipment, then OSHA preliminarily concludes that this change would not add any new compliance cost to employers. OSHA seeks comments on this issue as well.

#### Underground Construction—Diesel Engine

Existing regulatory language in § 1926.800(k)(10)(ii) requires that mobile diesel-powered equipment used underground comply with the Mine Safety Health Administration’s (MSHA) provisions of 30 CFR part 32. In 1996, MSHA revoked part 32 and replaced it with updated provisions in 30 CFR part 7, subpart E and 30 CFR 75.1909 Non-permissible diesel-powered equipment; design and performance requirements, 75.1910 Non-permissible diesel-

<sup>40</sup> BLS, 2013b. Employer costs for employee benefits (other than wage and salary) were estimated to be 31 percent of total compensation for workers employed in construction. The fringe benefit factor is calculated by  $1/(1 - \text{percent of total compensation attributable to employee benefits, or } 1/(1 - .3) = 1.45$ . Total employer cost for employee compensation is calculated by multiplying the base wages (\$16.84) by the fringe benefits factor (1.45).

<sup>41</sup> In the 911 Emergency Medical Services section of PEA presented earlier, the Agency examined total construction starts, which were estimated using Dodge data. Included within that total were new home starts. However, as has historically been the case when examining the paperwork burden for 29 CFR 1926.250, the Agency is using U.S. Census data rather than the Dodge report. The Dodge report does not include data on townhomes separate from condominiums; townhomes and condominiums are both grouped together in the Dodge report’s multifamily category. For the purposes of analyzing the change to this provision, OSHA needs to be able to separate condominiums from townhomes; the U.S. Census’ definition of a single family homes identically matches the new home constructions that the Agency needs to measure. Therefore, OSHA believes the data provided from the U.S. Census is the best available for analyzing the proposed update to 29 CFR 1926.250(a)(2).

powered equipment; electrical system design and performance requirements, and 75.1911 Fire suppression systems for diesel-powered equipment and fuel transportation units (61 FR 55411). In 2001, MSHA issued 30 CFR 57.5067 to allow engines that meet Environmental Protection Administration (EPA) requirements to be used as an alternative to seeking MSHA approval under part 7, subpart E (66 FR 5706). The Agency proposes to update the regulatory language in § 1926.800(k)(10)(ii) to cross-reference these updated provisions.

If adopted, these changes will allow employers who use diesel-powered engines on mobile equipment in underground construction to use current MSHA procedures to obtain approval plates to affix to the engines or meet or exceed the applicable EPA requirements listed at MSHA Table 57.5067-1, and meet the requirements for other machine features in 30 CFR 75.1909, 75.1910, and 75.1911(a)-(i) for non-permissible diesel-powered engines. Based on available information, OSHA has determined that currently manufactured equipment meets the proposed requirements and are generally compliant with the more stringent EPA Tier 3 and Tier 4 emission requirements (ERG, 2015). The Agency has therefore preliminarily concluded that all applicable new equipment currently available for in the market meets the proposed requirements.

OSHA recognizes that there may be some employers using equipment that predates the newer MSHA standards, and the EPA requirements referenced in them. To avoid the costs of replacing existing equipment in use, the Agency proposes to allow equipment purchased before the effective date of the final rule to continue to comply with the terms of existing § 1926.800(k)(10)(ii) (including having been approved by MSHA under

30 CFR part 32 (1995) or be determined to be equivalent to such MSHA-approved equipment). OSHA solicits comment on the number of engines in use that meet the existing standard but will not meet the requirements of the new MSHA standard and whether continued use of such equipment presents a serious safety or health hazard. OSHA also seeks comment on whether this proposed grandfathering is workable.

The Agency observes that some parts of the updated MSHA regulations have additional requirements, such as the potential need for training on fire suppression systems. However, as discussed in the Summary and Explanation, OSHA proposes to carry over the reference to only *equipment* requirements in the MSHA standards. Therefore, as explained, these other elements of the MSHA standards would not apply here and would therefore carry no cost.

In summary, because diesel equipment manufactured for underground construction apparently conforms with the newer MSHA standards, and the proposal would “grandfather” in existing equipment, the Agency believes employers will not have additional expenses in complying with the this proposed change to the Underground Construction standard. OSHA welcomes comments on this preliminary conclusion.

**Coke Oven Emissions**

Section 1926.1129 regulates exposure to coke oven emissions in construction. In the Summary and Explanation, the point was made that the provisions of this standard do not fit construction work. Therefore OSHA is proposing to delete 29 CFR 1926.1129 (and the reference to it in 29 CFR 1926.55).

An interpretation letter to Mr. Katz from Assistant Secretary Charles Jeffress on June 22, 1999 stated, “We will remove 29 CFR 1926.1129 from OSHA’s

Internet Web site; the standard will be deleted from Part 1926 Code of Federal Regulations, and we [OSHA] will formally notify OSHA field offices that § 1926.1129 is not to be enforced.” Since OSHA is not enforcing § 1926.1129 and it has no applicability to construction, this change will have no cost.

**Removal of Social Security Number Collection Requirements From OSHA’s Standards**

As discussed in the Summary and Explanation, OSHA is proposing to delete the requirements in its standards for employers to use social security numbers to identify employees on exposure monitoring, medical surveillance, and other records. The Agency believes that while this change will help employers to protect their employees from identity theft, it will not impose new costs upon employers. The proposed changes would not require employers to delete social security numbers from existing records, nor would they prohibit employers from continuing to use them to identify employees; employers would simply no longer be required to include employee social security numbers on the records. The Agency believes that these changes have the potential to provide benefits to both employees and employers and potential cost savings, but OSHA has not quantified those potential benefits and savings for this preliminary analysis.

**C. Summary**

OSHA preliminarily concludes that the proposed provisions do not impose costs of any significance on any employer, and therefore concludes that the proposed rule is economically feasible. Table IV-2 provides a brief summary of the cost savings and benefits OSHA estimates would result from the proposed rule.

TABLE IV-2

Item	Cost savings/benefits
<b>Cost Savings</b>	
Remove the load limit posting requirement for single family dwellings or townhouses in § 1926.250 (a)(2).	\$2,948,715.
Remove the requirement for periodic CXR in § 1910.1029, § 1910.1045, and § 1910.1018.	266,697.
Revise paragraph (f) in 29 CFR 1926.50—Medical Services and First Aid.	- 27,899.
Total .....	3,187,513.
Allow digital storage of chest roentgenograms in § 1910.1029, § 1910.1045, § 1910.1018, § 1910.1001, § 1915.1001, § 1926.1101, § 1910.1027, and § 1926.1127.	Reduces storage costs, brings standard up to date, simplifies.

TABLE IV-2—Continued

Item	Cost savings/benefits
<b>Benefits</b>	
Remove the requirement for periodic CXR in § 1910.1029, § 1910.1045, and § 1910.1018.	Reduced radiation, fewer false positives.
Update required pulmonary function testing requirements in § 1910.1043.	Brings OSHA standards up to current technology and medical practices.
Revise decompression tables to require adherence to 1992 French Air and Oxygen Decompression tables in Subpart S of Part 1926.	Better protect employees, reduce cases of decompression illness, bring OSHA standard up to current medical guidelines.

#### D. Regulatory Flexibility Analysis

In accordance with the Regulatory Flexibility Act, 5 U.S.C. 601 *et seq.* (as amended), OSHA examined the regulatory requirements of the proposed rule to determine whether these proposed requirements would have a significant economic impact on a substantial number of small entities. This proposed rule has estimated annual costs of \$27,899 and would lead to approximately \$3.2 million per year in cost savings to regulated entities. Since the costs related to this proposal (from posting location information in limited circumstances) amount to a few dollars per construction project, and are widely dispersed geographically and throughout the industry, the Agency believes the proposed rule does not possess potential to have a significant impact on a substantial number of small entities. The Agency therefore certifies that the proposed rule would not have a significant economic impact on a substantial number of small entities.

#### References

- BLS, 2013a. Bureau of Labor Statistics Occupational Employment Survey. May 2013. BLS Occupational Code: Construction Laborer 47–2061. Found at: <http://www.bls.gov/oes/current/oes472061.htm>.
- BLS, 2013b. Employer Cost for Employee Compensation, December 2013. Economic News Release March 12th 2014. Found at: <http://www.bls.gov/news.release/ecec.106.htm>.
- Census, 2012. U.S. Census Bureau, “Characteristics of New Housing 2012.” Found at: <http://www.census.gov/construction/chars/highlights.html>.
- Census, 2014. U.S. Census Bureau, Construction Spending Survey data, accessed from <http://www.census.gov/econ/currentdata>.
- Dodge Data and Analytics, data run, 2 Penn Plaza New York, New York 10121.
- ERG, 2015. Eastern Research Group, “Supporting Information for Standard Improvement Project 4,” September, 2015.
- FCC, 2014. Federal Communications Commission, “911 Wireless Services Guide,” December 2014.
- NENA, 2001. RCN Commission and the National Emergency Number Association

(NENA), “Report Card to the Nation: The Effectiveness, Accessibility and Future of America’s 9–1–1 Service,” September 2001. Found at: [https://c.yimcdn.com/sites/www.nena.org/resource/collection/7F122EC0-BC5A-46DD-9A65-B39A035E87D5/NENA\\_Report\\_to\\_the\\_Nation\\_1.pdf](https://c.yimcdn.com/sites/www.nena.org/resource/collection/7F122EC0-BC5A-46DD-9A65-B39A035E87D5/NENA_Report_to_the_Nation_1.pdf).

OSHA, 1989. U.S. Department of Labor, Occupational Safety and Health Administration, Office of Regulatory Analysis. *Regulatory Impact and Regulatory Flexibility Analysis of 29 CFR 190.147 (The Control of Hazardous Energy Sources—Lockout/Tagout)* August, 1989. Found at: <http://www.regulations.gov/#!documentDetail;D=OSHA-S012A-2006-0642-0266>.

#### V. Legal Considerations

The purpose of the Occupational Safety and Health Act of 1970 (OSH Act; 29 U.S.C. 651 *et al.*) 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 and enforce occupational safety and health standards; authorized summary adoption of existing national consensus and established Federal standards within two years of the effective date of the OSH Act (29 U.S.C. 655(a)); authorizing promulgation of standards pursuant to notice and comment (29 U.S.C. 655(b)); and required employers to comply with OSHA standards (29 U.S.C. 654(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)). A standard is reasonably necessary or appropriate within the meaning of Section 652(8) if it substantially reduces or eliminates significant risk. In addition, it must be technologically and economically feasible, cost effective, and consistent with prior Agency action, or a justified departure. A

standard must be supported by substantial evidence, and be better able to effectuate the OSH Act’s purposes than any national consensus standard it supersedes. (See 58 FR 16612–16616, March 30, 1993.)

A standard is technologically feasible if the protective measures it requires already exist, can be brought into existence with available technology, or can be created with technology that can reasonably be expected to be developed. (See *American Textile Mfrs. Institute v. OSHA*, 452 U.S. 490, 513 (1981) (ATMI); *American Iron and Steel Institute v. OSHA*, 939 F.2d 975, 980 (D.C. Cir. 1991) (AISI).)

A standard is economically feasible if industry can absorb or pass on the costs of compliance without threatening its long-term profitability or competitive structure. See ATMI, 452 U.S. at 530 n. 55; AISI, 939 F.2d at 980. A standard is cost effective if the protective measures it requires are the least costly of the available alternatives that achieve the same level of protection. ATMI, 452 U.S. at 514 n. 32; *International Union, UAW v. OSHA*, 37 F.3d 665, 668 (D.C. Cir. 1994) (LOTO II). Section 6(b)(7) of the OSH Act authorizes OSHA to include among a standard’s requirements labeling, monitoring, medical testing, and other information-gathering and transmittal provisions. (29 U.S.C. 655(b)(7).) OSHA safety standards also must be highly protective. (See 58 FR at 16614–16615; LOTO II, 37 F.3d at 668–669.) Finally, whenever practical, standards shall “be expressed in terms of objective criteria and of the performance desired.” (29 U.S.C. 655(b)(5).)

#### VI. OMB Review Under the Paperwork Reduction Act of 1995

##### A. Overview

The purposes of the Paperwork Reduction Act 1995 (PRA), 44 U.S.C. 3501 *et seq.*, include enhancing the quality and utility of information the Federal government requires and minimizing the paperwork and reporting burden on affected entities. The PRA requires certain actions before

an agency can adopt or revise a collection of information (paperwork), including publishing a summary of the collection of information and a brief description of the need for and proposed use of the information. PRA defines “collection of information” as “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 PRA, a Federal agency may not conduct or sponsor a collection of information unless it is approved by OMB under the PRA, and displays a currently valid OMB control number, and the public is not required to respond to a collection of information unless it displays a currently valid OMB control number (44 U.S.C. 3507). Also, notwithstanding any other provisions of law, no person 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).

The Standards Improvement Project-Phase IV (SIP-IV) proposal would modify a number of Information Collections currently approved by the

Office of Management and Budget (OMB) under the PRA.

*B. Solicitation of Comments*

Concurrent with publication of this proposed rule, the Department is submitting a series of Information Collection Requests (ICRs) to revise the collections in accordance with this NPRM, as required by the PRA. See 44 U.S.C. 3507(d). Some of these revisions, if adopted, would result in changes to the existing burden hour and/or cost estimates. Other revisions may be less significant and would not change the ICR burden hour and cost estimates.<sup>42</sup>

The Agency solicits comments on the information collection requirements contained in this NPRM. The Agency is particularly interested in comments on the collections of information requirements that:

- Evaluate whether the proposed collection of information requirements are necessary for the proper performance of the Agency’s functions, including whether the information is useful;
- Evaluate the accuracy of OSHA’s estimate of the burden (time and cost) of the information collection requirements, including the validity of the methodology and assumptions used;

- Enhance the quality, utility, and clarity of the information collected; and
- Minimize the compliance burden on employers, for example, by using automated or other technological techniques for collecting and transmitting information.

*C. Proposed Revisions to the Collection of Information Requirements*

As required by 5 CFR 1320.5(a)(1)(iv) and 1320.8(d)(2), the following paragraphs provide information about the ICRs, including the changes in burden associated with the proposed revisions to information collection requirements.

1. *Title:* Standards Improvement Project-Phase IV (SIP-IV)
2. *Description of revisions to the ICRs:* The SIP-IV proposal adds, removes, or revises collection of information requirements, as further explained in Table 1(a) that identifies those ICRs where the proposal will change burden hours and costs. For those ICRs, Table 1(b) itemizes the responses, frequencies, time, burden hours, and cost as a result of the program change. Table 2 identifies those ICRs where the proposal will add to or revise the text of standards, but do not result in a burden or cost change as result.

TABLE 1(a)—ICRS WITH PROPOSED BURDEN HOUR CHANGES

ICR title	OMB control No.	Provisions being modified
Coke Oven Emissions (29 CFR 1910.1029).	1218–0128	OSHA is proposing to remove the requirement for periodic chest x-rays as part of the medical exams for employees. In addition, OSHA is proposing to add the option of digital radiography to its existing standards because digital radiography systems are rapidly replacing traditional analog film-based systems in medical facilities.
Acrylonitrile (29 CFR 1910.1045) .....	1218–0126	OSHA is proposing to remove the requirement for periodic chest x-rays as part of the medical exams for employees. OSHA is proposing to add the option of digital radiography to its existing standards because digital radiography systems are rapidly replacing traditional analog film-based systems in medical facilities.
Inorganic Arsenic (29 CFR 1910.1018) ....	1218–0104	OSHA is proposing to remove the requirement for periodic chest x-rays as part of the medical exams for employees. OSHA is proposing to add the option of digital radiography to its existing standards because digital radiography systems are rapidly replacing traditional analog film-based systems in medical facilities.
Construction Standards on Posting Emergency Telephone Numbers and Floor Load Limits (29 CFR 1926.50 and 29 CFR 1926.250).	1218–0093	OSHA is proposing to add to 29 CFR 1926.50(f) a requirement that when an employer uses a communication system for contacting 911 services, if the communication system is in an area that does not automatically supply the caller’s latitude and longitude to the 911 dispatcher, the employer must post or otherwise provide to employees the latitude and longitude of the work site or other information that communicates the location of the worksite. In addition, OSHA is proposing to remove the load limit posting requirement for single family dwellings or townhouses in 29 CFR 1926.250.

<sup>42</sup>The proposal would revise to existing standard provisions that are not collections of information. These revisions are not addressed in this preamble section. However some revisions will modify

language contained in a currently OMB approved information collection (paperwork analysis), though they will not change burden hour or cost estimates. These information collections, referenced by OMB

Control number, are included in this section since the Agency will prepare and submit an ICR to OMB to incorporate the revised language into the existing information collection.

TABLE 1(b)—ESTIMATED BURDEN HOURS AND COST

ICR Title and paragraph modified	OMB control No.	Number of respondents	Number of responses	Frequency per response	Average time per response (hours)	Estimated burden hour /program change	Estimated cost (capital-operation and maintenance) change
Coke Oven Emissions (29 CFR 1910.1029) (§ 1910.1029(j))	1218–0128	2,324	2,324	Annual .....	1.42	– 581	– \$159,008
Acrylonitrile (29 CFR 1910.1045) (§ 1910.1045(n)) .....	1218–0126	467	467	Annual .....	1.25	– 117	– 31,952
Inorganic Arsenic (29 CFR 1910.1018) (§ 1910.1018(n)) .....	1218–0104	792	792	Annual .....	1.42	– 198	– 54,188
Construction Standard on Posting Emergency Telephone Numbers (29 CFR 1926.50) <sup>43</sup> (§ 1926.50(f)).	1218–0093	22,849	22,849	Annual .....	.05	1,142	27,899
Construction Standard on Floor Load Limits (29 CFR 1926.250) (§ 1926.250 (a)).	1218–0093	483,000	483,000	Annual .....	0.25	– 120,750	– 2,948,715
Grand Total .....	.....	509,432	509,432	.....	.....	– 120,504	– 3,165,964

TABLE 2—ICRs WITH NO PROPOSED BURDEN HOUR CHANGES

ICR title	OMB control No.	Provisions being modified
Asbestos in General Industry (29 CFR 1910.1001).	1218–0133	OSHA is proposing to add the option of digital radiography to its existing standards because digital radiography systems are rapidly replacing traditional analog film-based systems in medical facilities.
Asbestos in Construction (29 CFR 1926.1101).	1218–0134	OSHA is proposing to add the option of digital radiography to its existing standards because digital radiography systems are rapidly replacing traditional analog film-based systems in medical facilities.
Asbestos in Shipyards (29 CFR 1915.1001).	1218–0195	OSHA is proposing to add the option of digital radiography to its existing standards because digital radiography systems are rapidly replacing traditional analog film-based systems in medical facilities.
Cadmium in Construction (29 CFR 1926.1127).	1218–0186	OSHA is proposing to add the option of digital radiography to its existing standards because digital radiography systems are rapidly replacing traditional analog film-based systems in medical facilities.
Cadmium in General Industry (29 CFR 1910.1027).	1218–0185	OSHA is proposing to add the option of digital radiography to its existing standards because digital radiography systems are rapidly replacing traditional analog film-based systems in medical facilities.
Cotton Dust (29 CFR 1910.1043).	1218–0061	OSHA is proposing to revise paragraph (h) and Appendix D of its Cotton Dust standard. Many of the revisions are simply editorial, to clarify existing language, as well as to update outdated pulmonary function measurements. OSHA is also proposing to update paragraph (h)(2)(iii) to require a determination of the FEV1/FVC ration, and the evaluation of FEV1, FVC, and FEV1/FVC against the lower limit of normal (LLN) for each race/ethnic group, by age, which is consistent with generally accepted practices.

This proposal will also have an impact on the provisions in OSHA’s standards that currently require employers to include employee SSNs on exposure monitoring, medical surveillance, and other records. As explained above in the *Summary and Explanation of the Proposed Rule* section (see Section III.B.17.), the

Agency previously considered stakeholder comments regarding the SSN collection requirements in OSHA’s standards during the SIP II (70 FR 1112, January 5, 2005) and Respirable Crystalline Silica (81 FR 16285, March 25, 2016) rulemakings. Eliminating SSN collection requirements from OSHA’s standards will affect several of the ICRs

covered under the PRA. Table 3 shows the control number, title, and paragraph or appendix modified for each of the ICRs that will be affected. The agency believes removing the social security numbers will have no measureable impact on employer burden.

TABLE 3—ICRs AFFECTED BY SOCIAL SECURITY REMOVAL

OMB control No.	Title	Paragraph/appendix modified
1218–0202 .....	Hazardous Waste Operations and Emergency Response for General Industry (29 CFR 1910.120) and Construction (29 CFR 1926.65).	1910.120(f)(8)(ii)(A), 1926.65(f)(8)(ii)(A).
1218–0133 .....	Asbestos in General Industry (29 CFR 1910.1001) .....	1910.1001(m)(1)(ii)(F), 1910.1001(m)(3)(ii)(A), Appendix D.
1218–0010 .....	Vinyl Chloride Standard (29 CFR 1910.1017) .....	1910.1017(m)(1).
1218–0104 .....	Inorganic Arsenic (29 CFR 1910.1018) .....	1910.1018(q)(1)(ii)(D), 1910.1018(q)(2)(ii)(A).

<sup>43</sup> Both 29 CFR 1926.50 and 1926.250 are covered by the same ICR, 1218–0093.

TABLE 3—ICRS AFFECTED BY SOCIAL SECURITY REMOVAL—Continued

OMB control No.	Title	Paragraph/appendix modified
1218–0092	Lead Standard in General Industry (29 CFR 1910.1025)	1910.1025(d)(5), 1910.1025(n)(1)(ii)(D), 1910.1025(n)(2)(ii)(A), 1910.1025(n)(3)(ii)(A), Appendix B.
1218–0252	Hexavalent Chromium Standards for General Industry (29 CFR 1910.1026), Shipyard Employment (29 CFR 1915.1026), and Construction (29 CFR 1926.1126).	1910.1026(m)(1)(ii)(F), 1910.1026(m)(4)(ii)(A), 1915.1026(k)(1)(ii)(F), 1915.1026(k)(4)(ii)(A), 1926.1126(k)(1)(ii)(F), 1926.1126(k)(4)(ii)(A).
1218–0185	Cadmium in General Industry Standard (29 CFR 1910.1027)	1910.1027(n)(1)(ii)(B), 1910.1027(n)(3)(ii)(A), Appendix D.
1218–0129	Benzene (29 CFR 1910.1028)	1910.1028(k)(1)(ii)(D), 1910.1028(k)(2)(ii)(A).
1218–0128	Coke Oven Emissions (29 CFR 1910.1029)	1910.1029(m)(1)(i)(a), 1910.1029(m)(2)(i)(a).
1218–0180	Bloodborne Pathogens Standard (29 CFR 1910.1030)	1910.1030(h)(1)(ii)(A).
1218–0061	Cotton Dust (29 CFR 1910.1043)	1910.1043(k)(1)(ii)(C), 1910.1043(k)(2)(ii)(A), Appendices B–I, B–II, B–III.
1218–0101	1,2-Dibromo-3-Chloropropane (DBCP) Standard (29 CFR 1910.1044)	1910.1044(p)(1)(ii)(d), 1910.1044(p)(2)(ii)(a).
1218–0126	Acrylonitrile Standard (29 CFR 1910.1045)	1910.1045(q)(2)(ii)(D).
1218–0108	Ethylene Oxide (EtO) Standard (29 CFR 1910.1047)	1910.1047(k)(2)(ii)(F), 1910.1047(k)(3)(ii)(A).
1218–0145	Formaldehyde Standard (29 CFR 1910.1048)	1910.1048(o)(1)(vi), 1910.1048(o)(3)(i), 1910.1048(o)(4)(ii)(D), Appendix D.
1218–0184	4,4'-Methylenedianiline (MDA) for General Industry (29 CFR 1910.1050)	1910.1050(n)(3)(ii)(D), 1910.1050(n)(4)(ii)(A), 1910.1050(n)(5)(ii)(A).
1218–0170	1,3-Butadiene Standard (29 CFR 1910.1051)	1910.1051(m)(2)(ii)(F), 1910.1051(m)(4)(ii)(A), Appendix F.
1218–0179	Methylene Chloride (29 CFR 1910.1052)	1910.1052(m)(2)(ii)(F), 1910.1052(m)(2)(iii)(C), 1910.1052(m)(3)(ii)(A), Appendix B.
1218–0266	Respirable Crystalline Silica Standards for General Industry, Shipyard Employment and Marine Terminals (29 CFR 1910.1053) and Construction (29 CFR 1926.1153) 1910.1053(k)(1)(ii)(G), 1910.1053(k)(3)(ii)(A), 1926.1153(j)(1)(ii)(G), 1926.1153(j)(3)(ii)(A).	
1218–0195	Asbestos in Shipyards Standard (29 CFR 1915.1001)	1915.1001(n)(2)(ii)(F), 1915.1001(n)(3)(ii)(A), Appendix D.
1218–0134	Asbestos in Construction (29 CFR 1926.1101)	1926.1101(n)(2)(ii)(F), 1926.1101(n)(3)(ii)(A), Appendix D.
1218–0186	Cadmium in Construction Standard (29 CFR 1926.1127)	1926.1127(d)(2)(iv), 1926.1127(n)(1)(ii)(B), 1926.1127(n)(3)(ii)(A).
1218–0183	4,4'-Methylenedianiline (MDA) in Construction (29 CFR 1926.60)	1926.60(o)(4)(ii)(F), 1926.60(o)(5)(ii)(A).
1218–0189	Lead in Construction Standard (29 CFR 1926.62)	1926.62(d)(5), 1926.62(n)(1)(ii)(D), 1926.62(n)(2)(ii)(A), 1926.62(n)(3)(ii)(A), Appendix B.

In addition to the above-described changes, the Agency will make adjustments to the some of the ICRs to reflect on-going PRA interpretations that will result in changes to the burden hours and costs; these changes are not a result of this rulemaking.

**D. Submitting Comments**

Members of the public who wish to comment on 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 DOL–OSHA, Office of Management and Budget, Room 10235, Washington, DC 20503. You may also submit comments

to OMB by email at *OIRA\_submission@omb.eop.gov*. Please reference the ICR’s OMB control number in order to help ensure proper consideration. The Agency encourages commenters also to submit their comments on these paperwork requirements to the rulemaking docket (Docket Number OSHA–2012–0007), 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** notice titled **DATES** and **ADDRESSES**.

**E. Docket and Inquiries**

To access the docket to read or download comments and other materials related to these paperwork determination, including the ICR (containing the Supporting Statement with attachments describing the paperwork determinations in detail) use the procedures described under the section of this notice titled **ADDRESSES**. You also may obtain an electronic copy of the complete ICRs 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 Mr. Todd Owen, Directorate of Standards and Guidance, OSHA, Room N-3609, U.S. Department of Labor, 200 Constitution Avenue NW., Washington, DC 20210; telephone (202) 693-2222.

## VII. Federalism

OSHA reviewed this proposed rule in accordance with the Executive Order on Federalism (Executive Order 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 authority exists and the problem is national in scope. Executive Order 13132 provides for preemption of State law only with the expressed consent of Congress. Agencies must limit any such preemption to the extent possible.

Under Section 18 of the OSH Act, Congress expressly provides that States may adopt, with Federal approval, a plan for the development and enforcement of occupational safety and health standards; States that obtain Federal approval for such a plan are referred to 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.

While OSHA drafted this proposed rule to protect employees in every State, Section 18(c)(2) of the OSH Act permits State Plan States and Territories to develop and enforce their own standards, provided the requirements in these standards are at least as safe and healthful as the requirements specified in this proposed rule.

In summary, this proposed rule complies with Executive Order 13132. In States without OSHA-approved State Plans, any standard developed from this proposed rule 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 Plans

When Federal OSHA promulgates a new standard or a 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 revise their standards to

reflect the new standard or amendment. The State standard must be at least as effective as the final Federal standard or amendment, and must be promulgated within six months of the publication date of the final Federal rule (29 U.S.C. 667(c)(2); 29 CFR 1953.5(a)).

A State-Plan State may demonstrate that a standard change is unnecessary because the State standard is already the same as or at least as effective as the new or amended Federal standard. In order to avoid delays in worker protection, the effective date of the State standard and any of its delayed provisions must be the date of State promulgation or the Federal effective date, whichever is later. The Assistant Secretary may permit a longer time period if the State timely demonstrates that good cause exists for extending the time limitation (29 CFR 1953.5(a)). Of the 28 States and territories with OSHA-approved State plans, 22 cover public and private-sector employees: 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. Six States and territories cover only public-sector employees: Connecticut, Illinois, Maine, New Jersey, New York, and the Virgin Islands.

When OSHA promulgates a new standard or amendment that does not impose additional or more stringent requirements than the existing standard, State Plan States are not required to amend their standards, although OSHA may encourage them to do so.

OSHA concludes that this final rule, by revising confusing, outdated, duplicative, or inconsistent standards, will increase the protection afforded to employees while reducing the compliance burden of employers. Therefore, States and Territories with approved State Plans must adopt comparable amendments to their standards within six months of the promulgation date of this rule unless they demonstrate that such amendments are not necessary because their existing standards are at least as effective in protecting workers as this final rule.

## IX. Unfunded Mandates Reform Act of 1995

OSHA reviewed this proposed rule in accordance with the Unfunded Mandates Reform Act of 1995 (UMRA; 2 U.S.C. 1501 *et seq.*) and Executive Order 12875 (56 FR 58093). As discussed in section IV (“Preliminary Economic Analysis and Regulatory Flexibility Act Certification”) of this notice, the Agency determined that this

proposed rule has one revision with estimated annual new costs of \$27,899, but all proposed revisions would result in approximately \$3.2 million per year in overall (net) cost savings to regulated entities.

As noted under section VIII (“State Plans”) of this notice, the Agency’s standards do not apply to State and local governments except in States that elect voluntarily to adopt a State Plan approved by the Agency. Consequently, this proposed rule 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 proposed rule does not mandate that State, local, or tribal governments adopt new, unfunded regulatory obligations, or increase expenditures by the private sector of more than \$100 million in any year.

## X. Review by the Advisory Committee for Construction Safety and Health

OSHA must consult with the ACCSH whenever the Agency proposes a rulemaking that involves the occupational safety and health of construction employees (29 CFR 1911.10, 1912.3). Accordingly, prior to the dates of meetings listed below, OSHA distributed to the ACCSH members for their review, a copy of the proposed revisions that applied to construction, as well as a brief summary and explanation of these revisions. At the regular meetings on December 15–16, 2011, May 10–11 2012, November 29, 2012, March 18, 2013, May 23, 2013, August 22, 2013, May 7–8 2014, December 3–4, 2014, and December 2, 2015, OSHA staff made presentations to the ACCSH members that summarized the material provided to them earlier, and then responded to their questions. The ACCSH subsequently recommended that OSHA publish the proposal.

## XI. Public Participation

### A. Submission of Comments and Access to the Docket

OSHA invites comments on the proposed revisions described, and the specific issues raised, in this notice. These comments should include supporting information and data. OSHA will carefully review and evaluate these comments, information, and data, as well as any other information in the rulemaking record, to determine how to proceed.

When submitting comments, parties must follow the procedures specified in the previous sections titled **DATES** and

**ADDRESSES.** The comments must provide the name of the commenter and docket number. The comments also should identify clearly the provision of the proposal each comment is addressing, the position taken with respect to the proposed provision or issue, and the basis for that position. Comments, along with supporting data and references, submitted on or before the end of the specified comment period will become part of the proceedings record, and will be available for public inspection and copying at <http://www.regulations.gov>.

**B. Requests for an Informal Public Hearing**

Under section 6(b)(3) of the OSH Act and 29 CFR 1911.11, members of the public may request an informal public hearing by following the instructions under the section of this **Federal Register** notice titled **ADDRESSES**. Hearing requests must include the name and address of the party requesting the hearing, and submitted (e.g., postmarked, transmitted, sent) on or before December 5, 2016. All submissions must bear a postmark or provide other evidence of the submission date.

**List of Subjects**

*29 CFR Part 1904*

Recordkeeping.

*29 CFR Part 1910*

Chest X-ray requirements, Incorporation by reference, Lockout/tagout, Pulmonary-function testing, Reporting and recordkeeping requirements.

*29 CFR Part 1915*

Chest X-ray requirements, Reporting and recordkeeping requirements, Sanitation.

*29 CFR Part 1926*

Airborne contaminants, Construction, Chest X-ray requirements, Coke oven emissions, Diesel equipment, Decompression table, Excavations, Emergency services, Incorporation by reference, Lanyards, Load limits, Manual on Uniform Traffic Control Devices (MUCTD), Personal protective equipment, Process safety management, Reporting and recordkeeping requirements, Roll-over protective structures (ROPs).

**Authority and Signature**

David Michaels, Ph.D., MPH, Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, authorized the preparation of this notice pursuant to

Sections 4, 6, and 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657), 29 CFR part 1911, and Secretary's Order 1-2012 (77 FR 3912).

Signed at Washington, DC, on August 10, 2016.

**David Michaels,**

*Assistant Secretary of Labor for Occupational Safety and Health.*

**Proposed Amendments to Standards**

For the reasons stated in the preamble of this proposed rule, the Occupational Safety and Health Administration is proposing to amend 29 CFR parts 1904, 1910, 1915, and 1926 as set forth below:

**PART 1904—RECORDING AND REPORTING OCCUPATIONAL INJURIES AND ILLNESSES**

- 1. Revise the authority citation for part 1904 to read as follows:

**Authority:** 29 U.S.C. 657, 658, 660, 666, 669, 673, Secretary of Labor's Orders No. 3-2000 (65 FR 50017) and 1-2012 (77 FR 3912), as applicable, and 5 U.S.C. 553.

**Subpart C—Recordkeeping Forms and Recording Criteria**

- 2. Revise paragraph (b)(6) of § 1904.10 to read as follows:

**§ 1904.10 Recording criteria for cases involving occupational hearing loss.**

\* \* \* \* \*

(b) \* \* \*

(6) *If a physician or other licensed health care professional determines the hearing loss is not work-related, do I still need to record the case?* If a physician or other licensed health care professional determines, following the rules set out in § 1904.5, that the hearing loss is not work-related or that occupational noise exposure did not significantly aggravate the hearing loss, you do not have to consider the case work-related or record the case on the OSHA 300 Log.

\* \* \* \* \*

**PART 1910—OCCUPATIONAL SAFETY AND HEALTH STANDARDS**

- 3. The authority section for part 1910 continues to read as follows:

**Authority:** 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 31159), 4-2010 (75 FR 55355), or 1-2012 (77 FR 3912), as applicable.

Sections 1910.6, 1910.7, 1910.8, and 1910.9 also issued under 29 CFR 1911. Section 1910.7(f) also issued under 31 U.S.C. 9701, 29 U.S.C. 9a, 5 U.S.C. 553; Public Law 106-113 (113 Stat. 1501A-222); Public Law 11-8 and 111-317; and OMB Circular A-25

(dated July 8, 1993) (58 FR 38142, July 15, 1993).

**Subpart A—General**

- 4. Add paragraphs (aa) and (bb) to § 1910.6 to read as follows:

**§ 1910.6 Incorporation by reference.**

\* \* \* \* \*

(aa) The following material is available for purchase at the American Thoracic Society (ATS), 25 Broadway, 18th Floor New York, NY 10004; Web site: <http://www.atsjournals.org/>.

(1) Spirometric Reference Values from a Sample of the General U.S. Population. Hankinson JL, Odencrantz JR, Fedan KB. American Journal of Respiratory and Critical Care Medicine, 159(1):179-187, January 1999, IBR approved for § 1910.1043(h).

(2) [Reserved]

(bb) The following material is available for purchase from the International Labour Organization (ILO), 4 route des Morillons, CH-1211 Genève 22, Switzerland; telephone: +41 (0) 22 799 6111; fax: +41 (0) 22 798 8685; Web site: <http://www.ilo.org/>.

(1) Guidelines for the Use of the ILO International Classification of Radiographs of Pneumoconioses, Revised Edition 2011, Occupational safety and health series; 22 (Rev.2011), IBR approved for § 1910.1001, Appendix E.

(2) [Reserved]

**Subpart J—General Environmental Controls**

- 5. The authority section for subpart J continues to read as follows:

**Authority:** 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), 5-2007 (72 FR 31159), 4-2010 (75 FR 55355), or 1-2012 (77 FR 3912), as applicable.

- 6. Amend § 1910.147 by:

- a. Revising paragraphs (a)(1)(i), (a)(2)(iii)(A), and (a)(3)(i);
  - b. Revising the definition of "Servicing and/or maintenance" in paragraph (b);
  - c. Revising paragraphs (c)(1) and (c)(4)(i) note;
  - d. Revising paragraph (f)(4);
  - e. Revising Appendix A.
- The revisions read as follows:

**§ 1910.147 The control of hazardous energy (lockout/tagout).**

(a) \* \* \*

(1) \* \* \*

(i) This standard covers the servicing and maintenance of machines and equipment in which the energization or

startup of the machines or equipment, or release of stored energy could cause injury to employees. This standard establishes minimum performance requirements for the control of such hazardous energy.

\* \* \* \* \*

(2) \* \* \*  
(iii) \* \* \*

(A) Work on cord and plug connected electric equipment for which exposure to the hazards of energization or startup of the equipment is controlled by the unplugging of the equipment from the energy source and by the plug being under the exclusive control of the employee performing the servicing or maintenance.

\* \* \* \* \*

(3) \* \* \*

(i) This section requires employers to establish a program and utilize procedures for affixing appropriate lockout devices or tagout devices to energy isolating devices, and to otherwise disable machines or equipment to prevent energization, startup or release of stored energy in order to prevent injury to employees.

\* \* \* \* \*

(b) \* \* \*

*Servicing and/or maintenance.*

Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines

or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the energization or startup of the equipment or release of hazardous energy.

\* \* \* \* \*

(c) \* \* \*

(1) *Energy control program.* The employer shall establish a program consisting of energy control procedures, employee training and periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the energizing, startup or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source and rendered inoperative.

\* \* \* \* \*

(4) \* \* \*

(i) \* \* \*

**Note: Exception:** The employer need not document the required procedure for a particular machine or equipment, when all of the following elements exist: (1) The machine or equipment has no potential for stored or residual energy or reaccumulation of stored energy after shut down which could endanger employees; (2) the machine or equipment has a single energy source which can be readily identified and isolated; (3) the isolation and locking

out of that energy source will completely deenergize and deactivate the machine or equipment; (4) the machine or equipment is isolated from that energy source and locked out during servicing or maintenance; (5) a single lockout device will achieve a locked-out condition; (6) the lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance; (7) the servicing or maintenance does not create hazards for other employees; and (8) the employer, in utilizing this exception, has had no accidents involving the activation or reenergization of the machine or equipment during servicing or maintenance.

\* \* \* \* \*

(f) \* \* \*

(4) *Shift or personnel changes.*

Specific procedures shall be utilized during shift or personnel changes to ensure the continuity of lockout or tagout protection, including provision for the orderly transfer of lockout or tagout device protection between off-going and oncoming employees, to minimize exposure to hazards from the energization or startup of the machine or equipment, or the release of stored energy.

\* \* \* \* \*

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**APPENDIX A TO §1910.147—TYPICAL MINIMAL LOCKOUT PROCEDURE***General*

The following simple lockout procedure is provided to assist employers in developing their procedures so they meet the requirements of this standard. When the energy isolating devices are not lockable, tagout may be used, provided the employer complies with the provisions of the standard which require additional training and more rigorous periodic inspections. When tagout is used and the energy isolating devices are lockable, the employer must provide full employee protection (*see* paragraph (c)(3)) and additional training and more rigorous periodic inspections are required. For more complex systems, more comprehensive procedures may need to be developed, documented and utilized.

*Lockout Procedure*

Lockout procedure for

---

(Name of Company for single procedure or identification of equipment if multiple procedures are used)

*Purpose*

This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the energization or start-up of the machine or equipment or release of stored energy could cause injury.

---

*Compliance with This Program*

All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize or use that machine or equipment.

---

Type of compliance enforcement to be taken for violation of the above.

*Sequence of Lockout*

(1) Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance.

---

Name(s)/Job Title(s) of affected employees and how to notify.

(2) The authorized employee shall refer to the company procedure to identify the type and magnitude of the energy that the machine or equipment utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy.

---

Type(s) and magnitude(s) of energy, its hazards and the methods to control the energy.

(3) If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop button, open switch, close valve, etc.).

---

Type(s) and location(s) of machine or equipment operating controls.

(4) De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s).

---

Type(s) and location(s) of energy isolating devices.

(5) Lock out the energy isolating device(s) with assigned individual lock(s).

(6) Stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.

---

Type(s) of stored energy—methods to dissipate or restrain.

(7) Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other normal operating control(s) or by testing to make certain the equipment will not operate.

CAUTION: Return operating control(s) to neutral or “off” position after verifying the isolation of the equipment.

---

Method of verifying the isolation of the equipment.

(8) The machine or equipment is now locked out.

*Restoring Equipment to Service.* When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken.

(1) Check the machine or equipment and the immediate area around the machine or equipment to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.

(2) Check the work area to ensure that all employees have been safely positioned or removed from the area.

(3) Verify that the controls are in neutral.

(4) Remove the lockout devices and reenergize the machine or equipment.

**Note:** The removal of some forms of blocking may require reenergization of the machine before safe removal.

(5) Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

#### Subpart Z—Toxic and Hazardous Substances

■ 7. Revise the authority citation for subpart Z to read as follows:

**Authority:** Sections 4, 6, and 8 of the Occupational Safety and Health Act of 1970 (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), or 5-2007 (72 FR 31159), 4-2010 (75 FR 55355) or 1-2012 (77 FR 3912), as applicable; and 29 CFR part 1911.

All of subpart Z issued under section 6(b) of the Occupational Safety and Health Act of 1970, except those substances that have exposure limits listed in Tables Z-1, Z-2, and Z-3 of 29 CFR 1910.1000. The latter were issued under section 6(a) (29 U.S.C. 655(a)).

Section 1910.1000, Tables Z-1, Z-2 and Z-3 also issued under 5 U.S.C. 553, but not under 29 CFR part 1911 except for the arsenic (organic compounds), benzene, cotton dust, and chromium (VI) listings.

Section 1910.1001 also issued under section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704) and 5 U.S.C. 553.

Section 1910.1002 also issued under 5 U.S.C. 553, but not under 29 U.S.C. 655 or 29 CFR part 1911.

Sections 1910.1018, 1910.1029, and 1910.1200 also issued under 29 U.S.C. 653.

Section 1910.1030 also issued under Pub. L. 106-430, 114 Stat. 1901.

Section 1910.1201 also issued under 49 U.S.C. 1801-1819 and 5 U.S.C. 553.

- 8. Amend § 1910.1001 by:
  - a. Revising paragraphs (I)(2)(ii) and (I)(3)(ii);
  - b. Revising the heading to Table 1;
  - c. Revising Appendix D;
  - d. Revising Appendix E;
  - e. Revising Appendix H, sections III and IV(iii).

The revisions read as follows:

#### § 1910.1001 Asbestos.

\* \* \* \* \*

(1) \* \* \*

(2) \* \* \*

(ii) Such examination shall include, as a minimum, a medical and work history; a complete physical examination of all systems with emphasis on the respiratory system, the cardiovascular system and digestive

tract; completion of the respiratory disease standardized questionnaire in Appendix D to this section, part 1; a 14-by 17-inch or other reasonably-sized standard film or digital posterior-anterior chest X-ray; pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV(1.0)); and any additional tests deemed appropriate by the examining physician. Classification of all chest X-rays shall be conducted in accordance with Appendix E to this section.

(3) \* \* \*

(ii) The scope of the medical examination shall be in conformance with the protocol established in paragraph (I)(2)(ii) of this section, except that the frequency of chest X-rays shall be conducted in accordance with Table 1, and the abbreviated standardized questionnaire contained in part 2 of Appendix D to this section shall be administered to the employee.

Table 1—Frequency of Chest X-ray

\* \* \* \* \*

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**APPENDIX D TO § 1910.1001—MEDICAL QUESTIONNAIRES; MANDATORY**

This mandatory appendix contains the medical questionnaires that must be administered to all employees who are exposed to asbestos above permissible exposure limit, and who will therefore be included in their employer's medical surveillance program. Part 1 of the appendix contains the Initial Medical Questionnaire, which must be obtained for all new hires who will be covered by the medical surveillance requirements. Part 2 includes the abbreviated Periodical Medical Questionnaire, which must be administered to all employees who are provided periodic medical examinations under the medical surveillance provisions of the standard.

Part 1  
INITIAL MEDICAL QUESTIONNAIRE

1. NAME \_\_\_\_\_
2. CLOCK NUMBER \_\_\_\_\_
3. PRESENT OCCUPATION \_\_\_\_\_
4. PLANT \_\_\_\_\_
5. ADDRESS \_\_\_\_\_
6. \_\_\_\_\_  
(Zip Code)
7. TELEPHONE NUMBER \_\_\_\_\_
8. INTERVIEWER \_\_\_\_\_
9. DATE \_\_\_\_\_
10. Date of Birth \_\_\_\_\_  

Month	Day	Year
-------	-----	------
11. Place of Birth \_\_\_\_\_
12. Sex
 

1. Male	_____
2. Female	_____
13. What is your marital status?
 

1. Single	_____	4. Separated/ Divorced	_____
2. Married	_____	3. Widowed	_____
14. Race
 

1. White	_____	4. Hispanic	_____
2. Black	_____	5. Indian	_____
3. Asian	_____	6. Other	_____
15. What is the highest grade completed in school? \_\_\_\_\_  
(For example 12 years is completion of high school)

**OCCUPATIONAL HISTORY**

- 16A. Have you ever worked full time (30 hours per week or more) for 6 months or more? 1. Yes \_\_\_\_\_ 2. No \_\_\_\_\_

IF YES TO 16A:

B. Have you ever worked for a year or more in any dusty job? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

Specify job/industry \_\_\_\_\_ Total Years Worked \_\_\_

Was dust exposure: 1. Mild \_\_\_ 2. Moderate \_\_\_ 3. Severe \_\_\_

C. Have you ever been exposed to gas or chemical fumes in your work? 1. Yes \_\_\_ 2. No \_\_\_

Specify job/industry \_\_\_\_\_ Total Years Worked \_\_\_

Was exposure: 1. Mild \_\_\_ 2. Moderate \_\_\_ 3. Severe \_\_\_

D. What has been your usual occupation or job -- the one you have worked at the longest?  
 1. Job occupation \_\_\_\_\_  
 2. Number of years employed in this occupation \_\_\_\_\_  
 3. Position/job title \_\_\_\_\_  
 4. Business, field or industry \_\_\_\_\_

(Record on lines the years in which you have worked in any of these industries, e.g. 1960-1969)

Have you ever worked:	YES	NO
E. In a mine? .....	_____	_____
F. In a quarry? .....	_____	_____
G. In a foundry? .....	_____	_____
H. In a pottery? .....	_____	_____
I. In a cotton, flax or hemp mill?....	_____	_____
J. With asbestos? .....	_____	_____

17. PAST MEDICAL HISTORY YES NO

A. Do you consider yourself to be in good health? \_\_\_\_\_

If "NO" state reason \_\_\_\_\_

B. Have you any defect of vision? \_\_\_\_\_

If "YES" state nature of defect \_\_\_\_\_

C. Have you any hearing defect? \_\_\_\_\_

If "YES" state nature of defect \_\_\_\_\_

D. Are you suffering from or have you ever suffered from:	YES	NO
---	-----	----

a. Epilepsy (or fits, seizures, convulsions)?	_____	_____
---	-------	-------

b. Rheumatic fever?	_____	_____
---------------------	-------	-------

c. Kidney disease?	_____	_____
--------------------	-------	-------

d. Bladder disease?	_____	_____
---------------------	-------	-------

e. Diabetes?	_____	_____
--------------	-------	-------

f. Jaundice?	_____	_____
--------------	-------	-------

18. CHEST COLDS AND CHEST ILLNESSES

18A. If you get a cold, does it "usually" go to your chest? (Usually means more than 1/2 the time)	1. Yes ___	2. No ___
	3. Don't get colds ___	

19A. During the past 3 years, have you had any chest illnesses that have kept you off work, indoors at home, or in bed?	1. Yes ___	2. No ___
---	------------	-----------

IF YES TO 19A:

B. Did you produce phlegm with any of these chest illnesses?	1. Yes ___	2. No ___
	3. Does Not Apply ___	

C. In the last 3 years, how many such illnesses with (increased) phlegm did you	Number of illnesses ___	
	No such illnesses ___	

have which lasted a week or more?

20. Did you have any lung trouble before the age of 16? 1. Yes \_\_\_ 2. No \_\_\_

21. Have you ever had any of the following?

1A. Attacks of bronchitis? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 1A:

B. Was it confirmed by a doctor? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

C. At what age was your first attack? Age in Years \_\_\_  
Does Not Apply \_\_\_

2A. Pneumonia (include bronchopneumonia)? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 2A:

B. Was it confirmed by a doctor? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

C. At what age did you first have it? Age in Years \_\_\_  
Does Not Apply \_\_\_

3A. Hay Fever? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 3A:

B. Was it confirmed by a doctor? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

C. At what age did it start? Age in Years \_\_\_  
Does Not Apply \_\_\_

22A. Have you ever had chronic bronchitis? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 22A:

B. Do you still have it? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

C. Was it confirmed by a doctor? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

D. At what age did it start? Age in Years \_\_\_  
Does Not Apply \_\_\_

23A. Have you ever had emphysema? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 23A:

B. Do you still have it? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

C. Was it confirmed by a doctor? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

D. At what age did it start? Age in Years \_\_\_  
Does Not Apply \_\_\_

24A. Have you ever had asthma? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 24A:

B. Do you still have it? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

C. Was it confirmed by a doctor? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

D. At what age did it start? Age in Years \_\_\_  
Does Not Apply \_\_\_

E. If you no longer have it, at what age did it stop? Age stopped \_\_\_  
Does Not Apply \_\_\_

25. Have you ever had:

A. Any other chest illness? 1. Yes \_\_\_ 2. No \_\_\_

If yes, please specify \_\_\_\_\_

B. Any chest operations? 1. Yes \_\_\_ 2. No \_\_\_

If yes, please specify \_\_\_\_\_

C. Any chest injuries? 1. Yes \_\_\_ 2. No \_\_\_

If yes, please specify \_\_\_\_\_

26A. Has a doctor ever told you that you had heart trouble? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 26A:

B. Have you ever had treatment for heart trouble in the past 10 years? 1. Yes \_\_\_ 2. No \_\_\_ 3. Does Not Apply \_\_\_

27A. Has a doctor told you that you had high blood pressure? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 27A:

B. Have you had any treatment for high blood pressure (hypertension) in the past 10 years? 1. Yes \_\_\_ 2. No \_\_\_ 3. Does Not Apply \_\_\_

28. When did you last have your chest X-rayed? (Year) \_\_\_ \_\_\_ \_\_\_ \_\_\_

29. Where did you last have your chest X-rayed (if known)? \_\_\_\_\_

What was the outcome? \_\_\_\_\_

FAMILY HISTORY

30. Were either of your natural parents ever told by a doctor that they had a chronic lung condition such as:	FATHER			MOTHER		
	1. Yes	2. No	3. Don't know	1. Yes	2. No	3. Don't know
A. Chronic Bronchitis?	___	___	___	___	___	___
B. Emphysema?	___	___	___	___	___	___
C. Asthma?	___	___	___	___	___	___
D. Lung cancer?	___	___	___	___	___	___
E. Other chest conditions?	___	___	___	___	___	___
F. Is parent currently alive?	___	___	___	___	___	___
G. Please Specify	___	Age if Living	___	___	Age if Living	___
	___	Age at Death	___	___	Age at Death	___
	___	Don't Know	___	___	Don't Know	___
H. Please specify cause of death	_____			_____		

COUGH

31A. Do you usually have a cough? (Count a cough with first smoke or on first going out of doors. Exclude clearing of throat.) (If no, skip to question 31C.)	1. Yes ___	2. No ___
B. Do you usually cough as much as 4 to 6 times a day 4 or more days out of the week?	1. Yes ___	2. No ___
C. Do you usually cough at all on getting up or first thing in the morning?	1. Yes ___	2. No ___

D. Do you usually cough at all during the rest of the day or at night? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO ANY OF ABOVE (31A, B, C, OR D), ANSWER THE FOLLOWING. IF NO TO ALL, CHECK "DOES NOT APPLY" AND SKIP TO NEXT PAGE

E. Do you usually cough like this on most days for 3 consecutive months or more during the year? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

F. For how many years have you had the cough? Number of years \_\_\_  
Does not apply \_\_\_

32A. Do you usually bring up phlegm from your chest? 1. Yes \_\_\_ 2. No \_\_\_  
Count phlegm with the first smoke or on first going out of doors. Exclude phlegm from the nose. Count swallowed phlegm.)  
(If no, skip to 32C)

B. Do you usually bring up phlegm like this as much as twice a day 4 or more days out of the week? 1. Yes \_\_\_ 2. No \_\_\_

C. Do you usually bring up phlegm at all on getting up or first thing in the morning? 1. Yes \_\_\_ 2. No \_\_\_

D. Do you usually bring up phlegm at all on during the rest of the day or at night? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO ANY OF THE ABOVE (32A, B, C, OR D), ANSWER THE FOLLOWING:

IF NO TO ALL, CHECK "DOES NOT APPLY" AND SKIP TO 33A

E. Do you bring up phlegm like this on most days for 3 consecutive months or more during the year? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

F. For how many years have you had trouble with phlegm? Number of years \_\_\_  
Does not apply \_\_\_

EPISODES OF COUGH AND PHLEGM

33A. Have you had periods or episodes of (increased\*) cough and phlegm lasting for 3 weeks or more each year?

1. Yes \_\_\_ 2. No \_\_\_

\*(For persons who usually have cough and/or phlegm)

IF YES TO 33A

B. For how long have you had at least 1 such episode per year?

Number of years \_\_\_  
Does not apply \_\_\_

WHEEZING

34A. Does your chest ever sound wheezy or whistling

1. When you have a cold?

1. Yes \_\_\_ 2. No \_\_\_

2. Occasionally apart from colds?

1. Yes \_\_\_ 2. No \_\_\_

3. Most days or nights?

1. Yes \_\_\_ 2. No \_\_\_

B. For how many years has this been present?

Number of years \_\_\_  
Does not apply \_\_\_

35A. Have you ever had an attack of wheezing that has made you feel short of breath?

1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 35A

B. How old were you when you had your first such attack?

Age in years \_\_\_  
Does not apply \_\_\_

C. Have you had 2 or more such episodes?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

D. Have you ever required medicine or treatment for the(se) attack(s)?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

BREATHLESSNESS

36. If disabled from walking by any condition other than heart or lung disease, please describe and proceed to question 38A.

Nature of condition(s)  
\_\_\_\_\_  
\_\_\_\_\_

37A. Are you troubled by shortness of breath when hurrying on the level or walking up a slight hill?

1. Yes \_\_\_ 2. No \_\_\_

## IF YES TO 37A

B. Do you have to walk slower than people of your age on the level because of breathlessness?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

C. Do you ever have to stop for breath when walking at your own pace on the level?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

D. Do you ever have to stop for breath after walking about 100 yards (or after a few minutes) on the level?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

E. Are you too breathless to leave the house or breathless on dressing or climbing one flight of stairs?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

TOBACCO SMOKING

38A. Have you ever smoked cigarettes?  
(No means less than 20 packs of cigarettes or 12 oz. of tobacco in a lifetime or less than 1 cigarette a day for 1 year.)

1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 38A

- B. Do you now smoke cigarettes (as of one month ago)
  - 1. Yes \_\_\_ 2. No \_\_\_
  - 3. Does not apply \_\_\_
  
- C. How old were you when you first started regular cigarette smoking?
  - Age in years \_\_\_
  - Does not apply \_\_\_
  
- D. If you have stopped smoking cigarettes completely, how old were you when you stopped?
  - Age stopped \_\_\_
  - Check if still smoking \_\_\_
  - Does not apply \_\_\_
  
- E. How many cigarettes do you smoke per day now?
  - Cigarettes per day \_\_\_
  - Does not apply \_\_\_
  
- F. On the average of the entire time you smoked, how many cigarettes did you smoke per day?
  - Cigarettes per day \_\_\_
  - Does not apply \_\_\_
  
- G. Do or did you inhale the cigarette smoke?
  - 1. Does not apply \_\_\_
  - 2. Not at all \_\_\_
  - 3. Slightly \_\_\_
  - 4. Moderately \_\_\_
  - 5. Deeply \_\_\_
  
- 39A. Have you ever smoked a pipe regularly?
  - 1. Yes \_\_\_ 2. No \_\_\_

(Yes means more than 12 oz. of tobacco in a lifetime.)

IF YES TO 39A:

FOR PERSONS WHO HAVE EVER SMOKED A PIPE

- B. 1. How old were you when you started to smoke a pipe regularly?
  - Age \_\_\_
  
- 2. If you have stopped smoking a pipe completely, how old were you when you stopped?
  - Age stopped \_\_\_
  - Check if still smoking pipe \_\_\_
  - Does not apply \_\_\_

C. On the average over the entire time you smoked a pipe, how much pipe tobacco did you smoke per week? \_\_\_\_\_ oz. per week (a standard pouch of tobacco contains 1 1/2 oz.)  
 \_\_\_\_\_ Does not apply

D. How much pipe tobacco are you smoking now? \_\_\_\_\_ oz. per week  
 Not currently smoking a pipe \_\_\_\_\_

E. Do you or did you inhale the pipe smoke?  
 1. Never smoked \_\_\_\_\_  
 2. Not at all \_\_\_\_\_  
 3. Slightly \_\_\_\_\_  
 4. Moderately \_\_\_\_\_  
 5. Deeply \_\_\_\_\_

40A. Have you ever smoked cigars regularly? 1. Yes \_\_\_\_\_ 2. No \_\_\_\_\_

(Yes means more than 1 cigar a week for a year)

IF YES TO 40A

FOR PERSONS WHO HAVE EVER SMOKED A PIPE

B. 1. How old were you when you started smoking cigars regularly? Age \_\_\_\_\_

2. If you have stopped smoking cigars completely, how old were you when you stopped smoking cigars? Age stopped \_\_\_\_\_  
 Check if still \_\_\_\_\_  
 Does not apply \_\_\_\_\_

C. On the average over the entire time you smoked cigars, how many cigars did you smoke per week? Cigars per week \_\_\_\_\_  
 Does not apply \_\_\_\_\_

D. How many cigars are you smoking per week now? Cigars per week \_\_\_\_\_  
 Check if not smoking cigars currently \_\_\_\_\_

E. Do or did you inhale the cigar smoke?

- 1. Never smoked \_\_\_
- 2. Not at all \_\_\_
- 3. Slightly \_\_\_
- 4. Moderately \_\_\_
- 5. Deeply \_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_

Part 2

PERIODIC MEDICAL QUESTIONNAIRE

- 1. NAME \_\_\_\_\_
- 2. CLOCK NUMBER \_\_\_\_\_
- 3. PRESENT OCCUPATION \_\_\_\_\_
- 4. PLANT \_\_\_\_\_
- 5. ADDRESS \_\_\_\_\_
- 6. \_\_\_\_\_
- (Zip Code)
- 7. TELEPHONE NUMBER \_\_\_\_\_
- 8. INTERVIEWER \_\_\_\_\_
- 9. DATE \_\_\_\_\_

- 10. What is your marital status?
  - 1. Single \_\_\_
  - 2. Married \_\_\_
  - 3. Widowed \_\_\_
  - 4. Separated/ Divorced \_\_\_

11. OCCUPATIONAL HISTORY

- 11A. In the past year, did you work full time (30 hours per week or more) for 6 months or more?
  - 1. Yes \_\_\_
  - 2. No \_\_\_

IF YES TO 11A:

- 11B. In the past year, did you work in a dusty job?
  - 1. Yes \_\_\_
  - 2. No \_\_\_
  - 3. Does not Apply \_\_\_

- 11C. Was dust exposure:
  - 1. Mild \_\_\_
  - 2. Moderate \_\_\_
  - 3. Severe \_\_\_

- 11D. In the past year, were you exposed to gas or chemical fumes in your work?
  - 1. Yes \_\_\_
  - 2. No \_\_\_

- 11E. Was exposure:
  - 1. Mild \_\_\_
  - 2. Moderate \_\_\_
  - 3. Severe \_\_\_

- 11F. In the past year,  
what was your:
1. Job/occupation? \_\_\_\_\_
  2. Position/job title? \_\_\_\_\_

12. RECENT MEDICAL HISTORY

- 12A. Do you consider yourself to  
be in good health? Yes \_\_\_ No \_\_\_

If NO, state reason \_\_\_\_\_

- 12B. In the past year, have you developed:

	<u>Yes</u>	<u>No</u>
Epilepsy?	___	___
Rheumatic fever?	___	___
Kidney disease?	___	___
Bladder disease?	___	___
Diabetes?	___	___
Jaundice?	___	___
Cancer?	___	___

13. CHEST COLDS AND CHEST ILLNESSES

- 13A. If you get a cold, does it "usually" go to your chest? (usually means more than 1/2 the time)

1. Yes \_\_\_ 2. No \_\_\_  
3. Don't get colds \_\_\_

- 14A. During the past year, have you had  
any chest illnesses that have kept you  
off work, indoors at home, or in bed?
1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

IF YES TO 14A:

- 14B. Did you produce phlegm with any  
of these chest illnesses?
1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

- 14C. In the past year, how many such  
illnesses with (increased) phlegm  
did you have which lasted a week  
or more?
- Number of illnesses \_\_\_  
No such illnesses \_\_\_

15. RESPIRATORY SYSTEM

In the past year have you had:

	<u>Yes or No</u>	<u>Further Comment on Positive Answers</u>
Asthma	_____	
Bronchitis	_____	
Hay Fever	_____	
Other Allergies	_____	

	<u>Yes or No</u>	<u>Further Comment on Positive Answers</u>
Pneumonia	_____	
Tuberculosis	_____	
Chest Surgery	_____	
Other Lung Problems	_____	
Heart Disease	_____	

Do you have:

	<u>Yes or No</u>	<u>Further Comment on Positive Answers</u>
Frequent colds	_____	
Chronic cough	_____	
Shortness of breath when walking or climbing one flight or stairs	_____	

Do you:

Wheeze	_____	
Cough up phlegm	_____	
Smoke cigarettes	_____	Packs per day _____ How many years _____

Date \_\_\_\_\_

Signature \_\_\_\_\_

**APPENDIX E TO § 1910.1001—CLASSIFICATION OF CHEST X-RAYS—MANDATORY**

(a) Chest X-rays shall be classified in accordance with the International Labour Organization (ILO) Classification of Radiographs of Pneumoconioses (revised edition 2011) (incorporated by reference, see § 1910.6), and recorded on a classification form following the format of the CDC/NIOSH (M) 2.8 form. As a minimum, the content within the bold lines of this form (items 1 through 4) shall be included. This form is not to be submitted to NIOSH.

(b) All X-rays shall be classified only by a B-Reader, a board eligible/certified radiologist, or an experienced physician with known expertise in pneumoconioses.

(c) Whenever classifying chest X-rays made under this section, the physician shall have immediately available for reference a complete set of the ILO Classification of Radiographs for Pneumoconioses (revised edition 2011) and the Guidelines for the use of the ILO International Classification of Radiographs of Pneumoconioses (revised edition 2011).

\* \* \* \* \*

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**APPENDIX H TO § 1910.1001—MEDICAL SURVEILLANCE GUIDELINES FOR ASBESTOS**

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**NON-MANDATORY**

\* \* \* \* \*

**III. Signs and Symptoms of Exposure-Related Disease**

The signs and symptoms of lung cancer or gastrointestinal cancer induced by exposure to asbestos are not unique, except that a chest X-ray of an exposed patient with lung cancer may show pleural plaques, pleural calcification, or pleural fibrosis, and may also show asbestosis (i.e., small irregular parenchymal opacities). Symptoms characteristic of mesothelioma include shortness of breath, pain in the chest or abdominal pain. Mesothelioma has a much longer average latency period compared with lung cancer (40 years versus 15-20 years), and mesothelioma is therefore more likely to be found among workers who were first exposed to asbestos at an early age. Mesothelioma is a fatal disease.

Asbestosis is pulmonary fibrosis caused by the accumulation of asbestos fibers in the lungs. Symptoms include shortness of breath, coughing, fatigue, and vague feelings of sickness. When the fibrosis worsens, shortness of breath occurs even at rest. The diagnosis of asbestosis is most commonly based on a history of exposure to asbestos, the presence of characteristic radiologic abnormalities, end-inspiratory crackles (rales), and other clinical features of fibrosing lung disease. Pleural plaques and thickening may be observed on chest X-rays. Asbestosis is often a progressive disease even in the absence of continued exposure, although this appears to be a highly individualized characteristic. In severe cases, death may be caused by respiratory or cardiac failure.

IV. Surveillance and Preventive Considerations

\* \* \* \* \*

(iii) A physical examination including a chest X-ray and pulmonary function test that includes measurement of the employee's forced vital capacity (FVC) and forced expiratory volume at one second (FEV(1)).

\* \* \* \* \*

- 9. Amend § 1910.1018 by:
- a. Revising paragraphs (n)(2)(ii)(A) and, (n)(3)(i) and (ii);
- b. Revising Appendix A, section VI;
- c. Revising Appendix C, sections I(2) and (4).

The revisions read as follows:

§ 1910.1018 Inorganic arsenic.

\* \* \* \* \*  
(n) \* \* \*

- (2) \* \* \*
- (ii) \* \* \*
- (A) A standard film or digital posterior-anterior chest X-ray;

\* \* \* \* \*

- (3) \* \* \*
- (i) Examinations must be provided in accordance with paragraphs (n)(2)(i) and (n)(2)(ii)(B) and (C) of this section at least annually.

(ii) Whenever a covered employee has not taken the examinations specified in paragraphs (n)(2)(i) and (n)(2)(ii)(B) and (C) of this section within six (6) months preceding the termination of employment, the employer shall provide such examinations to the employee upon termination of employment.

\* \* \* \* \*

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**APPENDIX A TO § 1910.1018—INORGANIC ARSENIC SUBSTANCE INFORMATION SHEET**

\* \* \* \* \*

**VI. MEDICAL EXAMINATIONS**

If your exposure to arsenic is over the Action Level (5 µg/m<sup>3</sup>) -- (including all persons working in regulated areas) at least 30 days per year, or you have been exposed to arsenic for more than 10 years over the Action Level, your employer is required to provide you with a medical examination. The examination shall be every 6 months for employees over 45 years old or with more than 10 years exposure over the Action Level and annually for other covered employees. The medical examination must include a medical history; a chest X-ray (during initial examination only); skin examination and a nasal examination. The examining physician will provide a written opinion to your employer containing the results of the medical exams. You should also receive a copy of this opinion. The physician must not tell your employer any conditions he detects unrelated to occupational exposure to arsenic but must tell you those conditions.

\* \* \* \* \*

APPENDIX C TO § 1910.1018—MEDICAL SURVEILLANCE GUIDELINES

I. GENERAL

\* \* \* \* \*

(2) A 14" by 17" or other reasonably-sized standard film or digital posterior-anterior chest X-ray;

\* \* \* \* \*

(4) Other examinations which the physician believes appropriate because of the employee's exposure to inorganic arsenic or because of required respirator use.

Periodic examinations are also to be provided to the employees listed above. The periodic examinations shall be given annually for those covered employees 45 years of age or less with fewer than 10 years employment in areas where employee exposure exceeds the action level (5 µg/m<sup>3</sup>). Periodic examinations need not include sputum cytology or chest X-ray and only an updated medical history is required.

Periodic examinations for other covered employees shall be provided every six (6) months. These examinations shall include all tests required in the initial examination, except the chest X-ray, and the medical history need only be updated.

The examination contents are minimum requirements. Additional tests such as lateral and oblique X-rays or pulmonary function tests may be useful. For workers exposed to three arsenicals which are associated with lymphatic cancer, copper acetoarsenite, potassium arsenite, or sodium arsenite the examination should also include palpation of superficial lymph nodes and complete blood count.

\* \* \* \* \*

- 10. Amend § 1910.1027 by:
  - a. Revising paragraph (l)(4)(ii)(C);
  - b. Revising Appendix D.
- The revisions read as follows:

**§ 1910.1027 Cadmium.**

- (l) \* \* \*
- (4) \* \* \*
- (ii) \* \* \*

(C) A 14 inch by 17 inch or other reasonably-sized standard film or digital

posterior-anterior chest X-ray (after the initial X-ray, the frequency of chest X-rays is to be determined by the examining physician);

\* \* \* \* \*

**APPENDIX D TO § 1910.1027—OCCUPATIONAL HEALTH HISTORY INTERVIEW WITH  
REFERENCE TO CADMIUM EXPOSURE**

*Directions*

(To be read by employee and signed prior to the interview)

Please answer the questions you will be asked as completely and carefully as you can. These questions are asked of everyone who works with cadmium. You will also be asked to give blood and urine samples. The doctor will give your employer a written opinion on whether you are physically capable of working with cadmium. Legally, the doctor cannot share personal information you may tell him/her with your employer. The following information is considered strictly confidential. The results of the tests will go to you, your doctor and your employer. You will also receive an information sheet explaining the results of any biological monitoring or physical examinations performed.

If you are just being hired, the results of this interview and examination will be used to:

- (1) Establish your health status and see if working with cadmium might be expected to cause unusual problems,
- (2) Determine your health status today and see if there are changes over time,
- (3) See if you can wear a respirator safely.

If you are not a new hire:

OSHA says that everyone who works with cadmium can have periodic medical examinations performed by a doctor. The reasons for this are:

- a) If there are changes in your health, either because of cadmium or some other reason, to find them early,
- b) to prevent kidney damage.

Please sign below.

I have read these directions and understand them:

\_\_\_\_\_  
Employee signature

\_\_\_\_\_  
Date

Thank you for answering these questions. (Suggested Format)

Name \_\_\_\_\_

Age \_\_\_\_\_

Company \_\_\_\_\_

Job \_\_\_\_\_

Type of Preplacement Exam:

Periodic

Termination

Initial

Other

Blood Pressure \_\_\_\_\_

Pulse Rate \_\_\_\_\_

1. How long have you worked at the job listed above?

Not yet hired

Number of months

Number of years

2. Job Duties etc.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Have you ever been told by a doctor that you had bronchitis?

Yes

No

If yes, how long ago?

Number of months

Number of years

4. Have you ever been told by a doctor that you had emphysema?

Yes

No

If yes, how long ago?

Number of years

Number of months

5. Have you ever been told by a doctor that you had other lung problems?

Yes

No

If yes, please describe type of lung problems and when you had these problems.

---

---

---

6. In the past year, have you had a cough?

Yes

No

If yes, did you cough up sputum?

Yes

No

If yes, how long did the cough with sputum production last?

Less than 3 months

3 months or longer

If yes, for how many years have you had episodes of cough with sputum production lasting this long?

Less than one

1

2

Longer than 2

7. Have you ever smoked cigarettes?

Yes

- No
8. Do you now smoke cigarettes?  
 Yes  
 No
9. If you smoke or have smoked cigarettes, for how many years have you smoked, or did you smoke?  
 Less than 1 year  
 Number of years

What is or was the greatest number of packs per day that you have smoked?

Number of packs

If you quit smoking cigarettes, how many years ago did you quit?

Less than 1 year

Number of years

How many packs a day do you now smoke?

Number of packs per day

10. Have you ever been told by a doctor that you had a kidney or urinary tract disease or disorder?  
 Yes  
 No

11. Have you ever had any of these disorders?

Kidney stones..... Yes  No

Protein in urine..... Yes  No

Blood in urine ..... Yes  No

Difficulty urinating..... Yes  No

Other kidney/Urinary disorders..... Yes  No

Please describe problems, age, treatment, and follow up for any kidney or urinary problems you have had:

---



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12. Have you ever been told by a doctor or other health care provider who took your blood pressure that your blood pressure was high?

Yes

No

13. Have you ever been advised to take any blood pressure medication?

Yes

No

14. Are you presently taking any blood pressure medication?

Yes

No

15. Are you presently taking any other medication?

Yes

No

16. Please list any blood pressure or other medications and describe how long you have been taking each one:

Medicine	How long Taken

17. Have you ever been told by a doctor that you have diabetes? (sugar in your blood or urine)

Yes

No

If yes, do you presently see a doctor about your diabetes?

Yes

No

If yes, how do you control your blood sugar?

Diet alone

Diet plus oral medicine

Diet plus insulin (injection)

18. Have you ever been told by a doctor that you had:

Anemia  Yes  No

A low blood count?  Yes  No

19. Do you presently feel that you tire or run out of energy sooner than normal or sooner than other people your age?

Yes

No

If yes, for how long have you felt that you tire easily?

Less than 1 year

Number of years

20. Have you given blood within the last year?

Yes

No

If yes, how many times?

Number of times

How long ago was the last time you gave blood?

Less than 1 month

Number of months

21. Within the last year have you had any injuries with heavy bleeding?

Yes

No

If yes, how long ago?

Less than 1 month

Number of months

Describe: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

22. Have you recently had any surgery?

Yes

No

If yes, please describe: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

23. Have you seen any blood lately in your stool or after a bowel movement?

Yes

No

24. Have you ever had a test for blood in your stool?

Yes

No

If yes, did the test show any blood in the stool?

Yes

No

What further evaluation and treatment were done? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

The following questions pertain to the ability to wear a respirator.  
Additional information for the physician can be found in The Respiratory Protective  
Devices Manual.

25. Have you ever been told by a doctor that you have asthma?

Yes

No

If yes, are you presently taking any medication for asthma? Mark all that apply.

Shots

Pills

Inhaler

26. Have you ever had a heart attack?

Yes

No

If yes, how long ago?

Number of years

Number of months

27. Have you ever had pains in your chest?

Yes

No

If yes, when did it usually happen?

While resting

While working

- While exercising
- Activity didn't matter
28. Have you ever had a thyroid problem?
- Yes
- No
29. Have you ever had a seizure or fits?
- Yes
- No
30. Have you ever had a stroke (cerebrovascular accident)?
- Yes
- No
31. Have you ever had a ruptured eardrum or a serious hearing problem?
- Yes
- No
32. Do you now have a claustrophobia, meaning fear of crowded or closed in spaces or any psychological problems that would make it hard for you to wear a respirator?
- Yes
- No

The following questions pertain to reproductive history.

33. Have you or your partner had a problem conceiving a child?
- Yes
- No
- If yes, specify:
- Self
- Present mate
- Previous mate

34. Have you or your partner consulted a physician for a fertility or other reproductive problem?

Yes

No

If yes, specify who consulted the physician:

Self

Spouse/partner

Self and partner

If yes, specify diagnosis made: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

35. Have you or your partner ever conceived a child resulting in a miscarriage, still birth or deformed offspring?

Yes

No

If yes, specify:

Miscarriage

Still birth

Deformed offspring

If outcome was a deformed offspring, please specify type:

\_\_\_\_\_  
\_\_\_\_\_

36. Was this outcome a result of a pregnancy of:

Yours with present partner

Yours with a previous partner

37. Did the timing of any abnormal pregnancy outcome coincide with present employment?

Yes

No

List dates of occurrences: \_\_\_\_\_

\_\_\_\_\_

38. What is the occupation of your spouse or partner?

\_\_\_\_\_

\_\_\_\_\_

For Women Only

39. Do you have menstrual periods?

Yes

No

Have you had menstrual irregularities?

Yes

No

If yes, specify type: \_\_\_\_\_

\_\_\_\_\_

If yes, what was the approximated date this problem began? \_\_\_\_\_

\_\_\_\_\_

Approximate date problem stopped? \_\_\_\_\_

\_\_\_\_\_

For Men Only

40. Have you ever been diagnosed by a physician as having prostate gland problem(s)?

[ ] Yes

[ ] No

If yes, please describe type of problem(s) and what was done to evaluate and treat the problem(s): \_\_\_\_\_

\_\_\_\_\_

\* \* \* \* \*

- 11. Amend § 1910.1029 by:
  - a. Revising paragraphs (j)(2)(ii) and (j)(3);
  - b. Revising Appendix A, section VI;
  - c. Revising Appendix B, section II(A).
- The revisions read as follows:

**§ 1910.1029 Coke oven emissions.**

\* \* \* \* \*

(j) \* \* \*

(2) \* \* \*

(ii) 14- by 17-inch or other reasonably-sized standard film or digital posterior-anterior chest X-ray;

\* \* \* \* \*

(3) *Periodic examinations.* (i) The employer shall provide the examinations specified in paragraphs (j)(2)(i) and (j)(2)(iii) through (vi) of this section at least annually for employees covered under paragraph (j)(1)(i) of this section.

(ii) The employer must provide the examinations specified in paragraphs (j)(2)(i) and (j)(2)(iii) through (vii) of this section at least annually for employees 45 years of age or older or with five (5) or more years employment in the regulated area.

(iii) Whenever an employee who is 45 years of age or older or with five (5) or more years employment in a regulated area transfers or is transferred from employment in a regulated area, the employer must continue to provide the examinations specified in paragraphs (j)(2)(i) and (j)(2)(iii) through (vii) of this section at least annually as long as that employee is employed by the same employer or a successor employer.

\* \* \* \* \*

**APPENDIX A To § 1910.1029—COKE OVEN EMISSIONS SUBSTANCE INFORMATION**

**SHEET**

\* \* \* \* \*

**VI. MEDICAL EXAMINATIONS**

If you work in a regulated area at least 30 days per year, your employer is required to provide you with a medical examination every year. The initial medical examination must include a medical history, a chest X-ray, pulmonary function test, weight comparison, skin examination, a urinalysis, and a urine cytology exam for early detection of urinary cancer. Periodic examinations shall include all tests required in the initial examination, except that (1) the x-ray is to be performed during initial examination only and (2) the urine cytologic test is to be performed only on those employees who are 45 years or older or who have worked for 5 or more years in the regulated area. The examining physician will provide a written opinion to your employer containing the results of the medical exams. You should also receive a copy of this opinion.

\* \* \* \* \*

## APPENDIX B TO § 1910.1029—INDUSTRIAL HYGIENE AND MEDICAL SURVEILLANCE

## GUIDELINES

\* \* \* \* \*

## II. MEDICAL SURVEILLANCE GUIDELINES

A. *General.* The minimum requirements for the medical examination for coke oven workers are given in paragraph (j) of the standard. The initial examination is to be provided to all coke oven workers who work at least 30 days in the regulated area. The examination includes a 14" by 17" or other reasonably-sized standard film or digital posterior-anterior chest X-ray reading, pulmonary function tests (FVC and FEV 1.0), weight, urinalysis, skin examination, and a urinary cytologic examination. These tests are needed to serve as the baseline for comparing the employee's future test results. Periodic exams include all the elements of the initial exams, except that (1) the x-ray is to be performed during initial examination only and (2) the urine cytologic test is to be performed only on those employees who are 45 years or older or who have worked for 5 or more years in the regulated area. The examination contents are minimum requirements; additional tests such as lateral and oblique X-rays or additional pulmonary function tests may be performed if deemed necessary.

\* \* \* \* \*

- 12. Amend § 1910.1043 by:
  - a. Revising paragraphs (h)(2)(iii) and (h)(3)(ii);
  - b. Revising paragraph (n)(1);
  - c. Revising Appendices B–I, B–II, and B–III;
  - d. Removing and reserving Appendix C;
  - e. Revising Appendix D.
- The revisions read as follows:

**§ 1910.1043 Cotton Dust.**

\* \* \* \* \*

- (h) \* \* \*
- (2) \* \* \*

(iii) A pulmonary function measurement, including forced vital capacity (FVC) and forced expiratory volume in one second (FEV1), and

determination of the FEV1/FVC ratio shall be made. FVC, FEV1, and FEV1/FVC ratio values shall be compared to appropriate race/ethnicity-specific Lower Limit of Normal (LLN) values and predicted values published in Spirometric Reference Values from a Sample of the General U.S. Population, American Journal of Respiratory and Critical Care Medicine, 159(1):179–187, January 1999 (incorporated by reference, see § 1910.6). To obtain reference values for Asian-Americans, Spirometric Reference Values FEV1 and FVC predicted and LLN values for Caucasians shall be multiplied by 0.88 to adjust for ethnic differences. These determinations shall be made for each employee before the employee enters

the workplace on the first day of the work week, preceded by at least 35 hours of no exposure to cotton dust. The tests shall be repeated during the shift, no less than 4 and no more than 10 hours after the beginning of the work shift; and, in any event, no more than one hour after cessation of exposure. Such exposure shall be typical of the employee's usual workplace exposure.

\* \* \* \* \*

- (3) \* \* \*

(ii) Medical surveillance as required in paragraph (h)(3)(i) of this section shall be provided every six months for all employees in the following categories:

(A) An FEV1 greater than the LLN, but with an FEV1 decrement of 5 percent or 200 ml. on a first working day;

(B) An FEV1 of less than the LLN; or  
\* \* \* \* \*  
(n) \* \* \*  
(1) Appendices B and D of this section are incorporated as part of this section

and the contents of these appendices are mandatory.  
\* \* \* \* \*

**APPENDIX B-I**  
**RESPIRATORY QUESTIONNAIRE**

A. IDENTIFICATION DATA

PLANT \_\_\_\_\_

DAY MONTH YEAR  
(figures) (last 2 digits)

NAME \_\_\_\_\_ DATE OF INTERVIEW \_\_\_\_\_  
(Surname)

\_\_\_\_\_ DATE OF BIRTH \_\_\_\_\_  
(First Names)

ADDRESS \_\_\_\_\_ AGE \_\_\_\_ (8, 9) SEX \_\_\_\_\_ (10)  
M F

\_\_\_\_\_ RACE \_\_\_\_\_ (11)  
W N IND OTHER

INTERVIEWER: 1 2 3 4 5 6 7 8 (12)

WORK SHIFT: 1st \_\_\_\_ 2nd \_\_\_\_ 3rd \_\_\_\_ (13)

STANDING HEIGHT \_\_\_\_\_ (14, 15)

WEIGHT \_\_\_\_\_ (16, 18)

## PRESENT WORK AREA

If working in more than one specified work area, X area where most of the work shift is spent. If "other," but spending 25% of the work shift in one of the specified work areas, classify in that work area. If carding department employee, check area within that department where most of the work shift is spent (if in doubt, check "throughout"). For work areas such as spinning and weaving where many work rooms may be involved, be sure to check to specific work room to which the employee is assigned - if he works in more than one work room within a department classify as 7 (all) for that department.

	(19)	(20)	(21)	(22)	(23)	(24)	(25)	
Work- room Number	Open	Pick	Area	Card #1	#2	Spin	Wind	Twist
AT	1			Cards				
RISK	2			Draw				
(cotton & cotton blend)	3			Comb				
	4			Thru Out				
	5							
	6							
	7 (all)							
Control (synthe- tic & wo ol)	8							
Ex- Worker (cotton)	9							

Continued -

	Work- Room Number	(26) Spool	(27) Warp	(28) Slash	(29) Weave	(30) Other
AT	1					
RISK	2					
(cotton & cotton blend)	3					
	4					
	5					
	6					
	7 (all)					
Control (synthetic & wool)	8					
Ex- Worker (cotton)	9					

Use actual wording of each question. Put X in appropriate square after each question. When in doubt record "No". When no square, circle appropriate answer.

B. COUGH

(on getting up)

Do you usually cough first thing in the morning? \_\_\_\_\_

Yes \_\_\_\_\_ No \_\_\_\_\_ (31)

(Count a cough with first smoke or on "first going out of doors." Exclude clearing throat or a single cough.)

Do you usually cough during the day or at night? Yes \_\_\_\_\_ No \_\_\_\_\_ (32)  
 (Ignore an occasional cough.)

If 'Yes' to either question (31-32):

Do you cough like this on most days for as much as three months a year? Yes \_\_\_\_\_ No \_\_\_\_\_ (33)

Do you cough on any particular day of the week? Yes \_\_\_\_\_ No \_\_\_\_\_ (34)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
If 'Yes': Which day?	Mon	Tues	Wed	Thur	Fri	Sat	Sun	(35)

---

C. PHLEGM or alternative word to suit local custom.

(on getting up)

Do you usually bring up any phlegm from your chest first thing in the morning? (Count phlegm with the first smoke or on "first going out of doors." Exclude phlegm from the nose. Count swallowed phlegm.) Yes \_\_\_\_\_ No \_\_\_\_\_ (36)

Do you usually bring up any phlegm from your chest during the day or at night? (Accept twice or more.) Yes \_\_\_\_\_ No \_\_\_\_\_ (37)

If 'Yes' to question (36) or (37):

Do you bring up any phlegm like this on most days for as much as three months each year? Yes \_\_\_\_\_ No \_\_\_\_\_ (38)

If 'Yes' to question (33) or (38):

(cough)

How long have you had this phlegm? (1) \_\_\_\_\_ 2 years or less (39)

(Write in number of years) (2) \_\_\_\_\_ More than 2 year-9 years

(3) \_\_\_ 10-19 years

(4) \_\_\_ 20+ years

\* These words are for subjects who work at night

D. CHEST ILLNESSES

In the past three years, have you had a period of (increased) \*cough and phlegm lasting for 3 weeks or more?

(1) \_\_\_ No (40)

(2) \_\_\_ Yes, only one period

(3) \_\_\_ Yes, two or more periods

\*For subjects who usually have phlegm

During the past 3 years have you had any chest illness which has kept you off work, indoors at home or in bed? (For as long as one week, flu?)

Yes \_\_\_\_\_ No \_\_\_\_\_ (41)

If `Yes' to (41):

Did you bring up (more) phlegm than usual in any of these illnesses?

Yes \_\_\_\_\_ No \_\_\_\_\_ (42)

If `Yes' to (42):

During the past three years have you had:

Only one such illness with increased phlegm? (1) \_\_\_\_\_ (43)

More than one such illness: (2) \_\_\_\_\_ (44)

Br. Grade \_\_\_\_\_

E. TIGHTNESS

Does your chest ever feel tight or your breathing become difficult?

Yes \_\_\_\_\_ No \_\_\_\_\_ (45)

Is your chest tight or your breathing difficult on any particular day of the week? (after a week or 10 days from the mill)

Yes \_\_\_\_\_ No \_\_\_\_\_ (46)

If `Yes': Which day? (3) (4) (5) (6) (7) (8)  
 Mon. ^ Tues. Wed. Thur. Fri. Sat. Sun. (47)  
 (1) / \ (2)

Sometimes Always

If `Yes' Monday: At what time on (1) \_\_\_ Before entering the mill (48)  
 Monday does your chest feel tight or your (2) \_\_\_ After entering the mill  
 breathing difficult?

(Ask only if NO to Question (45))

In the past, has your chest ever been tight or  
 your breathing difficult on any particular day  
 of the week?

Yes \_\_\_\_\_ No \_\_\_\_\_ (49)

If `Yes': Which day? (3) (4) (5) (6) (7) (8)  
 Mon. ^ Tues. Wed. Thur. Fri. Sat. Sun. (50)  
 (1) / \ (2)

Sometimes Always

#### F. BREATHLESSNESS

If disabled from walking by any condition other  
 than heart or lung disease put "X" here and \_\_\_\_\_ (51)  
 leave questions (52-60) unasked.

Are you ever troubled by shortness of breath,  
 when hurrying on the level or walking up a slight  
 hill? Yes \_\_\_\_\_ No \_\_\_\_\_ (52)

If `No', grade is 1.

If `Yes', proceed to next question.

Do you get short of breath walking with other  
 people at an ordinary pace on the level? Yes \_\_\_\_\_ No \_\_\_\_\_ (53)

If `No', grade is 2.

If 'Yes', proceed to next question.

Do you have to stop for breath when walking at your own pace on the level?

Yes \_\_\_\_\_ No \_\_\_\_\_ (54)

If 'No', grade is 3.

If 'Yes', proceed to next question.

Are you short of breath on washing or dressing?

Yes \_\_\_\_\_ No \_\_\_\_\_ (55)

If 'No', grade is 4.

If 'Yes' grade is 5.

Dyspnea Grd. \_\_\_\_\_ (56)

#### ON MONDAYS

Are you ever troubled by shortness of breath, when hurrying on the level or walking up a slight hill?

Yes \_\_\_\_\_ No \_\_\_\_\_ (57)

If 'No', grade is 1.

If 'Yes', proceed to next question.

Do you get short of breath walking with other people at ordinary pace on the level?

Yes \_\_\_\_\_ No \_\_\_\_\_ (58)

If 'No', grade is 2.

If 'Yes', proceed to next question.

Do you have to stop for breath when walking at your own pace on level ground?

Yes \_\_\_\_\_ No \_\_\_\_\_ (59)

If 'No', grade is 3.

If 'Yes', proceed to next question.

Are you short of breath on washing or dressing?

Yes \_\_\_\_\_ No \_\_\_\_\_ (60)

If 'No', grade is 4.

If 'Yes', grade is 5.

B. Grd. \_\_\_\_\_ (61)



Cigars										(70)
--------	--	--	--	--	--	--	--	--	--	------

- If cigarettes, how many packs per day?  
(Write in number of cigarettes)
- (1) \_\_\_\_\_ Less than 1/2 pack (71)
  - (2) \_\_\_\_\_ 1/2 pack, but less than 1 pack
  - (3) \_\_\_\_\_ 1 pack, but less than 1 1/2 packs
  - (4) \_\_\_\_\_ 1 1/2 packs or more

Number of years \_\_\_\_\_ (72, 73)

If an ex smoker (cigarettes, cigar or pipe),  
how long since you stopped?  
(Write in number of years) \_\_\_\_\_ (74)

- (1) \_\_\_\_\_ 0-1 year
- (2) \_\_\_\_\_ 1-4 years
- (3) \_\_\_\_\_ 5-9 years
- (4) \_\_\_\_\_ 10+ years

\* Have you changed your smoking habits since last interview? If yes, specify what changes.

I. OCCUPATIONAL HISTORY\*\*

Have you ever worked in:

A foundry? (As long as one year) Yes \_\_\_\_\_ No \_\_\_\_\_ (75)

Stone or mineral mining, quarry or processing?  
(As long as one year) Yes \_\_\_\_\_ No \_\_\_\_\_ (76)

Asbestos milling or processing? Yes \_\_\_\_\_ No \_\_\_\_\_ (77)

Other dusts, fumes or smoke? Yes \_\_\_\_\_ No \_\_\_\_\_ (78)

If yes, specify.

Type of exposure \_\_\_\_\_

Length of exposure \_\_\_\_\_

\*\* Ask only on first interview.

At what age did you first go to work in a textile mill?

(Write in specific age in appropriate square)

(1)	(2)	(3)	(4)	(5)	(6)
<20	20-24	25-29	30-34	35-39	40+

When you first worked in a textile mill, did you work with:

(1) \_\_\_\_\_ Cotton or cotton blend (79)

(2) \_\_\_\_\_ Synthetic or wool (80)

---

## APPENDIX B-II

### Respiratory Questionnaire for Non-Textile Workers for the Cotton Industry

\_\_\_\_\_  
Identification No.

\_\_\_\_\_  
Interviewer Code

\_\_\_\_\_  
Location

\_\_\_\_\_  
Date of Interview

#### A. IDENTIFICATION

\_\_\_\_\_  
1. NAME (Last) (First) (Middle Initial)

\_\_\_\_\_  
2. CURRENT ADDRESS (Number, Street, or Rural Route, City or Town, County, State, Zip Code)

\_\_\_\_\_  
3. PHONE NUMBER AREA CODE NO.

( \_\_\_\_\_ ) \_\_\_\_\_ - \_\_\_\_\_

4. BIRTHDATE (Mo., Day, Yr.)

5. AGE LAST BIRTHDAY

6. SEX

1. \_\_\_\_\_ Male 2. \_\_\_\_\_ Female

7. ETHNIC GROUP OR ANCESTRY

- 1. \_\_\_\_\_ White, not of Hispanic Origin
- 2. \_\_\_\_\_ Black, not of Hispanic Origin
- 3. \_\_\_\_\_ Hispanic
- 4. \_\_\_\_\_ American Indian or Alaskan Native
- 5. \_\_\_\_\_ Asian or Pacific Islander
- 6. \_\_\_\_\_ Other: \_\_\_\_\_

8. STANDING HEIGHT

\_\_\_\_\_ (cm)  
9. WEIGHT

10. WORK SHIFT

1st \_\_\_\_\_ 2nd \_\_\_\_\_ 3rd \_\_\_\_\_

11. PRESENT WORK AREA

Please indicate primary assigned work area and percent of time spent at that site.  
If at other locations, please indicate and note percent of time for each.

PRIMARY WORK AREA	_____
	_____
SPECIFIC JOB	_____
	_____

12. APPROPRIATE INDUSTRY

- 1. \_\_\_\_\_ Garnetting
- 2. \_\_\_\_\_ Cottonseed Oil Mill



2. Do you usually cough during the day or at night? (Ignore an occasional cough.) 1.  Yes 2.  No

If YES to either 1 or 2:

3. Do you cough like this on days for as much as three months a year? 1.  Yes 2.  No  
3.  NA

4. Do you cough on any particular day of the week? 1.  Yes 2.  No

If YES:

5. Which day? Mon. Tue. Wed. Thur. Fri. Sat. Sun.

#### PHLEGM

6. Do you usually bring up any phlegm from your chest first thing in the morning? (on getting up)\* (Count phlegm with the first smoke or on "first going out of doors." Exclude phlegm from the nose. Count swallowed phlegm.) 1.  Yes 2.  No

7. Do you usually bring up any phlegm from your chest during the day or at night? (Accept twice or more.) 1.  Yes 2.  No

If YES to either question 6 or 7:

8. Do you bring up phlegm like this on most days for as much as three months each year? 1.  Yes 2.  No

If YES to question 3 or 8:

9. How long have you had this phlegm? (1)  2 years or less  
(2)  More than 2 years - 9 years

- (cough) (3) \_\_\_ 10-19 years  
(Write in number of years) (4) \_\_\_ 20+ years

\* These words are for subjects who work at night.

### CHEST ILLNESS

10. In the past three years, have you had a period of (increased) cough and phlegm lasting for 3 weeks or more? (1) \_\_\_ No  
(2) \_\_\_ Yes, only one period  
(3) \_\_\_ Yes, two or more periods

For subjects who usually have phlegm:

11. During the past 3 years have you had any chest illness which has kept you off work, indoors at home or in bed? (For as long as one week, flu?) 1. \_\_\_ Yes 2. \_\_\_ No

If YES to 11:

12. Did you bring up (more) phlegm than usual in any of these illnesses? 1. \_\_\_ Yes 2. \_\_\_ No
13. Only one such illness with increased phlegm? 1. \_\_\_ Yes 2. \_\_\_ No

If YES to 12: During the past three years have you had:

14. More than one such illness: 1. \_\_\_ Yes 2. \_\_\_ No

Br. Grade \_\_\_\_\_

### TIGHTNESS

15. Does your chest ever feel tight or your breathing become difficult? 1. \_\_\_ Yes 2. \_\_\_ No

16. Is your chest tight or your breathing difficult on any particular day of the week? (after a week or 10 days away from the mill) 1. \_\_\_ Yes 2. \_\_\_ No

17. If 'Yes': Which day? Mon. ^ (3) (4) (5) (6) (7) (8) (1) / \ (2) Sometimes Always Tues. Wed. Thur. Fri. Sat. Sun.

18. If YES Monday: \_\_\_ Before entering mill At what time on Monday does your chest feel tight or your breathing difficult? \_\_\_ After entering mill

(ASK ONLY IF NO TO QUESTION 15)

19. In the past, has your chest ever been tight or your breathing difficult on any particular day of the week? 1. \_\_\_ Yes 2. \_\_\_ No

20. If 'Yes': Which day? Mon. ^ (3) (4) (5) (6) (7) (8) (1) / \ (2) Sometimes Always Tues. Wed. Thur. Fri. Sat. Sun.

BREATHLESSNESS

21. If disabled from walking by any condition other than heart or lung disease put "X" in the space and leave questions (22-30) unasked. \_\_\_\_\_

22. Are you ever troubled by shortness of breath, when hurrying on the level or walking up a slight hill? 1. \_\_\_ Yes 2. \_\_\_ No

If NO, grade is 1. If YES, proceed to next

question.

23. Do you get short of breath walking with other people at an ordinary pace on the level? 1.  Yes 2.  No

If NO, grade is 2. If YES, proceed to next question.

24. Do you have to stop for breath when walking at your own pace on the level? 1.  Yes 2.  No

If NO, grade is 3. If YES, proceed to next question.

25. Are you short of breath on washing or dressing? 1.  Yes 2.  No

If NO, grade is 4, If YES, grade is 5.

26. Dyspnea Grd. \_\_\_\_\_

ON MONDAYS:

27. Are you ever troubled by shortness of breath, when hurrying on the level or walking up a slight hill? 1.  Yes 2.  No

If NO, grade is 1, If YES, proceed to next question.

28. Do you get short of breath walking with other people at an ordinary pace on the level? 1.  Yes 2.  No

If NO, grade is 2, If YES, proceed to next question.

29. Do you have to stop for breath when walking at your own pace on the level? 1.  Yes 2.  No

If NO, grade is 3, If YES, proceed to next question.

30. Are you short of breath on washing or dressing? 1.  Yes 2.  No

If NO, grade is 4, If YES, grade is 5.

B. Grd. \_\_\_\_\_

#### OTHER ILLNESSES AND ALLERGY HISTORY

32. Do you have a heart condition for which you are under a doctor's care? 1.  Yes 2.  No

33. Have you ever had asthma? 1.  Yes 2.  No

If yes, did it begin:

(1) Before age 30 \_\_\_\_\_

(2) After age 30 \_\_\_\_\_

34. If yes before 30: did you have asthma before ever going to work in a textile mill? 1.  Yes 2.  No

35. Have you ever had hay fever or other allergies (other than above)? 1.  Yes 2.  No

#### TOBACCO SMOKING

36. Do you smoke? 1.  Yes 2.  No  
Record Yes if regular smoker up to one month ago. (Cigarettes, cigar or pipe)

If NO to (33).

37. Have you ever smoked? 1.  Yes 2.  No  
(Cigarettes, cigars, pipe. Record NO if subject has never smoked as much as one cigarette a day, or 1 oz. of tobacco a month, for as long as one year.)

If YES to (33) or (34); what have you smoked for how many years?  
 (Write in specific number of years in the appropriate square)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
Years	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	>40	
Cigarettes										(38)
Pipe										(39)
Cigars										(40)

41. If cigarettes, how many packs per day?  
 Write in number of cigarettes \_\_\_\_\_

- \_\_\_\_\_ Less than 1/2 pack
- \_\_\_\_\_ 1/2 pack, but less than 1 pack
- \_\_\_\_\_ 1 pack, but less than 1 1/2 packs
- \_\_\_\_\_ 1-1/2 packs or more

42. Number of pack years: \_\_\_\_\_

43. If an ex-smoker (Cigarettes, cigar or pipe), how long since you stopped? (Write in number of years.) \_\_\_\_\_

- \_\_\_\_\_ 0-1 year
- \_\_\_\_\_ 1-4 years
- \_\_\_\_\_ 5-9 years
- \_\_\_\_\_ 10+ years

**OCCUPATIONAL HISTORY**

Have you ever worked in:

44. A foundry? 1. \_\_\_\_\_ Yes 2. \_\_\_\_\_ No  
 (As long as one year)

45. Stone or mineral mining, quarrying or processing? 1. \_\_\_\_\_ Yes 2. \_\_\_\_\_ No  
 (As long as one year)

46. Asbestos milling or processing? 1. \_\_\_ Yes 2. \_\_\_ No  
(Ever)

47. Cotton or cotton blend mill? 1. \_\_\_ Yes 2. \_\_\_ No  
(For controls only)

48. Other dusts, fumes or smoke? 1. \_\_\_ Yes 2. \_\_\_ No  
If yes, specify.

Type of exposure \_\_\_\_\_

Length of exposure \_\_\_\_\_

**APPENDIX B-III**

**ABBREVIATED RESPIRATORY QUESTIONNAIRE**

**A. IDENTIFICATION DATA**

PLANT \_\_\_\_\_

DAY MONTH YEAR  
(figures) (last 2 digits)

NAME \_\_\_\_\_ DATE OF INTERVIEW \_\_\_\_\_  
(Surname)

\_\_\_\_\_ DATE OF BIRTH \_\_\_\_\_  
(First Names)

M F

ADDRESS \_\_\_\_\_ AGE \_\_\_\_ (8, 9) SEX \_\_\_\_\_ (10)

W N IND OTHER



Control (synthetic & wool)	8								
Ex- Worker (cotton)	9								

Continued –

	Work- Room Number	(26) Spool	(27) Warp	(28) Slash	(29) Weave	(30) Other
AT	1					
RISK	2					
(cotton & cotton blend)	3					
	4					
	5					
	6					
	7 (all)					
Control (synthetic & wool)	8					
Ex- Worker (cotton)	9					

Use actual wording of each question. Put X in appropriate square after each question. When in doubt record 'No'. When no square, circle appropriate answer.

B. COUGH

(on getting up)

Do you usually cough first thing in the morning? \_\_\_\_\_

Yes \_\_\_\_\_ No \_\_\_\_\_ (31)

(Count a cough with first smoke or on "first going out of doors." Exclude clearing throat or a single cough.)

Do you usually cough during the day or at night? Yes \_\_\_\_\_ No \_\_\_\_\_ (32)

(Ignore an occasional cough.)

If 'Yes' to either question (31-32):

Do you cough like this on most days for as much as three months a year?

Yes \_\_\_\_\_ No \_\_\_\_\_ (33)

Do you cough on any particular day of the week?

Yes \_\_\_\_\_ No \_\_\_\_\_ (34)

(1) (2) (3) (4) (5) (6) (7)

If 'Yes': Which day? Mon Tues Wed Thur Fri Sat Sun (35)

C. PHLEGM or alternative word to suit local custom.

(on getting up)

Do you usually bring up any phlegm from your chest first thing in the morning? (Count phlegm with the first smoke or on "first going out of doors." Exclude phlegm from the nose. Count swallowed phlegm.)

Yes \_\_\_\_\_ No \_\_\_\_\_ (36)

Do you usually bring up any phlegm from your chest during the day or at night?  
(Accept twice or more.)

Yes \_\_\_\_\_ No \_\_\_\_\_ (37)

If 'Yes' to question (36) or (37):

Do you bring up any phlegm like this on most days for as much as three months each year?

Yes \_\_\_\_\_ No \_\_\_\_\_ (38)

If 'Yes' to question (33) or (38):

(cough)

How long have you had this phlegm?

(1) \_\_\_\_ 2 years or less

(Write in number of years)

(2) \_\_\_\_ More than 2 years-9 years

(3) \_\_\_\_ 10-19 years

(4) \_\_\_\_ 20+ years

\* These words are for subjects who work at night

D. TIGHTNESS

Does your chest ever feel tight or your breathing become difficult?

Yes \_\_\_\_\_ No \_\_\_\_\_ (39)

Is your chest tight or your breathing difficult on any particular day of the week? (after a week or 10 days from the mill)

Yes \_\_\_\_\_ No \_\_\_\_\_ (40)

If 'Yes': Which day? (3) (4) (5) (6) (7) (8)

Mon. ^ Tues. Wed. Thur. Fri. Sat. Sun. (41)

(1) / \ (2)

Sometimes Always

If 'Yes' Monday At what time on Monday does your chest feel tight or your breathing difficult?

(1) \_\_\_\_ Before entering the mill (42)

(2) \_\_\_\_ After entering the mill

(Ask only if NO to Question (45))

In the past, has your chest ever been tight or your breathing difficult on any particular day of the week?

Yes \_\_\_\_\_ No \_\_\_\_\_ (43)

If 'Yes': Which day?

(3) (4) (5) (6) (7) (8)

Mon. ^ Tues. Wed. Thur. Fri. Sat. Sun. (44)

(1) / \ (2)

Sometimes Always

E. TOBACCO SMOKING

\* Have you changed your smoking habits since last interview?

If yes, specify what changes.</EXTRACT>

**APPENDIX C TO §1910.1043 [Reserved]**

**APPENDIX D TO §1910.1043 – PULMONARY FUNCTION STANDARDS FOR COTTON DUST****STANDARD**

The spirometric measurements of pulmonary function shall conform to the following minimum standards, and these standards are not intended to preclude additional testing or alternate methods which can be determined to be superior.

**I. APPARATUS**

a. The instrument shall be accurate to within  $\pm 50$  milliliters or within  $\pm 3$  percent of reading, whichever is greater.

b. 1. Instruments purchased on or before [DATE ONE YEAR AFTER PUBLICATION OF FINAL RULE IN THE FEDERAL REGISTER] should be capable of measuring vital capacity from 0 to 7 liters BTPS

2. Instruments purchased after [DATE ONE YEAR AFTER PUBLICATION OF FINAL RULE IN THE FEDERAL REGISTER] should be capable of measuring vital capacity from 0 to 8 liters BTPS.

c. The instrument shall have a low inertia and offer low resistance to airflow such that the resistance to airflow at 12 liters per second must be less than 1.5 cm H<sub>2</sub>O/(liter/sec).

d. The zero time point for the purpose of timing the FEV<sub>1</sub> shall be determined by extrapolating the steepest portion of the volume time curve back to the maximal inspiration volume (1, 2, 3, 4) or by an equivalent method.

e. 1. Instruments purchased on or before [DATE ONE YEAR AFTER PUBLICATION OF FINAL RULE IN THE FEDERAL REGISTER] that incorporate measurements of airflow to determine volume shall conform to the same volume

accuracy stated in (a) of this section when presented with flow rates from at least 0 to 12 liters per second.

2. Instruments purchased after [DATE ONE YEAR AFTER PUBLICATION OF FINAL RULE IN THE FEDERAL REGISTER] that incorporate measurements of airflow to determine volume shall conform to the same volume accuracy stated in (a) of this section when presented with flow rates from at least 0 to 14 liters per second.

f. The instrument or user of the instrument must have a means of correcting volumes to body temperature saturated with water vapor (BTPS) under conditions of varying ambient spirometer temperatures and barometric pressures.

g. 1. Instruments purchased on or before [DATE ONE YEAR AFTER PUBLICATION OF FINAL RULE IN THE FEDERAL REGISTER] shall provide a tracing or display of either flow versus volume or volume versus time during the entire forced expiration. A tracing or display is necessary to determine whether the patient has performed the test properly. The tracing must be stored and available for recall and must be of sufficient size that hand measurements may be made within requirement of paragraph (a) of this section. If a paper record is made it must have a paper speed of at least 2 cm/sec and a volume sensitivity of at least 10.0 mm of chart per liter of volume.

2. Instruments purchased after [DATE ONE YEAR AFTER PUBLICATION OF FINAL RULE IN THE FEDERAL REGISTER] shall provide during testing a paper tracing or real-time display of flow versus volume and volume versus time for the entire forced expiration. Such a tracing or display is necessary to determine whether the patient has performed the test properly. Flow-volume and volume-time curves must be stored and available for recall. Real-time displays shall have a volume scale of at least 5 mm/L,

a time scale of at least 10 mm/s, and a flow scale of at least 2.5 mm/L/s, when both flow-volume and volume-time displays are visible. If hand measurements will be made, paper tracings must be of sufficient size to allow those measurements to be made within requirement of paragraph (a) of this section. If a paper record is made it must have a paper speed of at least 2 cm/sec and a volume sensitivity of at least 10.0 mm of chart per liter of volume.

h. 1. Instruments purchased on or before [DATE ONE YEAR AFTER PUBLICATION OF FINAL RULE IN THE FEDERAL REGISTER] shall be capable of accumulating volume for a minimum of 10 seconds and shall not stop accumulating volume before (i) the volume change for a 0.5-second interval is less than 25 milliliters, or (2) the flow is less than 50 milliliters per second for a 0.5 second interval.

2. Instruments purchased after [DATE ONE YEAR AFTER PUBLICATION OF FINAL RULE IN THE FEDERAL REGISTER] shall be capable of accumulating volume for a minimum of 15 seconds and shall not stop accumulating volume before the volume change for a 1-second interval is less than 25 milliliters.

i. The forced vital capacity (FVC) and forced expiratory volume in 1 second (FEV<sub>1.0</sub>) measurements shall comply with the accuracy requirements stated in paragraph (a) of this section. That is, they should be accurately measured to within  $\pm 50$  ml or within  $\pm 3$  percent of reading, whichever is greater.

j. 1. Instruments purchased on or before [DATE ONE YEAR AFTER PUBLICATION OF FINAL RULE IN THE FEDERAL REGISTER] must be capable of being calibrated in the field with respect to the FEV(1) and FVC. This calibration of the FEV(1) and FVC may be either directly or indirectly through volume and time base

measurements. The volume calibration source should provide a volume displacement of at least 2 liters and should be accurate to within + or - 30 milliliters.

2. Instruments purchased after [DATE ONE YEAR AFTER PUBLICATION OF FINAL RULE IN THE FEDERAL REGISTER] must be capable of having its calibration checked in the field and be recalibrated, if necessary, if the spirometer requires the technician to do so. The volume-calibration syringe shall provide a volume displacement of at least 3 liters and shall be accurate to within  $\pm 0.5$  percent of 3 liters (15 milliliters).

## II. TECHNIQUE FOR MEASUREMENT OF FORCED VITAL CAPACITY MANEUVER

a. Use of a nose clip is recommended but not required. The procedures shall be explained in simple terms to the patient who shall be instructed to loosen any tight clothing and stand in front of the apparatus. The patient may sit, but care should be taken on repeat testing that the same position be used and, if possible, the same spirometer. Particular attention shall be given to ensure that the chin is slightly elevated with the neck slightly extended. The patient shall be instructed to make a full inspiration from a normal breathing pattern and then blow into the apparatus, without interruption, as hard, fast, and completely as possible. At least three and no more than eight forced expirations shall be carried out. During the maneuvers, the patient shall be observed for compliance with instruction. The expirations shall be checked visually for technical acceptability and repeatability from flow-volume or volume-time tracings or displays. The following efforts shall be judged technically unacceptable when the patient:

1. Has not reached full inspiration preceding the forced expiration,
2. Has not used maximal effort during the entire forced expiration,

3. Has not tried to exhale continuously for at least 6 seconds and until an obvious plateau in the volume time curve has occurred,
  4. Has coughed in the first second or closed the glottis,
  5. Has an obstructed mouthpiece or a leak around the mouthpiece (obstruction due to tongue being placed in front of mouthpiece, false teeth falling in front of mouthpiece, etc.),
  6. Has an unsatisfactory start of expiration, one characterized by excessive hesitation (or false starts), and, therefore, not allowing back extrapolation of time 0 (extrapolated volume on the volume-time tracing must be less than 150 milliliters or 5 percent of the FVC, whichever is greater.)
  7. Has an excessive variability between the acceptable curves. The difference between the two largest FVCs from the satisfactory tracings should not exceed 150 milliliters and the difference between the two largest FEV1s of the satisfactory tracings should not exceed 150 milliliters.
- b. Periodic and routine calibration checks of the instrument for recording FVC and FEV1.0 shall be performed using a 3-liter syringe. Calibration checks to ensure that the spirometer is recording 3 liters of injected air to within  $\pm 3.5$  percent, or 2.90 to 3.10 liters, shall be conducted. Calibration checks of flow-type spirometers shall include injection of 3 liters air over a range of speeds, with injection times of 0.5 second, 3 seconds, and 6 or more seconds. Checks of volume-type spirometers shall include a single calibration check and a check to verify that the spirometer is not leaking more than 30 milliliters/minute air.

### III. INTERPRETATION OF SPIROGRAM

a. The first step in evaluating a spirogram should be to determine whether or not the patient has performed the test properly or as described in II above. From the three satisfactory tracings, the forced vital capacity (FVC) and forced expiratory volume in 1 second (FEV<sub>1.0</sub>) shall be measured and recorded. The largest observed FVC and largest observed FEV<sub>1</sub> shall be used in the analysis regardless of the curve(s) on which they occur.

b. [Reserved]

### IV. QUALIFICATIONS OF PERSONNEL ADMINISTERING THE TEST

Technicians who perform pulmonary function testing should have the basic knowledge required to produce meaningful results. Training consisting of approximately 16 hours of formal instruction should cover the following areas.

a. Basic physiology of the forced vital-capacity maneuver and the determinants of airflow limitation, with emphasis on the relation to repeatability of results.

b. Instrumentation requirements, including calibration check procedures, sources of error, and their correction.

c. Performance of the testing including patient coaching, recognition of improperly performed maneuvers and corrective actions.

d. Data quality with emphasis on repeatability.

e. Actual use of the equipment under supervised conditions.

f. Measurement of tracings and calculations of results.

■ 13. Revise paragraphs (n)(2)(iii), and (n)(3)(i) and (ii) of § 1910.1045 to read as follows:

**§ 1910.1045 Acrylonitrile.**

\* \* \* \* \*

(n) \* \* \*

(2) \* \* \*

(iii) 14- by 17-inch or other reasonably-sized standard film or digital posterior-anterior chest X-ray; and

\* \* \* \* \*

(3) \* \* \*

(i) The employer shall provide the examinations specified in paragraphs (n)(2)(i), (ii), and (iv) of this section at least annually for all employees specified in paragraph (n)(1) of this section.

(ii) If an employee has not had the examination specified in paragraphs (n)(2)(i), (ii), and (iv) of this section within 6 months preceding termination of employment, the employer shall make such examination available to the employee prior to such termination.

\* \* \* \* \*

■ 14. Revise Appendix D of § 1910.1048 to read as follows:

§ 1910.1048 Formaldehyde.

\* \* \* \* \*

APPENDIX D TO §1910.1048—NONMANDATORY MEDICAL DISEASE QUESTIONNAIRE

A. Identification

Plant Name: \_\_\_\_\_

Date: \_\_\_\_\_

Employee Name: \_\_\_\_\_

Job Title: \_\_\_\_\_

Birthdate: \_\_\_\_\_

Age: \_\_\_\_\_

Sex: \_\_\_\_\_

Height: \_\_\_\_\_

Weight: \_\_\_\_\_

B. Medical History

1. Have you ever been in the hospital as a patient?

Yes\_\_ No\_\_

If yes, what kind of problem were you having? \_\_\_\_\_  
\_\_\_\_\_

2. Have you ever had any kind of operation?

Yes\_\_ No\_\_

If yes, what kind? \_\_\_\_\_  
\_\_\_\_\_

3. Do you take any kind of medicine regularly?

Yes\_\_ No\_\_

If yes, what kind? \_\_\_\_\_  
\_\_\_\_\_

4. Are you allergic to any drugs, foods, or chemicals?

Yes\_\_ No\_\_

If yes, what kind of allergy is it? \_\_\_\_\_  
\_\_\_\_\_

What causes the allergy? \_\_\_\_\_  
\_\_\_\_\_

5. Have you ever been told that you have asthma, hayfever, or sinusitis?  
Yes\_\_ No\_\_
6. Have you ever been told that you have emphysema, bronchitis, or any other respiratory problems?  
Yes\_\_ No\_\_
7. Have you ever been told you had hepatitis?  
Yes\_\_ No\_\_
8. Have you ever been told that you had cirrhosis?  
Yes\_\_ No\_\_
9. Have you ever been told that you had cancer?  
Yes\_\_ No\_\_
10. Have you ever had arthritis or joint pain?  
Yes\_\_ No\_\_
11. Have you ever been told that you had high blood pressure?  
Yes\_\_ No\_\_
12. Have you ever had a heart attack or heart trouble?  
Yes\_\_ No\_\_

*B-1. Medical History Update*

1. Have you been in the hospital as a patient any time within the past year?  
Yes\_\_ No\_\_  
If so, for what condition? \_\_\_\_\_  
\_\_\_\_\_
2. Have you been under the care of a physician during the past year?  
Yes\_\_ No\_\_  
If so, for what condition? \_\_\_\_\_  
\_\_\_\_\_
3. Is there any change in your breathing since last year?  
Yes\_\_ No\_\_  
Better? \_\_\_\_\_  
Worse? \_\_\_\_\_  
No change? \_\_\_\_\_

If change, do you know why? \_\_\_\_\_  
\_\_\_\_\_

4. Is your general health different this year from last year?

Yes\_\_ No\_\_

If different, in what way? \_\_\_\_\_  
\_\_\_\_\_

5. Have you in the past year or are you now taking any medication on a regular basis?

Yes\_\_ No\_\_

Name Rx \_\_\_\_\_

Condition being treated \_\_\_\_\_

*C. Occupational History*

1. How long have you worked for your present employer?

\_\_\_\_\_

2. What jobs have you held with this employer? Include job title and length of time in each job \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. In each of these jobs, how many hours a day were you exposed to chemicals?

\_\_\_\_\_

4. What chemicals have you worked with most of the time?

\_\_\_\_\_

5. Have you ever noticed any type of skin rash you feel was related to your work?

Yes\_\_ No\_\_

6. Have you ever noticed that any kind of chemical makes you cough?

Yes\_\_ No\_\_

Wheeze?

Yes\_\_ No\_\_

Become short of breath or cause your chest to become tight?

Yes\_\_ No\_\_

7. Are you exposed to any dust or chemicals at home?

Yes\_\_ No\_\_

If yes, explain: \_\_\_\_\_

8. In other jobs, have you ever had exposure to:

Wood dust?

Yes\_\_ No\_\_

Nickel or chromium?

Yes\_\_ No\_\_

Silica (foundry, sand blasting)?

Yes\_\_ No\_\_

Arsenic or asbestos?

Yes\_\_ No\_\_

Organic solvents?

Yes\_\_ No\_\_

Urethane foams?

Yes\_\_ No\_\_

*C-1. Occupational History Update*

1. Are you working on the same job this year as you were last year?

Yes\_\_ No\_\_

If not, how has your job changed? \_\_\_\_\_

2. What chemicals are you exposed to on your job?

3. How many hours a day are you exposed to chemicals?

4. Have you noticed any skin rash within the past year you feel was related to your work?

Yes\_\_ No\_\_

If so, explain circumstances: \_\_\_\_\_

5. Have you noticed that any chemical makes you cough, be short of breath, or wheeze?  
Yes\_\_ No\_\_  
If so, can you identify it? \_\_\_\_\_  
\_\_\_\_\_

*D. Miscellaneous*

1. Do you smoke?  
Yes\_\_ No\_\_  
If so, how much and for how long? \_\_\_\_\_  
\_\_\_\_\_  
Pipe \_\_\_\_\_  
Cigars \_\_\_\_\_  
Cigarettes \_\_\_\_\_
2. Do you drink alcohol in any form?  
Yes\_\_ No\_\_  
If so, how much, how long, and how often? \_\_\_\_\_  
\_\_\_\_\_
3. Do you wear glasses or contact lenses?  
Yes\_\_ No\_\_
4. Do you get any physical exercise other than that required to do your job?  
Yes\_\_ No\_\_  
If so, explain: \_\_\_\_\_  
\_\_\_\_\_
5. Do you have any hobbies or "side jobs" that require you to use chemicals, such as furniture stripping, sand blasting, insulation or manufacture of urethane foam, furniture, etc.?  
Yes\_\_ No\_\_  
If so, please describe, giving type of business or hobby, chemicals used and length of exposures.  
\_\_\_\_\_

*E. Symptoms Questionnaire*

1. Do you ever have any shortness of breath?  
Yes\_\_ No\_\_

If yes, do you have to rest after climbing several flights of stairs?

Yes\_\_ No\_\_

If yes, if you walk on the level with people your own age, do you walk slower than they do?

Yes\_\_ No\_\_

If yes, if you walk slower than a normal pace, do you have to limit the distance that you walk?

Yes\_\_ No\_\_

If yes, do you have to stop and rest while bathing or dressing?

Yes\_\_ No\_\_

2. Do you cough as much as three months out of the year?

Yes\_\_ No\_\_

If yes, have you had this cough for more than two years?

Yes\_\_ No\_\_

If yes, do you ever cough anything up from chest?

Yes\_\_ No\_\_

3. Do you ever have a feeling of smothering, unable to take a deep breath, or tightness in your chest?

Yes\_\_ No\_\_

If yes, do you notice that this on any particular day of the week?

Yes\_\_ No\_\_

If yes, what day or the week?

Yes\_\_ No\_\_

If yes, do you notice that this occurs at any particular place?

Yes\_\_ No\_\_

If yes, do you notice that this is worse after you have returned to work after being off for several days?

Yes\_\_ No\_\_

4. Have you ever noticed any wheezing in your chest?

Yes\_\_ No\_\_

If yes, is this only with colds or other infections?

Yes\_\_ No\_\_

Is this caused by exposure to any kind of dust or other material?

Yes\_\_ No\_\_

If yes, what kind? \_\_\_\_\_

5. Have you noticed any burning, tearing, or redness of your eyes when you are at work?

Yes\_\_ No\_\_

If so, explain circumstances: \_\_\_\_\_

\_\_\_\_\_

6. Have you noticed any sore or burning throat or itchy or burning nose when you are at work?

Yes\_\_ No\_\_

If so, explain circumstances: \_\_\_\_\_

\_\_\_\_\_

7. Have you noticed any stuffiness or dryness of your nose?

Yes\_\_ No\_\_

8. Do you ever have swelling of the eyelids or face?

Yes\_\_ No\_\_

9. Have you ever been jaundiced?

Yes\_\_ No\_\_

If yes, was this accompanied by any pain?

Yes\_\_ No\_\_

10. Have you ever had a tendency to bruise easily or bleed excessively?

Yes\_\_ No\_\_

11. Do you have frequent headaches that are not relieved by aspirin or Tylenol?

Yes\_\_ No\_\_

If yes, do they occur at any particular time of the day or week?

Yes\_\_ No\_\_

If yes, when do they occur? \_\_\_\_\_

\_\_\_\_\_

- 
12. Do you have frequent episodes of nervousness or irritability?  
Yes\_\_ No\_\_
  13. Do you tend to have trouble concentrating or remembering?  
Yes\_\_ No\_\_
  14. Do you ever feel dizzy, light-headed, excessively drowsy or like you have been drugged?  
Yes\_\_ No\_\_
  15. Does your vision ever become blurred?  
Yes\_\_ No\_\_
  16. Do you have numbness or tingling of the hands or feet or other parts of your body?  
Yes\_\_ No\_\_
  17. Have you ever had chronic weakness or fatigue?  
Yes\_\_ No\_\_
  18. Have you ever had any swelling of your feet or ankles to the point where you could not wear your shoes?  
Yes\_\_ No\_\_
  19. Are you bothered by heartburn or indigestion?  
Yes\_\_ No\_\_
  20. Do you ever have itching, dryness, or peeling and scaling of the hands?  
Yes\_\_ No\_\_
  21. Do you ever have a burning sensation in the hands, or reddening of the skin?  
Yes\_\_ No\_\_
  22. Do you ever have cracking or bleeding of the skin on your hands?  
Yes\_\_ No\_\_
  23. Are you under a physician's care?  
Yes\_\_ No\_\_  
If yes, for what are you being treated? \_\_\_\_\_  
\_\_\_\_\_
  24. Do you have any physical complaints today?  
Yes\_\_ No\_\_  
If yes, explain? \_\_\_\_\_  
\_\_\_\_\_

25. Do you have other health conditions not covered by these questions?

Yes\_\_ No\_\_

If yes, explain: \_\_\_\_\_

\_\_\_\_\_

§ 1910.1051 1,3-Butadiene.

\* \* \* \* \*

**APPENDIX F TO §1910.1051—MEDICAL QUESTIONNAIRES (NON-MANDATORY))****1,3-Butadiene (BD) Initial Health Questionnaire****DIRECTIONS:**

You have been asked to answer the questions on this form because you work with BD (butadiene). These questions are about your work, medical history, and health concerns. Please do your best to answer all of the questions. If you need help, please tell the doctor or health care professional who reviews this form.

This form is a confidential medical record. Only information directly related to your health and safety on the job may be given to your employer. Personal health information will not be given to anyone without your consent.

Date: \_\_\_\_\_

Name: \_\_\_\_\_

Last

First

MI

Job Title: \_\_\_\_\_

Company's Name: \_\_\_\_\_

Supervisor's Name: \_\_\_\_\_ Supervisor's Phone No.: ( ) \_\_\_\_ - \_\_\_\_

**Work History**

1. Please list all jobs you have had in the past, starting with the job you have now and moving back in time to your first job. (For more space, write on the back of this page.)

Main Job Duty	Years	Company Name City, State	Chemicals
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			

2. Please describe what you do during a typical work day. Be sure to tell about you work with BD

\_\_\_\_\_

\_\_\_\_\_

3. \_\_\_\_\_  
Please check any of these chemicals that you work with now or have worked with in the past:

- benzene \_\_\_\_\_
- glues \_\_\_\_\_
- toluene \_\_\_\_\_
- inks, dyes \_\_\_\_\_
- other solvents, grease cutters \_\_\_\_\_
- insecticides (like DDT, lindane, etc.) \_\_\_\_\_
- paints, varnishes, thinners, strippers \_\_\_\_\_
- dusts \_\_\_\_\_
- carbon tetrachloride ("carbon tet") \_\_\_\_\_
- arsine \_\_\_\_\_
- carbon disulfide \_\_\_\_\_
- lead \_\_\_\_\_
- cement \_\_\_\_\_
- petroleum products \_\_\_\_\_
- nitrites \_\_\_\_\_

4. Please check the protective clothing or equipment you use at the job you have now:

- gloves \_\_\_\_\_
- coveralls \_\_\_\_\_
- respirator \_\_\_\_\_
- dust mask \_\_\_\_\_

safety glasses, goggles \_\_\_\_\_

Please circle your answer of yes or no.

5. Does your protective clothing or equipment fit you properly?

yes no

6. Have you ever made changes in your protective clothing or equipment to make it fit better?

yes no

7. Have you been exposed to BD when you were not wearing protective clothing or equipment?

yes no

8. Where do you eat, drink and/or smoke when you are at work?

(Please check all that apply.)

Cafeteria/restaurant/snack bar \_\_\_\_\_

Break room/employee lounge \_\_\_\_\_

Smoking lounge \_\_\_\_\_

At my work station \_\_\_\_\_

Please circle your answer.

9. Have you been exposed to radiation (like x-rays or nuclear material) at the job you have now or at past jobs?

yes no

10. Do you have any hobbies that expose you to dusts or chemicals (including paints, glues, etc.)?

yes no

11. Do you have any second or side jobs?

yes no

If yes, what are your duties there? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

12. Were you in the military?

yes no

If yes, what did you do in the military? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Family Health History**

1. In the FAMILY MEMBER column, across from the disease name, write which family member, if any, had the disease.

<b>Disease</b>	<b>Family Member</b>
Cancer	
Lymphoma	
Sickle Cell Disease or Trait	
Immune Disease	
Leukemia	
Anemia	

2. Please fill in the following information about family health:

<b>RELATIVE</b>	<b>ALIVE?</b>	<b>AGE AT DEATH?</b>	<b>CAUSE OF DEATH?</b>
Father			
Mother			
Brother/Sister			
Brother/Sister			
Brother/Sister			

**PERSONAL HEALTH HISTORY**

Birth Date \_\_\_/\_\_\_/\_\_\_ Age \_\_\_ Sex \_\_\_ Height \_\_\_ Weight \_\_\_

Please circle your answer.

1. Do you smoke any tobacco products?

yes no

2. Have you ever had any kind of surgery or operation?

yes no

If yes, what type of surgery: \_\_\_\_\_

\_\_\_\_\_

3. Have you ever been in the hospital for any other reasons?

yes no

If yes, please describe the reason: \_\_\_\_\_

\_\_\_\_\_

4. Do you have any on-going or current medical problems or conditions?

yes no

If yes, please describe: \_\_\_\_\_

\_\_\_\_\_

5. Do you now have or have you ever had any of the following?

Please check all that apply to you.

unexplained fever	_____	liver disease	_____
anemia ("low blood")	_____	cancer	_____
HIV/AIDS	_____	infertility	_____
weakness	_____	drinking problems	_____
sickle cell	_____	thyroid problems	_____
miscarriage	_____	night sweats	_____
skin rash	_____	chest pain	_____
bloody stools	_____	still birth	_____
leukemia/lymphoma	_____	eye redness	_____
neck mass/swelling	_____	lumps you can feel	_____
wheezing	_____	child with birth defect	_____
yellowing of skin	_____	autoimmune disease	_____
bruising easily	_____	overly tired	_____
lupus	_____	lung problems	_____
weight loss	_____	rheumatoid arthritis	_____
kidney problems	_____	mononucleosis("mono")	_____
enlarged lymph nodes	_____	nagging cough	_____

Please circle your answer.

6. Do you have any symptoms or health problems that you think may be related to your work with BD?

yes    no

If yes, please describe: \_\_\_\_\_

\_\_\_\_\_

7. Have any of your co-workers had similar symptoms or problems?

yes no don't know

If yes, please describe: \_\_\_\_\_

\_\_\_\_\_

8. Do you notice any irritation of your eyes, nose, throat, lungs or skin when working with BD?

yes no

9. Do you notice any blurred vision, coughing, drowsiness, nausea, or headache when working with BD?

yes no

10. Do you take any medications (including birth control or over-the-counter)?

yes no

If yes, please list: \_\_\_\_\_

\_\_\_\_\_

11. Are you allergic to any medication, food, or chemicals?

yes no

If yes, please list: \_\_\_\_\_

\_\_\_\_\_

12. Do you have any health conditions not covered by this questionnaire that you think are affected by your work with BD?

yes    no

If yes, please explain: \_\_\_\_\_

\_\_\_\_\_

13. Did you understand all the questions?

yes    no

\_\_\_\_\_  
Signature

\_\_\_\_\_

1,3-Butadiene (BD) Update Health Questionnaire

**DIRECTIONS:**

You have been asked to answer the questions on this form because you work with BD (butadiene). These questions ask about changes in your work, medical history, and health concerns since the last time you were evaluated. Please do your best to answer all of the questions. If you need help, please tell the doctor or health care professional who reviews this form.

This form is a confidential medical record. Only information directly related to your health and safety on the job may be given to your employer. Personal health information will not be given to anyone without your consent.

Date: \_\_\_\_\_

Name: \_\_\_\_\_

Last

First

MI

Job Title: \_\_\_\_\_

Company's Name: \_\_\_\_\_

Supervisor's Name: \_\_\_\_\_ Supervisor's Phone No.: ( ) \_\_\_\_\_ - \_\_\_\_\_

**Present Work History**

1. Please describe any NEW duties that you have at your job: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

2. Please list any additional job titles you have:

_____	_____
_____	_____
_____	_____

Please circle your answer.

3. Are you exposed to any other chemicals in your work since the last time you were evaluated for exposure to BD?

yes no

If yes, please list what they are: \_\_\_\_\_

\_\_\_\_\_

4. Does your personal protective equipment and clothing fit you properly?

yes no

5. Have you made changes in this equipment or clothing to make it fit better?

yes no

6. Have you been exposed to BD when you were not wearing protective equipment or clothing?

yes no

7. Are you exposed to any NEW chemicals at home or while working on hobbies?

yes no

If yes, please list what they are: \_\_\_\_\_

\_\_\_\_\_

8. Since your last BD health evaluation, have you started working any new second or side jobs?

yes no

If yes, what are your duties there? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Personal Health History

- 1. What is your current weight? \_\_\_\_\_ pounds
- 2. Have you been diagnosed with any new medical conditions or illness since your last evaluation?

yes no

If yes, please tell what they are: \_\_\_\_\_  
\_\_\_\_\_

- 3. Since your last evaluation, have you been in the hospital for any illnesses, injuries, or surgery?

yes no

If yes, please describe: \_\_\_\_\_  
\_\_\_\_\_

- 4. Do you have any of the following? Please place a check for all that apply to you.

unexplained fever	_____	neck mass/swelling	_____
anemia ("low blood")	_____	wheezing	_____
HIV/AIDS	_____	chest pain	_____
weakness	_____	bruising easily	_____
sickle cell	_____	lupus	_____
miscarriage	_____	weight loss	_____
skin rash	_____	kidney problems	_____
bloody rash	_____	enlarged lymph nodes	_____
leukemia/lymphoma	_____	liver disease	_____

cancer	_____	child with birth defect	_____
infertility	_____	autoimmune disease	_____
drinking problems	_____	overly tired	_____
thyroid problems	_____	lung problems	_____
night sweats	_____	rheumatoid arthritis	_____
still birth	_____	mononucleosis "mono"	_____
eye redness	_____	nagging cough	_____
lumps you can feel	_____	yellowing of skin	_____

Please circle your answer.

5. Do you have any symptoms or health problems that you think may be related to your work with BD?

yes    no

If yes, please describe: \_\_\_\_\_  
\_\_\_\_\_

6. Have any of your co-workers had similar symptoms or problems?

yes    no    don't know

If yes, please describe: \_\_\_\_\_  
\_\_\_\_\_

7. Do you notice any irritation of your eyes, nose, throat, lungs, or skin when working with BD?

yes    no

8. Do you notice any blurred vision, coughing, drowsiness, nausea, or headache when working with BD?

yes no

9. Have you been taking any NEW medications (including birth control or over-the-counter)?

yes no

If yes, please list:

\_\_\_\_\_

\_\_\_\_\_

10. Have you developed any NEW allergies to medications, foods, or chemicals?

yes no

If yes, please list:

\_\_\_\_\_

\_\_\_\_\_

11. Do you have any health conditions not covered by this questionnaire that you think are affected by your work with BD?

yes no

If yes, please explain: \_\_\_\_\_

\_\_\_\_\_

12. Did you understand all the questions?

yes    no

\_\_\_\_\_

Signature

■ 16. Revise Appendix B, section IV., of §1910.1052 to read as follows:

**§ 1910.1052 Methylene chloride.**  
\*   \*   \*   \*   \*

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**APPENDIX B TO SECTION 1910.1052—MEDICAL SURVEILLANCE FOR  
METHYLENE CHLORIDE**

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\* \* \* \* \*

#### IV. SURVEILLANCE AND PREVENTIVE CONSIDERATIONS

As discussed above, MC is classified as a suspect or potential human carcinogen. It is a central nervous system (CNS) depressant and a skin, eye and respiratory tract irritant. At extremely high concentrations, MC has caused liver damage in animals. MC principally affects the CNS, where it acts as a narcotic. The observation of the symptoms characteristic of CNS depression, along with a physical examination, provides the best detection of early neurological disorders. Since exposure to MC also increases the carboxyhemoglobin level in the blood, ambient carbon monoxide levels would have an additive effect on that carboxyhemoglobin level. Based on such information, a periodic post-shift carboxyhemoglobin test as an index of the presence of carbon monoxide in the blood is recommended, but not required, for medical surveillance.

Based on the animal evidence and three epidemiologic studies previously mentioned, OSHA concludes that MC is a suspect human carcinogen. The medical surveillance program is designed to observe exposed workers on a regular basis. While the medical surveillance program cannot detect MC-induced cancer at a preneoplastic stage, OSHA anticipates that, as in the past, early detection and treatments of cancers leading to enhanced survival rates will continue to evolve.

##### A. Medical and Occupational History:

The medical and occupational work history plays an important role in the initial evaluation of workers exposed to MC. It is therefore extremely important for the examining physician or other licensed health care professional to evaluate the MC-exposed worker carefully and completely and to focus the examination on MC's potentially associated health hazards. The medical evaluation must include an annual detailed work and medical history with special emphasis on cardiac history and neurological symptoms.

An important goal of the medical history is to elicit information from the worker regarding potential signs or symptoms associated with increased levels of carboxyhemoglobin due to the presence of carbon monoxide in the blood. Physicians or other licensed health care professionals should ensure that the smoking history of all MC exposed employees is known. Exposure to MC may cause a significant increase in carboxyhemoglobin level in all exposed persons. However, smokers as well as workers with anemia or heart disease and those concurrently exposed to carbon monoxide are at especially high risk of toxic effects because of an already reduced oxygen carrying capacity of the blood.

A comprehensive or interim medical and work history should also include occurrence of headache, dizziness, fatigue, chest pain, shortness of breath, pain in the limbs, and irritation of the skin and eyes.

In addition, it is important for the physician or other licensed health care professional to become familiar with the operating conditions in which exposure to MC is likely to occur. The physician or other licensed health care professional also must become familiar with the signs and symptoms that may indicate that a worker is receiving otherwise unrecognized and exceptionally high exposure levels of MC.

An example of a medical and work history that would satisfy the requirement for a comprehensive or interim work history is represented by the following:

The following is a list of recommended questions and issues for the self-administered questionnaire for methylene chloride exposure.

## QUESTIONNAIRE FOR METHYLENE CHLORIDE EXPOSURE

### *I. Demographic Information*

1. Name
2. Date
3. Date of Birth
4. Age
5. Present occupation
6. Sex
7. Race

### *II. Occupational History*

1. Have you ever worked with methylene chloride, dichloromethane, methylene dichloride, or CH<sub>2</sub>Cl<sub>2</sub> (all are different names for the same chemical)? Please list which on the occupational history form if you have not already.
2. If you have worked in any of the following industries and have not listed them on the occupational history form, please do so.

Furniture stripping

Polyurethane foam manufacturing

Chemical manufacturing or formulation

Pharmaceutical manufacturing

Any industry in which you used solvents to clean and degrease equipment or parts

Construction, especially painting and refinishing

Aerosol manufacturing

Any industry in which you used aerosol adhesives

3. If you have not listed hobbies or household projects on the occupational history form, especially furniture refinishing, spray painting, or paint stripping, please do so.

*III. Medical History*

## A. General

1. Do you consider yourself to be in good health? If no, state reason(s).
2. Do you or have you ever had:
  - a. Persistent thirst
  - b. Frequent urination (three times or more at night)
  - c. Dermatitis or irritated skin
  - d. Non-healing wounds
3. What prescription or non-prescription medications do you take, and for what reasons?
4. Are you allergic to any medications, and what type of reaction do you have?

## B. Respiratory

1. Do you have or have you ever had any chest illnesses or diseases? Explain.
2. Do you have or have you ever had any of the following:
  - a. Asthma
  - b. Wheezing
  - c. Shortness of breath
3. Have you ever had an abnormal chest X-ray? If so, when, where, and what were the findings?
4. Have you ever had difficulty using a respirator or breathing apparatus? Explain.
5. Do any chest or lung diseases run in your family? Explain.
6. Have you ever smoked cigarettes, cigars, or a pipe? Age started:
7. Do you now smoke?
8. If you have stopped smoking completely, how old were you when you stopped?
9. On the average of the entire time you smoked, how many packs of cigarettes, cigars, or bowls of tobacco did you smoke per day?

---

### C. Cardiovascular

1. Have you ever been diagnosed with any of the following: Which of the following apply to you now or did apply to you at some time in the past, even if the problem is controlled by medication? Please explain any yes answers (i.e., when problem was diagnosed, length of time on medication).
  - a. High cholesterol or triglyceride level
  - b. Hypertension (high blood pressure)
  - c. Diabetes
  - d. Family history of heart attack, stroke, or blocked arteries
2. Have you ever had chest pain? If so, answer the next five questions.
  - a. What was the quality of the pain (i.e., crushing, stabbing, squeezing)?
  - b. Did the pain go anywhere (i.e., into jaw, left arm)?
  - c. What brought the pain out?
  - d. How long did it last?
  - e. What made the pain go away?
3. Have you ever had heart disease, a heart attack, stroke, aneurysm, or blocked arteries anywhere in your body? Explain (when, treatment).
4. Have you ever had bypass surgery for blocked arteries in your heart or anywhere else? Explain.
5. Have you ever had any other procedures done to open up a blocked artery (balloon angioplasty, carotid endarterectomy, clot-dissolving drug)?
6. Do you have or have you ever had (explain each):
  - a. Heart murmur
  - b. Irregular heartbeat
  - c. Shortness of breath while lying flat
  - d. Congestive heart failure
  - e. Ankle swelling

- f. Recurrent pain anywhere below the waist while walking
- 7. Have you ever had an electrocardiogram (EKG)? When?
- 8. Have you ever had an abnormal EKG? If so, when, where, and what were the findings?
- 9. Do any heart diseases, high blood pressure, diabetes, high cholesterol, or high triglycerides run in your family? Explain.

#### D. Hepatobiliary and Pancreas

- 1. Do you now or have you ever drunk alcoholic beverages?  
Age started: \_\_\_\_\_ Age stopped: \_\_\_\_\_.
- 2. Average numbers per week:
  - a. Beers: \_\_\_\_\_, ounces in usual container:
  - b. Glasses of wine: \_\_\_\_\_, ounces per glass:
  - c. Drinks: \_\_\_\_\_, ounces in usual container:
- 3. Do you have or have you ever had (explain each):
  - a. Hepatitis (infectious, autoimmune, drug-induced, or chemical)
  - b. Jaundice
  - c. Elevated liver enzymes or elevated bilirubin
  - d. Liver disease or cancer

#### E. Central Nervous System

- 1. Do you or have you ever had (explain each):
  - a. Headache
  - a. Dizziness
  - b. Fainting
  - c. Loss of consciousness
  - d. Garbled speech
  - e. Lack of balance
  - f. Mental/psychiatric illness
  - g. Forgetfulness

---

## F. Hematologic

1. Do you have, or have you ever had (explain each):
  - a. Anemia
  - b. Sickle cell disease or trait
  - c. Glucose-6-phosphate dehydrogenase deficiency
  - d. Bleeding tendency disorder
  
2. If not already mentioned previously, have you ever had a reaction to sulfa drugs or to drugs used to prevent or treat malaria? What was the drug? Describe the reaction.

### B. Physical Examination

The complete physical examination, when coupled with the medical and occupational history, assists the physician or other licensed health care professional in detecting pre-existing conditions that might place the employee at increased risk, and establishes a baseline for future health monitoring. These examinations should include:

1. Clinical impressions of the nervous system, cardiovascular function and pulmonary function, with additional tests conducted where indicated or determined by the examining physician or other licensed health care professional to be necessary.
  
2. An evaluation of the advisability of the worker using a respirator, because the use of certain respirators places an additional burden on the cardiopulmonary system. It is necessary for the attending physician or other licensed health care professional to evaluate the cardiopulmonary function of these workers, in order to inform the employer in a written medical opinion of the worker's ability or fitness to work in an area requiring the use of certain types of respiratory protective equipment. The presence of facial hair or scars that might interfere with the worker's ability to wear certain types of respirators should also be noted during the examination and in the written medical opinion.

Because of the importance of lung function to workers required to wear certain types of respirators to protect themselves from MC exposure, these workers must receive an assessment of pulmonary function before they begin to wear a negative pressure respirator and at least annually thereafter. The recommended pulmonary function tests include measurement of the employee's forced vital capacity (FVC), forced expiratory volume at one second (FEV(1)), as well as calculation of the ratios of FEV(1) to FVC, and the ratios of measured FVC and measured FEV(1) to expected respective values corrected for variation due to age, sex, race, and height. Pulmonary function evaluation must be conducted by a physician or other licensed health care professional experienced in pulmonary function tests.

The following is a summary of the elements of a physical exam which would fulfill the requirements under the MC standard:

## PHYSICAL EXAM

### *I. Skin and appendages*

1. Irritated or broken skin
2. Jaundice
3. Clubbing cyanosis, edema
4. Capillary refill time
5. Pallor

### *II. Head*

1. Facial deformities
2. Scars
3. Hair growth

### *III. Eyes*

1. Scleral icterus
2. Corneal arcus
3. Pupillary size and response
4. Fundoscopic exam

### *IV. Chest*

1. Standard exam

### *V. Heart*

1. Standard exam
2. Jugular vein distension
3. Peripheral pulses

### *VI. Abdomen*

1. Liver span

*VII. Nervous System*

1. Complete standard neurologic exam

*VIII. Laboratory*

1. Hemoglobin and hematocrit
2. Alanine aminotransferase (ALT, SGPT)
3. Post-shift carboxyhemoglobin

*IX. Studies*

1. Pulmonary function testing
2. Electrocardiogram

An evaluation of the oxygen carrying capacity of the blood of employees (for example by measured red blood cell volume) is considered useful, especially for workers acutely exposed to MC.

It is also recommended, but not required, that end of shift carboxyhemoglobin levels be determined periodically, and any level above 3% for non-smokers and above 10% for smokers should prompt an investigation of the worker and his workplace. This test is recommended because MC is metabolized to CO, which combines strongly with hemoglobin, resulting in a reduced capacity of the blood to transport oxygen in the body. This is of particular concern for cigarette smokers because they already have a diminished hemoglobin capacity due to the presence of CO in cigarette smoke.

*C. Additional Examinations and Referrals*

1. Examination by a Specialist

When a worker examination reveals unexplained symptoms or signs (i.e. in the physical examination or in the laboratory tests), follow-up medical examinations are necessary to assure that MC exposure is not adversely affecting the worker's health. When the examining physician or other licensed health care professional finds it necessary, additional tests should be included to determine the nature of the medical problem and the underlying cause. Where relevant, the worker should be sent to a specialist for further testing and treatment as deemed necessary.

The final rule requires additional investigations to be covered and it also permits physicians or other licensed health care professionals to add appropriate or necessary tests to improve the diagnosis of disease should such tests become available in the future.

## 2. Emergencies

The examination of workers exposed to MC in an emergency should be directed at the organ systems most likely to be affected. If the worker has received a severe acute exposure, hospitalization may be required to assure proper medical intervention. It is not possible to precisely define "severe," but the physician or other licensed health care professional's judgement should not merely rest on hospitalization. If the worker has suffered significant conjunctival, oral, or nasal irritation, respiratory distress, or discomfort, the physician or other licensed health care professional should instigate appropriate follow-up procedures. These include attention to the eyes, lungs and the neurological system. The frequency of follow-up examinations should be determined by the attending physician or other licensed health care professional. This testing permits the early identification essential to proper medical management of such workers.

### *D. Employer Obligations*

The employer is required to provide the responsible physician or other licensed health care professional and any specialists involved in a diagnosis with the following information: a copy of the MC standard including relevant appendices, a description of the affected employee's duties as they relate to his or her exposure to MC; an estimate of the employee's exposure including duration (e.g., 15hr/wk, three 8-hour shifts/wk, full time); a description of any personal protective equipment used by the employee, including respirators; and the results of any previous medical determinations for the affected employee related to MC exposure to the extent that this information is within the employer's control.

### *E. Physicians' or Other Licensed Health Care Professionals' Obligations*

The standard requires the employer to ensure that the physician or other licensed health care professional provides a written statement to the employee and the employer. This statement should contain the physician's or licensed health care professional's opinion as to whether the employee has any medical condition placing him or her at increased risk of impaired health from exposure to MC or use of respirators, as appropriate. The physician or other licensed health care professional should also state his or her opinion regarding any restrictions that should be placed on the employee's exposure to MC or upon the use of protective clothing or equipment such as respirators. If the employee wears a respirator as a result of his or her exposure to MC, the physician or other licensed health care professional's opinion should also contain a statement regarding the suitability of the employee to wear the type of respirator assigned. Furthermore, the employee should be informed by the physician or other licensed health care professional about the cancer risk of MC and about risk factors for heart disease, and the potential for exacerbation of underlying heart disease by exposure to MC through its metabolism to carbon monoxide. Finally, the physician or other licensed health care professional should inform the employer that the employee has been told the results of the medical examination and of any medical conditions which require further explanation

or treatment. This written opinion must not contain any information on specific findings or diagnosis unrelated to employee's occupational exposures.

The purpose in requiring the examining physician or other licensed health care professional to supply the employer with a written opinion is to provide the employer with a medical basis to assist the employer in placing employees initially, in assuring that their health is not being impaired by exposure to MC, and to assess the employee's ability to use any required protective equipment.

\* \* \* \* \*

**PART 1915—OCCUPATIONAL SAFETY AND HEALTH STANDARDS FOR SHIPYARD EMPLOYMENT**

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

**Authority:** Section 41, Longshore and Harbor Workers' Compensation Act (33 U.S.C. 941); Sections 4, 6, and 8 of the Occupational Safety and Health Act of 1970 (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), as applicable; 29 CFR part 1911.

Sections 1915.120 and 1915.152 of 29 CFR also issued under 29 CFR part 1911.

**Subpart A—General Provisions**

■ 18. Add paragraph (d)(6) to § 1915.5 to read as follows:

**§ 1915.5 Incorporation by reference.**

\* \* \* \* \*

(d) \* \* \*

(6) The following material is available for purchase from the International Labour Organization (ILO), 4 route des

Morillons, CH-1211 Genève 22, Switzerland; telephone: +41 (0) 22 799 6111; fax: +41 (0) 22 798 8685; Web site: <http://www.ilo.org/>.

(i) Guidelines for the Use of the ILO International Classification of Radiographs of Pneumoconioses, Revised Edition 2011, Occupational safety and health series; 22 (Rev.2011), IBR approved for § 1915.1001, Appendix E.

\* \* \* \* \*

**Subpart F—General Working Conditions**

■ 19. Revise paragraph (b)(33) of § 1915.80 to read as follows:

**§ 1915.80 Scope, application, definitions, and effective dates.**

\* \* \* \* \*

(b) \* \* \*

(33) *Vermin.* Insects, birds, rodents and other animals that may create safety and health hazards for employees.

\* \* \* \* \*

**Subpart Z—Toxic and Hazardous Substances**

- 20. Amend § 1915.1001 by:
  - a. Revising paragraph (m)(2)(ii)(C);
  - b. Revising Appendix D;
  - c. Revising Appendix E;
  - d. Revising Appendix I, sections III and IV(iii).

The revisions read as follows:

**§ 1915.1001 Asbestos.**

\* \* \* \* \*

(m) \* \* \*

(2) \* \* \*

(ii) \* \* \*

(C) A physical examination directed to the pulmonary and gastrointestinal systems, including a 14- by 17-inch or other reasonably-sized standard film or digital posterior-anterior chest X-ray to be administered at the discretion of the physician, and pulmonary function tests of forced vital capacity (FVC) and forced expiratory volume at one second (FEV(1)). Classification of all chest X-rays shall be conducted in accordance with Appendix E to this section.

\* \* \* \* \*

## APPENDIX D TO § 1915.1001—MEDICAL QUESTIONNAIRES; MANDATORY

This mandatory appendix contains the medical questionnaires that must be administered to all employees who are exposed to asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals above the permissible exposure limit (0.1 f/cc), and who will therefore be included in their employer's medical surveillance program. Part 1 of the appendix contains the Initial Medical Questionnaire, which must be obtained for all new hires who will be covered by the medical surveillance requirements. Part 2 includes the abbreviated Periodical Medical Questionnaire, which must be administered to all employees who are provided periodic medical examinations under the medical surveillance provisions of the standard.

Part 1  
INITIAL MEDICAL QUESTIONNAIRE

1. NAME \_\_\_\_\_
2. CLOCK NUMBER \_\_\_\_\_
3. PRESENT OCCUPATION \_\_\_\_\_
4. PLANT \_\_\_\_\_
5. ADDRESS \_\_\_\_\_
6. \_\_\_\_\_  
(Zip Code) \_\_\_\_\_
7. TELEPHONE NUMBER \_\_\_\_\_
8. INTERVIEWER \_\_\_\_\_
9. DATE \_\_\_\_\_
10. Date of Birth \_\_\_\_\_  

Month	Day	Year
-------	-----	------
11. Place of Birth \_\_\_\_\_
12. Sex
 

1. Male	_____
2. Female	_____
13. What is your marital status?
 

1. Single	_____	4. Separated/ Divorced	_____
2. Married	_____		
3. Widowed	_____		
14. Race
 

1. White	_____	4. Hispanic	_____
2. Black	_____	5. Indian	_____
3. Asian	_____	6. Other	_____
15. What is the highest grade completed in school? \_\_\_\_\_  
(For example 12 years is completion of high school)

OCCUPATIONAL HISTORY

16A. Have you ever worked full time (30 hours per week or more) for 6 months or more? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 16A:

B. Have you ever worked for a year or more in any dusty job? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

Specify job/industry \_\_\_\_\_ Total Years Worked \_\_\_

Was dust exposure: 1. Mild \_\_\_ 2. Moderate \_\_\_ 3. Severe \_\_\_

C. Have you ever been exposed to gas or chemical fumes in your work? 1. Yes \_\_\_ 2. No \_\_\_

Specify job/industry \_\_\_\_\_ Total Years Worked \_\_\_

Was exposure: 1. Mild \_\_\_ 2. Moderate \_\_\_ 3. Severe \_\_\_

D. What has been your usual occupation or job -- the one you have worked at the longest?  
1. Job occupation \_\_\_\_\_  
2. Number of years employed in this occupation \_\_\_\_\_  
3. Position/job title \_\_\_\_\_  
4. Business, field or industry \_\_\_\_\_

(Record on lines the years in which you have worked in any of these industries, e.g. 1960-1969)

Have you ever worked:	YES	NO
E. In a mine? .....	_____	_____
F. In a quarry? .....	_____	_____
G. In a foundry? .....	_____	_____
H. In a pottery? .....	_____	_____
I. In a cotton, flax or hemp mill?....	_____	_____
J. With asbestos? .....	_____	_____

<b>17. <u>PAST MEDICAL HISTORY</u></b>	<b>YES</b>	<b>NO</b>
A. Do you consider yourself to be in good health?	_____	_____
If "NO" state reason _____		
B. Have you any defect of vision?	_____	_____
If "YES" state nature of defect _____		
C. Have you any hearing defect?	_____	_____
If "YES" state nature of defect _____		
D. Are you suffering from or have you ever suffered from:	<b>YES</b>	<b>NO</b>
a. Epilepsy (or fits, seizures, convulsions)?	_____	_____
b. Rheumatic fever?	_____	_____
c. Kidney disease?	_____	_____
d. Bladder disease?	_____	_____
e. Diabetes?	_____	_____
f. Jaundice?	_____	_____

**18. CHEST COLDS AND CHEST ILLNESSES**

18A. If you get a cold, does it "usually" go to your chest? (Usually means more than 1/2 the time)

	1. Yes _____	2. No _____
	3. Don't get colds _____	

19A. During the past 3 years, have you had any chest illnesses that have kept you off work, indoors at home, or in bed?

	1. Yes _____	2. No _____
--	--------------	-------------

## IF YES TO 19A:

B. Did you produce phlegm with any of these chest illnesses? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

C. In the last 3 years, how many such illnesses with (increased) phlegm did you have which lasted a week or more? Number of illnesses \_\_\_  
No such illnesses \_\_\_

20. Did you have any lung trouble before the age of 16? 1. Yes \_\_\_ 2. No \_\_\_

## 21. Have you ever had any of the following?

1A. Attacks of bronchitis? 1. Yes \_\_\_ 2. No \_\_\_

## IF YES TO 1A:

B. Was it confirmed by a doctor? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

C. At what age was your first attack? Age in Years \_\_\_  
Does Not Apply \_\_\_

2A. Pneumonia (include bronchopneumonia)? 1. Yes \_\_\_ 2. No \_\_\_

## IF YES TO 2A:

B. Was it confirmed by a doctor? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

C. At what age did you first have it? Age in Years \_\_\_  
Does Not Apply \_\_\_

3A. Hay Fever? 1. Yes \_\_\_ 2. No \_\_\_

## IF YES TO 3A:

B. Was it confirmed by a doctor? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

C. At what age did it start? Age in Years \_\_\_  
Does Not Apply \_\_\_

- 22A. Have you ever had chronic bronchitis? 1. Yes \_\_\_ 2. No \_\_\_
- IF YES TO 22A:
- B. Do you still have it? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_
- C. Was it confirmed by a doctor? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_
- D. At what age did it start? Age in Years \_\_\_  
Does Not Apply \_\_\_
- 23A. Have you ever had emphysema? 1. Yes \_\_\_ 2. No \_\_\_
- IF YES TO 23A:
- B. Do you still have it? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_
- C. Was it confirmed by a doctor? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_
- D. At what age did it start? Age in Years \_\_\_  
Does Not Apply \_\_\_
- 24A. Have you ever had asthma? 1. Yes \_\_\_ 2. No \_\_\_
- IF YES TO 24A:
- B. Do you still have it? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_
- C. Was it confirmed by a doctor? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_
- D. At what age did it start? Age in Years \_\_\_  
Does Not Apply \_\_\_
- E. If you no longer have it, at what age did it stop? Age stopped \_\_\_  
Does Not Apply \_\_\_

25. Have you ever had:

A. Any other chest illness? 1. Yes \_\_\_ 2. No \_\_\_

If yes, please specify \_\_\_\_\_

B. Any chest operations? 1. Yes \_\_\_ 2. No \_\_\_

If yes, please specify \_\_\_\_\_

C. Any chest injuries? 1. Yes \_\_\_ 2. No \_\_\_

If yes, please specify \_\_\_\_\_

26A. Has a doctor ever told you that you had heart trouble? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 26A:

B. Have you ever had treatment for heart trouble in the past 10 years? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

27A. Has a doctor told you that you had high blood pressure? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 27A:

B. Have you had any treatment for high blood pressure (hypertension) in the past 10 years? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

28. When did you last have your chest X-rayed? (Year) \_\_\_ \_\_\_ \_\_\_ \_\_\_

29. Where did you last have your chest X-rayed (if known)? \_\_\_\_\_

What was the outcome? \_\_\_\_\_

FAMILY HISTORY

30. Were either of your natural parents ever told by a doctor that they had a chronic lung condition such as:	FATHER			MOTHER		
	1. Yes	2. No	3. Don't know	1. Yes	2. No	3. Don't know
A. Chronic Bronchitis?	___	___	___	___	___	___
B. Emphysema?	___	___	___	___	___	___
C. Asthma?	___	___	___	___	___	___
D. Lung cancer?	___	___	___	___	___	___
E. Other chest conditions?	___	___	___	___	___	___
F. Is parent currently alive?	___	___	___	___	___	___
G. Please Specify	___	Age if Living	___	___	Age if Living	___
	___	Age at Death	___	___	Age at Death	___
	___	Don't Know	___	___	Don't Know	___
H. Please specify cause of death	_____			_____		

COUGH

- 31A. Do you usually have a cough? (Count a cough with first smoke or on first going out of doors. Exclude clearing of throat.) (If no, skip to question 31C.) 1. Yes \_\_\_ 2. No \_\_\_
- B. Do you usually cough as much as 4 to 6 times a day 4 or more days out of the week? 1. Yes \_\_\_ 2. No \_\_\_
- C. Do you usually cough at all on getting up or first thing in the morning? 1. Yes \_\_\_ 2. No \_\_\_

D. Do you usually cough at all during the rest of the day or at night? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO ANY OF ABOVE (31A, B, C, OR D), ANSWER THE FOLLOWING. IF NO TO ALL, CHECK "DOES NOT APPLY" AND SKIP TO NEXT PAGE

E. Do you usually cough like this on most days for 3 consecutive months or more during the year? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

F. For how many years have you had the cough? Number of years \_\_\_  
Does not apply \_\_\_

32A. Do you usually bring up phlegm from your chest? 1. Yes \_\_\_ 2. No \_\_\_  
Count phlegm with the first smoke or on first going out of doors. Exclude phlegm from the nose. Count swallowed phlegm.)  
(If no, skip to 32C)

B. Do you usually bring up phlegm like this as much as twice a day 4 or more days out of the week? 1. Yes \_\_\_ 2. No \_\_\_

C. Do you usually bring up phlegm at all on getting up or first thing in the morning? 1. Yes \_\_\_ 2. No \_\_\_

D. Do you usually bring up phlegm at all on during the rest of the day or at night? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO ANY OF THE ABOVE (32A, B, C, OR D), ANSWER THE FOLLOWING:

IF NO TO ALL, CHECK "DOES NOT APPLY" AND SKIP TO 33A

E. Do you bring up phlegm like this on most days for 3 consecutive months or more during the year? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

F. For how many years have you had trouble with phlegm? Number of years \_\_\_  
Does not apply \_\_\_

EPISODES OF COUGH AND PHLEGM

33A. Have you had periods or episodes of (increased\*) cough and phlegm lasting for 3 weeks or more each year?

1. Yes \_\_\_ 2. No \_\_\_

\*(For persons who usually have cough and/or phlegm)

IF YES TO 33A

B. For how long have you had at least 1 such episode per year?

Number of years \_\_\_  
Does not apply \_\_\_

WHEEZING

34A. Does your chest ever sound wheezy or whistling

1. When you have a cold?

1. Yes \_\_\_ 2. No \_\_\_

2. Occasionally apart from colds?

1. Yes \_\_\_ 2. No \_\_\_

3. Most days or nights?

1. Yes \_\_\_ 2. No \_\_\_

B. For how many years has this been present?

Number of years \_\_\_  
Does not apply \_\_\_

35A. Have you ever had an attack of wheezing that has made you feel short of breath?

1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 35A

B. How old were you when you had your first such attack?

Age in years \_\_\_  
Does not apply \_\_\_

C. Have you had 2 or more such episodes?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

D. Have you ever required medicine or treatment for the(se) attack(s)?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

BREATHLESSNESS

36. If disabled from walking by any condition other than heart or lung disease, please describe and proceed to question 38A.

Nature of condition(s)  
\_\_\_\_\_  
\_\_\_\_\_

37A. Are you troubled by shortness of breath when hurrying on the level or walking up a slight hill?

1. Yes \_\_\_ 2. No \_\_\_

## IF YES TO 37A

B. Do you have to walk slower than people of your age on the level because of breathlessness?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

C. Do you ever have to stop for breath when walking at your own pace on the level?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

D. Do you ever have to stop for breath after walking about 100 yards (or after a few minutes) on the level?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

E. Are you too breathless to leave the house or breathless on dressing or climbing one flight of stairs?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

TOBACCO SMOKING

38A. Have you ever smoked cigarettes?  
(No means less than 20 packs of cigarettes or 12 oz. of tobacco in a lifetime or less than 1 cigarette a day for 1 year.)

1. Yes \_\_\_ 2. No \_\_\_

## IF YES TO 38A

B. Do you now smoke cigarettes (as of one month ago)

1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

C. How old were you when you first started regular cigarette smoking? Age in years \_\_\_  
 Does not apply \_\_\_

D. If you have stopped smoking cigarettes completely, how old were you when you stopped? Age stopped \_\_\_  
 Check if still smoking \_\_\_  
 Does not apply \_\_\_

E. How many cigarettes do you smoke per day now? Cigarettes per day \_\_\_  
 Does not apply \_\_\_

F. On the average of the entire time you smoked, how many cigarettes did you smoke per day? Cigarettes per day \_\_\_  
 Does not apply \_\_\_

G. Do or did you inhale the cigarette smoke? 1. Does not apply \_\_\_  
 2. Not at all \_\_\_  
 3. Slightly \_\_\_  
 4. Moderately \_\_\_  
 5. Deeply \_\_\_

39A. Have you ever smoked a pipe regularly? 1. Yes \_\_\_ 2. No \_\_\_  
 (Yes means more than 12 oz. of tobacco in a lifetime.)

**IF YES TO 39A:**  
**FOR PERSONS WHO HAVE EVER SMOKED A PIPE**

B. 1. How old were you when you started to smoke a pipe regularly? Age \_\_\_

2. If you have stopped smoking a pipe completely, how old were you when you stopped? Age stopped \_\_\_  
 Check if still smoking pipe \_\_\_  
 Does not apply \_\_\_

C. On the average over the entire time you smoked a pipe, how much pipe tobacco did you smoke per week? \_\_\_ oz. per week (a standard pouch of tobacco contains 1 1/2 oz.)  
 \_\_\_ Does not apply



Signature \_\_\_\_\_

Date \_\_\_\_\_

Part 2  
PERIODIC MEDICAL QUESTIONNAIRE

- 1. NAME \_\_\_\_\_
- 2. CLOCK NUMBER \_\_\_\_\_
- 3. PRESENT OCCUPATION \_\_\_\_\_
- 4. PLANT \_\_\_\_\_
- 5. ADDRESS \_\_\_\_\_
- 6. \_\_\_\_\_
- (Zip Code)
- 7. TELEPHONE NUMBER \_\_\_\_\_
- 8. INTERVIEWER \_\_\_\_\_
- 9. DATE \_\_\_\_\_

- 10. What is your marital status?
  - 1. Single \_\_\_\_\_
  - 2. Married \_\_\_\_\_
  - 3. Widowed \_\_\_\_\_
  - 4. Separated/  
Divorced \_\_\_\_\_

11. OCCUPATIONAL HISTORY

- 11A. In the past year, did you work full time (30 hours per week or more) for 6 months or more?
  - 1. Yes \_\_\_\_\_
  - 2. No \_\_\_\_\_

IF YES TO 11A:

- 11B. In the past year, did you work in a dusty job?
  - 1. Yes \_\_\_\_\_
  - 2. No \_\_\_\_\_
  - 3. Does not Apply \_\_\_\_\_

- 11C. Was dust exposure:
  - 1. Mild \_\_\_\_\_
  - 2. Moderate \_\_\_\_\_
  - 3. Severe \_\_\_\_\_

- 11D. In the past year, were you exposed to gas or chemical fumes in your work?
  - 1. Yes \_\_\_\_\_
  - 2. No \_\_\_\_\_

- 11E. Was exposure:
  - 1. Mild \_\_\_\_\_
  - 2. Moderate \_\_\_\_\_
  - 3. Severe \_\_\_\_\_

- 11F. In the past year, what was your:
  - 1. Job/occupation? \_\_\_\_\_
  - 2. Position/job title? \_\_\_\_\_

12. RECENT MEDICAL HISTORY

12A. Do you consider yourself to be in good health? Yes \_\_\_ No \_\_\_

If NO, state reason \_\_\_\_\_

12B. In the past year, have you developed:

	<u>Yes</u>	<u>No</u>
Epilepsy?	___	___
Rheumatic fever?	___	___
Kidney disease?	___	___
Bladder disease?	___	___
Diabetes?	___	___
Jaundice?	___	___
Cancer?	___	___

13. CHEST COLDS AND CHEST ILLNESSES

13A. If you get a cold, does it "usually" go to your chest? (usually means more than 1/2 the time)

1. Yes \_\_\_ 2. No \_\_\_  
3. Don't get colds \_\_\_

14A. During the past year, have you had any chest illnesses that have kept you off work, indoors at home, or in bed?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

IF YES TO 14A:

14B. Did you produce phlegm with any of these chest illnesses?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

14C. In the past year, how many such illnesses with (increased) phlegm did you have which lasted a week or more?

Number of illnesses \_\_\_  
No such illnesses \_\_\_

15. RESPIRATORY SYSTEM

In the past year have you had:

	<u>Yes or No</u>	<u>Further Comment on Positive Answers</u>
Asthma	_____	
Bronchitis	_____	
Hay Fever	_____	

Other Allergies \_\_\_\_\_

Yes or No

Further Comment on Positive  
Answers

Pneumonia \_\_\_\_\_

Tuberculosis \_\_\_\_\_

Chest Surgery \_\_\_\_\_

Other Lung Problems \_\_\_\_\_

Heart Disease \_\_\_\_\_

Do you have: \_\_\_\_\_

Yes or No

Further Comment on Positive  
Answers

Frequent colds \_\_\_\_\_

Chronic cough \_\_\_\_\_

Shortness of breath  
when walking or  
climbing one flight  
or stairs \_\_\_\_\_

Do you: \_\_\_\_\_

Wheeze \_\_\_\_\_

Cough up phlegm \_\_\_\_\_

Smoke cigarettes \_\_\_\_\_ Packs per day \_\_\_\_\_ How many years \_\_\_\_\_

Date \_\_\_\_\_

Signature \_\_\_\_\_

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**APPENDIX E TO §1915.1001—CLASSIFICATION OF CHEST X-RAYS.****MANDATORY**

(a) Chest X-rays shall be classified in accordance with the International Labour Organization (ILO) Classification of Radiographs of Pneumoconioses (revised edition 2011) (incorporated by reference, see § 1915.5), and recorded on a classification form following the format of the CDC/NIOSH (M) 2.8 form. As a minimum, the content within the bold lines of this form (items 1 through 4) shall be included. This form is not to be submitted to NIOSH.

(b) All X-rays shall be classified only by a B-reader, a board eligible/certified radiologist, or an experienced physician with known expertise in pneumoconioses.

(c) Whenever classifying chest X-rays made under this section, the physician shall have immediately available for reference a complete set of the ILO Classification of Radiographs for Pneumoconioses (revised edition 2011) and the Guidelines for the use of the ILO International Classification of Radiographs of Pneumoconioses (revised edition 2011).

\* \* \* \* \*

**Appendix I TO §1915.1001—MEDICAL SURVEILLANCE GUIDELINES FOR ASBESTOS,****NON-MANDATORY**

\* \* \* \* \*

**III. Signs and Symptoms of Exposure-Related Disease**

The signs and symptoms of lung cancer or gastrointestinal cancer induced by exposure to asbestos are not unique, except that a chest X-ray of an exposed patient with lung cancer may show pleural plaques, pleural calcification, or pleural fibrosis, and may also show asbestosis (*i.e.*, small irregular parenchymal opacities). Symptoms characteristic of mesothelioma include shortness of breath, pain in the chest or abdominal pain. Mesothelioma has a much longer average latency period compared with lung cancer (40 years versus 15-20 years), and mesothelioma is therefore more likely to be found among workers who were first exposed to asbestos at an early age. Mesothelioma is a fatal disease.

Asbestosis is pulmonary fibrosis caused by the accumulation of asbestos fibers in the lungs. Symptoms include shortness of breath, coughing, fatigue, and vague feelings of sickness. When the fibrosis worsens, shortness of breath occurs even at rest. The diagnosis of asbestosis is most commonly based on a history of exposure to asbestos, the presence of characteristic radiologic abnormalities, end-inspiratory crackles (rales), and other clinical features of fibrosing lung disease. Pleural plaques and thickening may be observed on chest X-rays. Asbestosis is often a progressive disease even in the absence of continued exposure, although this appears to be a highly individualized characteristic. In severe cases, death may be caused by respiratory or cardiac failure.

## IV. Surveillance and Preventive Considerations

\* \* \* \* \*

(iii) A physical examination including a chest X-ray and pulmonary function test

that includes measurement of the employee's forced vital capacity (FVC) and forced expiratory volume at one second (FEV(1)).

\* \* \* \* \*

**PART 1926—SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION****Subpart A—General**

■ 21. The authority citation for subpart A continues to read as follows:

**Authority:** 40 U.S.C. 3701 *et seq.*; 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), or 5–2007 (72 FR 31160), 5–2007 (72 FR 31160), 4–2010 (75 FR 55355), or 1–2012 (77 FR 3912), as applicable; and 29 CFR part 1911.

■ 22. Amend § 1926.6 by:

- a. Revising paragraph (u)(1) and removing and reserving (u)(2);
- b. Redesignating paragraphs (x)(1) through (3) as paragraphs (x)(4) through (6), and adding new paragraphs (x)(1) through (3);
- c. Revising paragraph (dd); and
- d. Adding paragraphs (gg) and (hh).

The revisions and additions read as follows:

**§ 1926.6 Incorporation by reference.**

\* \* \* \* \*

(u) \* \* \*

(1) Manual on Uniform Traffic Control Devices, 2009 Edition, Part 6, May 2012, IBR approved for §§ 1926.200(g) and 1926.201(a).

\* \* \* \* \*

(x) \* \* \*

(1) ISO 27850:2013, Tractors for agriculture and forestry—Falling object protective structures—Test procedures and performance requirements, First Edition, May.01, 2013 (“ISO 27850:2013”), IBR approved for § 1926.1003(c).

(2) ISO 3471:2008, Earth-moving machinery—Roll-over protective structures—Laboratory tests and performance requirements, Fourth Edition, Aug. 8, 2008 (“ISO 3471:2008”), IBR approved for § 1926.1001(c).

(3) ISO 5700:2013, Tractors for agriculture and forestry—Roll-over

protective structures—Static test method and conditions, Fifth Edition, May 1, 2013 (“ISO 5700:2013”), IBR approved for § 1926.1002(c).

\* \* \* \* \*

(dd) The following material is available for purchase from the Society of Automotive Engineers (SAE), 400 Commonwealth Drive, Warrendale, PA 15096; telephone: 1–877–606–7323; fax: 724–776–0790; Web site: <http://www.sae.org/>:

(1) SAE 1970 Handbook, IBR approved for § 1926.602(b).

(2) SAE J166–1971, Trucks and Wagons, IBR approved for § 1926.602(a).

(3) SAE J167–1970, Protective Frame with Overhead Protection-Test Procedures and Performance Requirements, IBR approved for § 1926.1003(b).

(4) SAE J168–1970, Protective Enclosures-Test Procedures and Performance Requirements, IBR approved for § 1926.1002(b).

(5) SAE J185 (reaf. May 2003), Access Systems for Off-Road Machines, reaffirmed May 2003 (“SAE J185 (May 1993)”), IBR approved for § 1926.1423(c).

(6) SAE J236–1971, Self-Propelled Graders, IBR approved for § 1926.602(a).

(7) SAE J237–1971, Front End Loaders and Dozers, IBR approved for § 1926.602(a).

(8) SAE J319b–1971, Self-Propelled Scrapers, IBR approved for § 1926.602(a).

(9) SAE J320a–1971, Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired, Self-Propelled Scrapers, IBR approved for § 1926.1001(b).

(10) SAE J321a–1970, Fenders for Pneumatic-Tired Earthmoving Haulage Equipment, IBR approved for § 1926.602(a).

(11) SAE J333a–1970, Operator Protection for Agricultural and Light Industrial Tractors, IBR approved for § 1926.602(a).

(12) SAE J334a–1970, Protective Frame Test Procedures and Performance

Requirements, IBR approved for § 1926.1002(b).

(13) SAE J386–1969, Seat Belts for Construction Equipment, IBR approved for § 1926.602(a).

(14) SAE J394–1971, Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired Front End Loaders and Robber-Tired Dozers, IBR approved for 1926.1001(b).

(15) SAE J395–1971, Minimum Performance Criteria for Roll-Over Protective Structure for Crawler Tractors and Crawler-Type Loaders, IBR approved for § 1926.1001(b).

(16) SAE J396–1971, Minimum Performance Criteria for Roll-Over Protective Structure for Motor Graders, IBR approved for § 1926.1001(b).

(17) SAE J397–1969, Critical Zone Characteristics and Dimensions for Operators of Construction and Industrial Machinery, IBR approved for § 1926.1001(b).

(18) SAE J743a–1964, Tractor Mounted Side Boom, 1964 (“SAE J743a–1964”), IBR approved for § 1926.1501(a).

(19) SAE J959–1966, Lifting Crane Wire-Rope Strength Factors, 1966 (“SAE J959–1966”), IBR approved for § 1926.1501(a).

(20) SAE J987 (rev. Jun. 2003), Lattice Boom Cranes—Method of Test, revised Jun. 2003 (“SAE J987 (Jun. 2003)”), IBR approved for § 1926.1433(c).

(21) SAE J1063 (rev. Nov. 1993), Cantilevered Boom Crane Structures—Method of Test, revised Nov. 1993 (“SAE J1063 (Nov. 1993)”), IBR approved for § 1926.1433(c).

\* \* \* \* \*

(gg) The following material is available for purchase from the French government at <http://www.journal-officiel.gouv.fr/>.

(1) Travaux en milieu hyperbare, mesures particulières de prévention (Work in hyperbaric environment, specific prevention measures). J.O. Rep. Franç. Brochure n° 1636, June 1992.

(2) [Reserved]

(hh) The following material is available for purchase from the International Labour Organization (ILO), 4 route des Morillons, CH-1211 Genève 22, Switzerland; telephone: +41 (0) 22 799 6111; fax: +41 (0) 22 798 8685; Web site: <http://www.ilo.org/>.

(1) Guidelines for the Use of the ILO International Classification of Radiographs of Pneumoconioses, Revised Edition 2011, Occupational safety and health series; 22 (Rev. 2011), IBR approved for § 1926.1101, Appendix E.

(2) [Reserved]

**Subpart D—Occupational Health and Environmental Controls**

■ 23. Revise the authority citation for subpart D to read as follows:

**Authority:** Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704); Sections 4, 6, and 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, and 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 31159), 4-2010 (75 FR 55355), or 1-2012 (77 FR 3912) as applicable; and 29 CFR part 1911.

Sections 1926.59, 1926.60, and 1926.65 also issued under 5 U.S.C. 553 and 29 CFR part 1911.

Section 1926.61 also issued under 49 U.S.C. 1801-1819 and 5 U.S.C. 553.

Section 1926.62 also issued under section 1031 of the Housing and Community Development Act of 1992 (42 U.S.C. 4853).

Section 1926.65 also issued under section 126 of the Superfund Amendments and Reauthorization Act of 1986, as amended (reprinted at 29 U.S.C.A. 655 Note), and 5 U.S.C. 553.

■ 24. Revise paragraph (f) of § 1926.50 to read as follows:

**§ 1926.50 Medical services and first aid.**

\* \* \* \* \*

(f)(1) In areas where 911 emergency dispatch services are not available, the telephone numbers of the physicians, hospitals, or ambulances shall be conspicuously posted.

(2) In areas where 911 emergency dispatch services are available and an employer uses a communication system for contacting necessary emergency-medical service, the employer must:

(i) Ensure that the communication system is effective in contacting the emergency-medical service; and

(ii) When using a communication system in an area that does not automatically supply the caller's latitude and longitude information to the 911 emergency dispatcher, the employer must post in a conspicuous location at the worksite either:

(A) The latitude and longitude of the worksite; or

(B) Other location-identification information that communicates effectively to employees the location of the worksite.

**Note to paragraph (f)(2)(ii) of this section:** The requirement specified in paragraph (f)(2)(ii) of this section does not apply to worksites with readily available telephone land lines that have 911 emergency service that automatically identifies the location of the caller.

\* \* \* \* \*

■ 25. Amend § 1926.55 by:

■ a. Revising paragraph (a);

■ b. Revising paragraph (c);

■ c. In appendix A:

■ i. Revising the heading;

■ ii. Removing the entry for "Coke Oven Emissions";

■ iii. Revising entries for "Asbestos"; "Talc (containing asbestos); use asbestos limit"; "Tremolite, asbestiform";

Footnote 3; and the footnote designated by a single asterisk;

■ iv. Removing Footnote 4 and the footnote designated by double asterisks.

The revisions read as follows:

**§ 1926.55 Gases, vapors, fumes, dusts, and mists.**

(a) *Permissible Exposure Limits.*

Employers must limit an employee's exposure to any substance listed in Table A of this section in accordance with the following:

(1) *Substances with limits preceded by (C)—Ceiling Values.* An employee's exposure, as determined from breathing-zone air samples, to any substance in Table A with a permissible exposure limit preceded by (C) must at no time exceed the exposure limit specified for that substance. If instantaneous monitoring is not feasible, then the employer must assess the ceiling as a 15-minute time-weighted average exposure that the employer cannot exceed at any time during the working day.

(2) *Other substances—8-hour Time Weighted Averages.* An employee's exposure, as determined from breathing-zone air samples, to any substance in Table A with a permissible exposure limit not preceded by (C) must not exceed the limit specified for that substance measured as an 8-hour time-weighted average in any work shift.

\* \* \* \* \*

(c) Paragraphs (a) and (b) of this section do not apply to the exposure of employees to airborne asbestos, tremolite, anthophyllite, or actinolite dust. Whenever any employee is exposed to airborne asbestos, tremolite, anthophyllite, or actinolite dust, the requirements of § 1926.1101 of this title shall apply.

\* \* \* \* \*

TABLE A TO § 1926.55—PERMISSIBLE EXPOSURE LIMITS FOR AIRBORNE CONTAMINANTS

Substance	CAS No. <sup>d</sup>	ppm <sup>a</sup>	mg/m <sup>3</sup> . <sup>b</sup>	Skin designation
* * * * *				
Asbestos; see § 1926.1101.			*	*
* * * * *				
Talc (containing asbestos); use asbestos limit; see § 1926.1101.			*	*
* * * * *				
Tremolite, asbestiform; see § 1926.1101.			*	*
* * * * *				

Footnotes

\* \* \* \* \*

<sup>3</sup> Use Asbestos Limit § 1926.1101.

\* \* \* \* \*

\* An "X" designation in the "Skin Designation" column indicates that the substance is a dermal hazard.

<sup>a</sup> Parts of vapor or gas per million parts of contaminated air by volume at 25 °C and 760 torr.

<sup>b</sup> Milligrams of substance per cubic meter of air. When entry is in this column only, the value is exact; when listed with a ppm entry, it is approximate.

<sup>d</sup> The CAS number is for information only. Enforcement is based on the substance name. For an entry covering more than one metal compound, measured as the metal, the CAS number for the metal is given—not CAS numbers for the individual compounds.

■ 26. Revise § 1926.64 to read as follows:

**§ 1926.64 Process safety management of highly hazardous chemicals.**

For requirements regarding the process safety management of highly hazardous chemicals as it pertains to construction work, follow the requirements in 29 CFR 1910.119 of this chapter.

**Subpart E—Personal Protective and Life Saving Equipment**

■ 27. The authority citation for subpart E continues to read as follows:

**Authority:** 40 U.S.C. 3701 *et seq.*; 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), 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.

■ 28. Revise paragraph (c) of § 1926.95 to read as follows:

**§ 1926.95 Criteria for personal protective equipment.**

(c) *Design and selection.* Employers must ensure that all personal protective equipment:

(1) Is of safe design and construction for the work to be performed; and

(2) Is selected to ensure that it properly fits each affected employee.

■ 29. Revise paragraph (c) of § 1926.104 to read as follows:

**§ 1926.104 Safety belts, lifelines, and lanyards.**

(c) Lifelines used on rock-scaling operations, or in areas where the lifeline may be subjected to cutting or abrasion, shall be a minimum of 7/8-inch wire core manila rope. For all other lifeline applications, a minimum of 3/4-inch manila or equivalent, with a minimum

breaking strength of 5,000 pounds, shall be used.

**Subpart G—Signs, Signals, and Barricades**

■ 30. The authority citation for subpart G continues to read as follows:

**Authority:** 40 U.S.C. 333; 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), 3–2000 (65 FR 50017), 5–2002 (67 FR 65008), 5–2007 (72 FR 31159), 4–2010 (75 FR 55355), or 1–2012 (77 FR 3912), as applicable; and 29 CFR part 1911.

■ 31. Revise paragraph (g) of § 1926.200 to read as follows:

**§ 1926.200 Accident prevention signs, devices, and tags.**

(g) *Traffic control signs and devices.* (1) At points of hazard, construction areas shall be posted with legible traffic control signs and protected by traffic control devices.

(2) The design and use of all traffic control devices, including signs, signals, markings, barricades, and other devices, for protection of construction workers shall conform to Part VI of the MUTCD, 2009 Edition, including Revision 1 dated May 2012 and Revision 2 dated May 2012, FHWA (incorporated by reference, see § 1926.6).

■ 32. Revise paragraph (a) of § 1926.201 to read as follows:

**§ 1926.201 Signaling.**

(a) *Flaggers.* Signaling by flaggers and the use of flaggers, including warning garments worn by flaggers, shall conform to Part VI of the Manual on Uniform Traffic Control Devices, 2009 Edition, including Revision 1 dated May 2012 and Revision 2 dated May 2012, FHWA (incorporated by reference, see § 1926.6).

**§ 1926.202 [Removed]**

■ 33. Remove § 1926.202.

**§ 1926.203 [Removed]**

■ 34. Remove § 1926.203.

**Subpart H—Materials Handling, Storage, Use, and Disposal**

■ 35. The authority citation for subpart H continues to read as follows:

**Authority:** 40 U.S.C. 3701; 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), 4–2010 (75 FR 55355), or 1–2012 (77 FR 3912), as applicable.

Section 1926.250 also issued under 29 CFR part 1911.

■ 36. Revise paragraph (a)(2) of § 1926.250 to read as follows:

**§ 1926.250 General requirements for storage.**

(a) \* \* \*  
(2) Employers must:  
(i) Post the maximum safe load limits of the floors within buildings and structures, in pounds per square foot, conspicuously in all storage areas, except for floors or slabs on grade, and except that employers need not post limits in detached single-family dwellings or townhouses that are under construction; and  
(ii) Ensure that loads on floors do not exceed the maximum safe loads of the floors.

**Subpart P—Excavations**

■ 37. The authority citation for subpart P is revised to read as follows:

**Authority:** Sec. 107, Contract Worker Hours and Safety Standards Act (Construction Safety Act) (40 U.S.C. 333); Secs. 4, 6, 8, Occupational Safety and Health Act of 1970 (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), or 1–2012 (77 FR 3912), as applicable.

■ 38. Revise paragraph (j) of § 1926.651 to read as follows:

**§ 1926.651 Specific excavation requirements.**

(j) *Protection of employees from loose rock or soil.* (1) Where there is loose rock or soil on the excavation face, employers must use scaling to remove the loose material; install protective barricades at intervals as necessary on the face to stop and contain falling material; or use other means that provide equivalent protection.

(2) Protection from excavated or other materials or equipment shall be provided by placing and keeping excavated or other materials or equipment at least 2 feet (.61 m) from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

**Subpart S—Underground Construction, Caissons, Cofferdams, and Compressed Air**

■ 39. The authority citation for subpart S continues to read as follows:

**Authority:** 40 U.S.C. 3701; 29 U.S.C. 653, 655, 657; and Secretary of Labor's Orders 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), 5–2007 (72 FR 31159), or 1–2012 (77 FR 3912), as applicable.

■ 40. Revise paragraph (k)(10) of § 1926.800 to read as follows:

§ 1926.800 Underground construction.

\* \* \* \* \*

(k) \* \* \*

(10)(i) Internal combustion engines, except diesel-powered engines on mobile equipment, are prohibited underground.

(ii) Mobile diesel-powered equipment used underground in atmospheres other than gassy operations purchased on or before [DATE OF PUBLICATION OF FINAL RULE IN THE FEDERAL REGISTER] shall

(A) Comply with paragraph (k)(10)(iii); or

(B) Have been approved by MSHA under 30 CFR part 32 (formerly Schedule 24) (1995), or be demonstrated by the employer to be fully equivalent to such MSHA-approved equipment, and be operated in accordance with that part. For purposes of this subsection, when an applicable MSHA provision uses the term “mine,” use the phrase “underground construction site.” (Each brake horsepower of a diesel engine requires at least 100 cubic feet (28.32 m<sup>3</sup>) of air per minute for suitable operation in addition to the air requirements for personnel. Some engines may require a greater amount of air to ensure that the allowable levels of carbon monoxide, nitric oxide, and nitrogen dioxide are not exceeded.)

(iii) Mobile diesel-powered equipment used underground in atmospheres other than gassy operations purchased after [DATE OF PUBLICATION OF FINAL RULE IN THE FEDERAL REGISTER] shall comply with MSHA provisions 30 CFR 57.5067, 75.1909, 75.1910, and 75.1911(a) through (i) and shall be operated in accordance with those provisions. For purposes of this subsection, when an applicable MSHA provision uses the term “mine,” use the phrase “underground construction site.” (Each brake horsepower of a diesel engine requires at least 100 cubic feet (28.32 m<sup>3</sup>) of air per minute for suitable operation in addition to the air requirements for personnel. Some engines may require a greater amount of air to ensure that the allowable levels of carbon monoxide, nitric oxide, and nitrogen dioxide are not exceeded.)

\* \* \* \* \*

■ 41. Revise paragraph (f)(1) of § 1926.803 to read as follows:

§ 1926.803 Compressed Air.

\* \* \* \* \*

(f) \* \* \*

(1) Decompression to normal condition shall be in accordance with the 1992 French Air and Oxygen decompression tables (incorporated by reference, see § 1926.6).

\* \* \* \* \*

Appendix A to Subpart S of Part 1926 [Removed]

■ 42. Remove appendix A to subpart S of part 1926.

Subpart W—Rollover Protective Structures; Overhead Protection

■ 43. The authority citation for subpart W is revised to read as follows:

Authority: Section 3704 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3701); Sections 4, 6, and 8 of the Occupational Safety and Health Act of 1970 (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), or 1–2012 (77 FR 3912), as applicable.

■ 44. Amend § 1926.1000 by:

- a. Revising the section heading;
■ b. Revising paragraphs (a) through (c).
The revisions read as follows:

§ 1926.1000 Scope.

(a) Coverage. This subpart applies to the following types of material handling equipment: All rubber-tired, self-propelled scrapers, rubber-tired front-end loaders, rubber-tired dozers, wheel-type agricultural and industrial tractors, crawler tractors, crawler-type loaders, and motor graders, with or without attachments, that are used in construction work. This subpart also applies to compactors and rubber-tired skid-steer equipment, with or without attachments, manufactured after [EFFECTIVE DATE OF FINAL RULE], that are used in construction work. This subpart does not apply to sideboom pipelaying tractors.

(b) Equipment manufactured before [EFFECTIVE DATE OF FINAL RULE]. Material handling equipment described in paragraph (a) of this section (excluding compactors and rubber-tired skid-steer equipment) manufactured before [EFFECTIVE DATE OF FINAL RULE], shall be equipped with rollover protective structures that meet the minimum performance standards prescribed in § 1926.1001(b), as applicable. Agricultural and industrial tractors used in construction shall be equipped with rollover protective structures that meet the minimum performance standards prescribed in § 1926.1002(b), as applicable. When overhead protection is provided on agricultural and industrial tractors, the

overhead protection shall meet the minimum performance standards prescribed in § 1926.1003(b), as applicable.

(c) Equipment manufactured on or after [EFFECTIVE DATE OF FINAL RULE]. Material handling machinery described in paragraph (a) of this section manufactured on or after [EFFECTIVE DATE OF FINAL RULE], shall be equipped with rollover protective structures that meet the minimum performance standards prescribed in § 1926.1001(c). Agricultural and industrial tractors used in construction shall be equipped with rollover protective structures that meet the minimum performance standards prescribed in § 1926.1002(c). When overhead protection is provided on agricultural and industrial tractors, the overhead protection shall meet the minimum performance standards prescribed in § 1926.1003(c).

\* \* \* \* \*

■ 45. Section 1926.1001 is revised to read as follows:

§ 1926.1001 Minimum performance criteria for rollover protective structures for designated scrapers, loaders, dozers, graders, crawler tractors, compactors, and rubber-tired skid steer equipment.

(a) General. This section prescribes minimum performance criteria for rollover protective structures (ROPS) for rubber-tired self-propelled scrapers; rubber-tired front end loaders and rubber-tired dozers; crawler tractors and crawler-type loaders, motor graders, compactors, and rubber-tired skid steer equipment.

(b) Equipment manufactured before [EFFECTIVE DATE OF FINAL RULE]. For equipment listed in paragraph (a) of this section (excluding compactors and rubber-tired skid steer equipment) manufactured before [EFFECTIVE DATE OF FINAL RULE], the protective frames shall conform to the following Society of Automotive Engineers Recommended Practices as applicable: SAE J320a, Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired, Self-Propelled Scrapers; SAE J394, Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired Front End Loaders and Rubber-Tired Dozers; SAE J395, Minimum Performance Criteria for Roll-Over Protective Structure for Crawler Tractors and Crawler-Type Loaders; SAE J396, Minimum Performance Criteria for Roll-Over Protective Structure for Motor Graders; and SAE J397–1969, Critical Zone Characteristics and Dimensions for Operators of Construction and Industrial Machinery, as applicable (each incorporated by

reference, see § 1926.6), or comply with the consensus standard (ISO 3471–2008) listed in paragraph (c) of this section.

(c) *Equipment manufactured on or after [EFFECTIVE DATE OF FINAL RULE]*. For equipment listed in paragraph (a) of this section manufactured on or after *[EFFECTIVE DATE OF FINAL RULE]*, the protective frames shall meet the test and performance requirements of the International Organization for Standardization (ISO) standard ISO 3471–2008 Earth-Moving Machinery—Roll-over protective structures—Laboratory tests and performance requirements (incorporated by reference, see § 1926.6).

■ 46. Amend § 1926.1002 by:

- a. Revising paragraphs (a) through (d);
- b. Removing paragraphs (e) through (i);
- c. Redesignating paragraphs (j)(1) and (2) as (e)(1) and (2), respectively;
- d. Removing paragraphs (j)(3) and (k).

The revisions read as follows:

**§ 1926.1002 Protective frames (roll-over protective structures, known as ROPS) for wheel-type agricultural and industrial tractors used in construction.**

(a) *General*. This section sets forth requirements for frames used to protect operators of wheel-type agricultural and industrial tractors used in construction work that will minimize the possibility of operator injury resulting from accidental upsets during normal operation. See paragraph (e) of this section for definitions of agricultural and industrial tractors.

(b) *Equipment manufactured before [EFFECTIVE DATE OF FINAL RULE]*. For equipment manufactured before *[EFFECTIVE DATE OF FINAL RULE]*, the protective frames shall meet the test and performance requirements of the Society of Automotive Engineers Standard J334a–1970, Protective Frame Test Procedures and Performance Requirements and J168–1970, Protective enclosures-test procedures and performance requirements, as applicable (incorporated by reference, see § 1926.6), or comply with the consensus standard (ISO 5700–2013) listed in paragraph (c) of this section.

(c) *Equipment manufactured on or after [EFFECTIVE DATE OF FINAL RULE]*. For equipment manufactured on or after *[EFFECTIVE DATE OF FINAL RULE]*, the protective frames shall meet

the test and performance requirements of the International Organization for Standardization (ISO) standard ISO 5700–2013, Tractors for agriculture and forestry—Roll-over protective structures—static test method and acceptance conditions (incorporated by reference, see § 1926.6).

(d) For overhead protection requirements, see 29 CFR 1926.1003.

\* \* \* \* \*

■ 47. Section 1926.1003 is revised to read as follows:

**§ 1926.1003 Overhead protection for operators of agricultural and industrial tractors used in construction.**

(a) *General*. This section sets forth requirements for overhead protection used to protect operators of wheel-type agricultural and industrial tractors used in construction work that will minimize the possibility of operator injury resulting from overhead objects such as flying or falling objection, and from the cover itself in the event of accidental upset.

(b) *Equipment manufactured before [EFFECTIVE DATE OF FINAL RULE]*. When overhead protection is provided on wheel-type agricultural and industrial tractors manufactured before *[EFFECTIVE DATE OF FINAL RULE]*, the overhead protection shall be designed and installed according to the requirements contained in the test and performance requirements of Society of Automotive Engineers Standard J167–1970, Protective Frame with Overhead Protection-Test Procedures and Performance Requirements, which pertains to overhead protection requirements (incorporated by reference, see § 1926.6) or comply with the consensus standard (ISO 3449–2005) listed in paragraph (c) of this section.

(c) *Equipment manufactured on or after [EFFECTIVE DATE OF FINAL RULE]*. When overhead protection is provided on wheel-type agricultural and industrial tractors manufactured on or after [insert effective date of the final rule], the overhead protection shall be designed and installed according to the requirements contained in the test and performance requirements of the International Organization for Standardization (“ISO”) standard ISO 27850–2013, Tractors for agriculture and forestry—Falling object protective structures—Test procedures and performance requirements, which

pertains to overhead protection requirements (incorporated by reference, see § 1926.6).

(d) *Site clearing*. In the case of machines to which 29 CFR 1926.604 (relating to site clearing) also applies, the overhead protection may be either the type of protection provided in 29 CFR 1926.604, or the type of protection provided by this section.

**Appendix A to Subpart W of Part 1926 [Removed]**

■ 48. Remove appendix A to subpart W of part 1926.

**Subpart Z—Toxic and Hazardous Substances**

■ 49. The authority citation for subpart Z continues to read as follows:

**Authority:** Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704); Sections 4, 6, and 8 of the Occupational Safety and Health Act of 1970 (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.

■ 50. Amend § 1926.1101 by:

- a. Revising paragraph (m)(2)(ii)(C);
- b. Revising Appendix D;
- c. Revising Appendix E;
- d. Revising Appendix I, sections III and IV(iii).

The revisions read as follows:

**§ 1926.1101 Asbestos.**

\* \* \* \* \*

(m) \* \* \*

(2) \* \* \*

(ii) \* \* \*

(C) A physical examination directed to the pulmonary and gastrointestinal systems, including a 14- by 17-inch or other reasonably-sized standard film or digital posterior-anterior chest X-ray to be administered at the discretion of the physician, and pulmonary function tests of forced vital capacity (FVC) and forced expiratory volume at one second (FEV(1)). Classification of all chest X-rays shall be conducted in accordance with Appendix E to this section.

\* \* \* \* \*

**APPENDIX D TO §1926.1101—MEDICAL QUESTIONNAIRES; MANDATORY**

This mandatory appendix contains the medical questionnaires that must be administered to all employees who are exposed to asbestos above permissible exposure limit, and who will therefore be included in their employer's medical surveillance program. Part 1 of the appendix contains the Initial Medical Questionnaire, which must be obtained for all new hires who will be covered by the medical surveillance requirements. Part 2 includes the abbreviated Periodical Medical Questionnaire, which must be administered to all employees who are provided periodic medical examinations under the medical surveillance provisions of the standard.

## Part 1

## INITIAL MEDICAL QUESTIONNAIRE

1. NAME \_\_\_\_\_
2. CLOCK NUMBER \_\_\_\_\_
3. PRESENT OCCUPATION \_\_\_\_\_
4. PLANT \_\_\_\_\_
5. ADDRESS \_\_\_\_\_
6. \_\_\_\_\_  
(Zip Code)
7. TELEPHONE NUMBER \_\_\_\_\_
8. INTERVIEWER \_\_\_\_\_
9. DATE \_\_\_\_\_
10. Date of Birth \_\_\_\_\_  

Month	Day	Year
-------	-----	------
11. Place of Birth \_\_\_\_\_
12. Sex
 

1. Male	___
2. Female	___
13. What is your marital status?
 

1. Single	___	4. Separated/ Divorced	___
2. Married	___		
3. Widowed	___		
14. Race
 

1. White	___	4. Hispanic	___
2. Black	___	5. Indian	___
3. Asian	___	6. Other	___
15. What is the highest grade completed in school? \_\_\_\_\_  
(For example 12 years is completion of high school)

**OCCUPATIONAL HISTORY**

- 16A. Have you ever worked full time (30 hours per week or more) for 6 months or more? 1. Yes \_\_\_ 2. No \_\_\_

## IF YES TO 16A:

B. Have you ever worked for a year or more in any dusty job? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

Specify job/industry \_\_\_\_\_ Total Years Worked \_\_\_

Was dust exposure: 1. Mild \_\_\_ 2. Moderate \_\_\_ 3. Severe \_\_\_

C. Have you ever been exposed to gas or chemical fumes in your work? 1. Yes \_\_\_ 2. No \_\_\_

Specify job/industry \_\_\_\_\_ Total Years Worked \_\_\_

Was exposure: 1. Mild \_\_\_ 2. Moderate \_\_\_ 3. Severe \_\_\_

D. What has been your usual occupation or job -- the one you have worked at the longest?

1. Job occupation \_\_\_\_\_
2. Number of years employed in this occupation \_\_\_\_\_
3. Position/job title \_\_\_\_\_
4. Business, field or industry \_\_\_\_\_

(Record on lines the years in which you have worked in any of these industries, e.g. 1960-1969)

Have you ever worked:	YES	NO
E. In a mine? .....	_____	_____
F. In a quarry? .....	_____	_____
G. In a foundry? .....	_____	_____
H. In a pottery? .....	_____	_____
I. In a cotton, flax or hemp mill?....	_____	_____
J. With asbestos? .....	_____	_____

17. <u>PAST MEDICAL HISTORY</u>	YES	NO
A. Do you consider yourself to be in good health?	_____	_____
If "NO" state reason _____		
B. Have you any defect of vision?	_____	_____
If "YES" state nature of defect _____		
C. Have you any hearing defect?	_____	_____
If "YES" state nature of defect _____		
D. Are you suffering from or have you ever suffered from:	YES	NO
a. Epilepsy (or fits, seizures, convulsions)?	_____	_____
b. Rheumatic fever?	_____	_____
c. Kidney disease?	_____	_____
d. Bladder disease?	_____	_____
e. Diabetes?	_____	_____
f. Jaundice?	_____	_____

18. CHEST COLDS AND CHEST ILLNESSES

18A. If you get a cold, does it "usually" go to your chest? (Usually means more than 1/2 the time)

1. Yes \_\_\_\_      2. No \_\_\_\_  
3. Don't get colds \_\_\_\_

19A. During the past 3 years, have you had any chest illnesses that have kept you off work, indoors at home, or in bed?

1. Yes \_\_\_\_      2. No \_\_\_\_

## IF YES TO 19A:

B. Did you produce phlegm with any of these chest illnesses? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

C. In the last 3 years, how many such illnesses with (increased) phlegm did you have which lasted a week or more? Number of illnesses \_\_\_  
No such illnesses \_\_\_

20. Did you have any lung trouble before the age of 16? 1. Yes \_\_\_ 2. No \_\_\_

## 21. Have you ever had any of the following?

1A. Attacks of bronchitis? 1. Yes \_\_\_ 2. No \_\_\_

## IF YES TO 1A:

B. Was it confirmed by a doctor? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

C. At what age was your first attack? Age in Years \_\_\_  
Does Not Apply \_\_\_

2A. Pneumonia (include bronchopneumonia)? 1. Yes \_\_\_ 2. No \_\_\_

## IF YES TO 2A:

B. Was it confirmed by a doctor? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

C. At what age did you first have it? Age in Years \_\_\_  
Does Not Apply \_\_\_

3A. Hay Fever? 1. Yes \_\_\_ 2. No \_\_\_

## IF YES TO 3A:

B. Was it confirmed by a doctor? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

C. At what age did it start? Age in Years \_\_\_  
Does Not Apply \_\_\_

22A. Have you ever had chronic bronchitis? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 22A:

B. Do you still have it? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

C. Was it confirmed by a doctor? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

D. At what age did it start? Age in Years \_\_\_  
Does Not Apply \_\_\_

23A. Have you ever had emphysema? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 23A:

B. Do you still have it? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

C. Was it confirmed by a doctor? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

D. At what age did it start? Age in Years \_\_\_  
Does Not Apply \_\_\_

24A. Have you ever had asthma? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 24A:

B. Do you still have it? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

C. Was it confirmed by a doctor? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

D. At what age did it start? Age in Years \_\_\_  
Does Not Apply \_\_\_

E. If you no longer have it, at what age did it stop? Age stopped \_\_\_  
Does Not Apply \_\_\_

25. Have you ever had:

A. Any other chest illness? 1. Yes \_\_\_ 2. No \_\_\_

If yes, please specify \_\_\_\_\_

B. Any chest operations? 1. Yes \_\_\_ 2. No \_\_\_

If yes, please specify \_\_\_\_\_

C. Any chest injuries? 1. Yes \_\_\_ 2. No \_\_\_

If yes, please specify \_\_\_\_\_

26A. Has a doctor ever told you that you had heart trouble? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 26A:

B. Have you ever had treatment for heart trouble in the past 10 years? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

27A. Has a doctor told you that you had high blood pressure? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 27A:

B. Have you had any treatment for high blood pressure (hypertension) in the past 10 years? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

28. When did you last have your chest X-rayed? (Year) \_\_\_ \_\_\_ \_\_\_ \_\_\_

29. Where did you last have your chest X-rayed (if known)? \_\_\_\_\_

What was the outcome? \_\_\_\_\_

FAMILY HISTORY

30. Were either of your natural parents ever told by a doctor that they had a chronic lung condition such as:	FATHER			MOTHER		
	1. Yes	2. No	3. Don't know	1. Yes	2. No	3. Don't know
A. Chronic Bronchitis?	___	___	___	___	___	___
B. Emphysema?	___	___	___	___	___	___
C. Asthma?	___	___	___	___	___	___
D. Lung cancer?	___	___	___	___	___	___
E. Other chest conditions?	___	___	___	___	___	___
F. Is parent currently alive?	___	___	___	___	___	___
G. Please Specify	___	Age if Living	___	___	Age if Living	___
	___	Age at Death	___	___	Age at Death	___
	___	Don't Know	___	___	Don't Know	___
H. Please specify cause of death	_____			_____		

COUGH

- 31A. Do you usually have a cough? (Count a cough with first smoke or on first going out of doors. Exclude clearing of throat.) (If no, skip to question 31C.) 1. Yes \_\_\_ 2. No \_\_\_
- B. Do you usually cough as much as 4 to 6 times a day 4 or more days out of the week? 1. Yes \_\_\_ 2. No \_\_\_
- C. Do you usually cough at all on getting up or first thing in the morning? 1. Yes \_\_\_ 2. No \_\_\_

D. Do you usually cough at all during the rest of the day or at night? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO ANY OF ABOVE (31A, B, C, OR D), ANSWER THE FOLLOWING. IF NO TO ALL, CHECK "DOES NOT APPLY" AND SKIP TO NEXT PAGE

E. Do you usually cough like this on most days for 3 consecutive months or more during the year? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

F. For how many years have you had the cough? Number of years \_\_\_  
Does not apply \_\_\_

32A. Do you usually bring up phlegm from your chest? 1. Yes \_\_\_ 2. No \_\_\_  
Count phlegm with the first smoke or on first going out of doors. Exclude phlegm from the nose. Count swallowed phlegm.)  
(If no, skip to 32C)

B. Do you usually bring up phlegm like this as much as twice a day 4 or more days out of the week? 1. Yes \_\_\_ 2. No \_\_\_

C. Do you usually bring up phlegm at all on getting up or first thing in the morning? 1. Yes \_\_\_ 2. No \_\_\_

D. Do you usually bring up phlegm at all on during the rest of the day or at night? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO ANY OF THE ABOVE (32A, B, C, OR D), ANSWER THE FOLLOWING:

IF NO TO ALL, CHECK "DOES NOT APPLY" AND SKIP TO 33A

E. Do you bring up phlegm like this on most days for 3 consecutive months or more during the year? 1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

F. For how many years have you had trouble with phlegm? Number of years \_\_\_  
Does not apply \_\_\_

EPISODES OF COUGH AND PHLEGM

33A. Have you had periods or episodes of (increased\*) cough and phlegm lasting for 3 weeks or more each year? 1. Yes \_\_\_ 2. No \_\_\_

\*(For persons who usually have cough and/or phlegm)

IF YES TO 33A

B. For how long have you had at least 1 such episode per year? Number of years \_\_\_ Does not apply \_\_\_

WHEEZING

34A. Does your chest ever sound wheezy or whistling

1. When you have a cold? 1. Yes \_\_\_ 2. No \_\_\_

2. Occasionally apart from colds? 1. Yes \_\_\_ 2. No \_\_\_

3. Most days or nights? 1. Yes \_\_\_ 2. No \_\_\_

B. For how many years has this been present? Number of years \_\_\_ Does not apply \_\_\_

35A. Have you ever had an attack of wheezing that has made you feel short of breath? 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 35A

B. How old were you when you had your first such attack? Age in years \_\_\_ Does not apply \_\_\_

C. Have you had 2 or more such episodes? 1. Yes \_\_\_ 2. No \_\_\_ 3. Does not apply \_\_\_

D. Have you ever required medicine or treatment for the(se) attack(s)? 1. Yes \_\_\_ 2. No \_\_\_ 3. Does not apply \_\_\_

BREATHLESSNESS

36. If disabled from walking by any condition other than heart or lung disease, please describe and proceed to question 38A.

Nature of condition(s)  
\_\_\_\_\_  
\_\_\_\_\_

37A. Are you troubled by shortness of breath when hurrying on the level or walking up a slight hill?

1. Yes \_\_\_ 2. No \_\_\_

## IF YES TO 37A

B. Do you have to walk slower than people of your age on the level because of breathlessness?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

C. Do you ever have to stop for breath when walking at your own pace on the level?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

D. Do you ever have to stop for breath after walking about 100 yards (or after a few minutes) on the level?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

E. Are you too breathless to leave the house or breathless on dressing or climbing one flight of stairs?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does not apply \_\_\_

TOBACCO SMOKING

38A. Have you ever smoked cigarettes?  
(No means less than 20 packs of cigarettes or 12 oz. of tobacco in a lifetime or less than 1 cigarette a day for 1 year.)

1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 38A

- B. Do you now smoke cigarettes (as of one month ago)
  - 1. Yes \_\_\_ 2. No \_\_\_
  - 3. Does not apply \_\_\_
  
- C. How old were you when you first started regular cigarette smoking?
  - Age in years \_\_\_
  - Does not apply \_\_\_
  
- D. If you have stopped smoking cigarettes completely, how old were you when you stopped?
  - Age stopped \_\_\_
  - Check if still smoking \_\_\_
  - Does not apply \_\_\_
  
- E. How many cigarettes do you smoke per day now?
  - Cigarettes per day \_\_\_
  - Does not apply \_\_\_
  
- F. On the average of the entire time you smoked, how many cigarettes did you smoke per day?
  - Cigarettes per day \_\_\_
  - Does not apply \_\_\_
  
- G. Do or did you inhale the cigarette smoke?
  - 1. Does not apply \_\_\_
  - 2. Not at all \_\_\_
  - 3. Slightly \_\_\_
  - 4. Moderately \_\_\_
  - 5. Deeply \_\_\_
  
- 39A. Have you ever smoked a pipe regularly? (Yes means more than 12 oz. of tobacco in a lifetime.)
  - 1. Yes \_\_\_ 2. No \_\_\_

IF YES TO 39A:

FOR PERSONS WHO HAVE EVER SMOKED A PIPE

- B. 1. How old were you when you started to smoke a pipe regularly?
  - Age \_\_\_
  
- 2. If you have stopped smoking a pipe completely, how old were you when you stopped?
  - Age stopped \_\_\_
  - Check if still smoking pipe \_\_\_
  - Does not apply \_\_\_

C. On the average over the entire time you smoked a pipe, how much pipe tobacco did you smoke per week? \_\_\_\_\_ oz. per week (a standard pouch of tobacco contains 1 1/2 oz.)  
 \_\_\_\_\_ Does not apply

D. How much pipe tobacco are you smoking now? \_\_\_\_\_ oz. per week  
 Not currently smoking a pipe \_\_\_\_\_

E. Do you or did you inhale the pipe smoke?  
 1. Never smoked \_\_\_\_\_  
 2. Not at all \_\_\_\_\_  
 3. Slightly \_\_\_\_\_  
 4. Moderately \_\_\_\_\_  
 5. Deeply \_\_\_\_\_

40A. Have you ever smoked cigars regularly? 1. Yes \_\_\_\_\_ 2. No \_\_\_\_\_

(Yes means more than 1 cigar a week for a year)

IF YES TO 40A

FOR PERSONS WHO HAVE EVER SMOKED A PIPE

B. 1. How old were you when you started smoking cigars regularly? Age \_\_\_\_\_

2. If you have stopped smoking cigars completely, how old were you when you stopped smoking cigars? Age stopped \_\_\_\_\_  
 Check if still \_\_\_\_\_  
 Does not apply \_\_\_\_\_

C. On the average over the entire time you smoked cigars, how many cigars did you smoke per week? Cigars per week \_\_\_\_\_  
 Does not apply \_\_\_\_\_

D. How many cigars are you smoking per week now? Cigars per week \_\_\_\_\_  
 Check if not smoking cigars currently \_\_\_\_\_



what was your: 1. Job/occupation? \_\_\_\_\_  
2. Position/job title? \_\_\_\_\_

## 12. RECENT MEDICAL HISTORY

12A. Do you consider yourself to be in good health? Yes \_\_\_ No \_\_\_

If NO, state reason \_\_\_\_\_

12B. In the past year, have you developed:

	<u>Yes</u>	<u>No</u>
Epilepsy?	___	___
Rheumatic fever?	___	___
Kidney disease?	___	___
Bladder disease?	___	___
Diabetes?	___	___
Jaundice?	___	___
Cancer?	___	___

## 13. CHEST COLDS AND CHEST ILLNESSES

13A. If you get a cold, does it "usually" go to your chest? (usually means more than 1/2 the time)

1. Yes \_\_\_ 2. No \_\_\_  
3. Don't get colds \_\_\_

14A. During the past year, have you had any chest illnesses that have kept you off work, indoors at home, or in bed?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

IF YES TO 14A:

14B. Did you produce phlegm with any of these chest illnesses?

1. Yes \_\_\_ 2. No \_\_\_  
3. Does Not Apply \_\_\_

14C. In the past year, how many such illnesses with (increased) phlegm did you have which lasted a week or more?

Number of illnesses \_\_\_  
No such illnesses \_\_\_

## 15. RESPIRATORY SYSTEM

In the past year have you had:

	<u>Yes or No</u>	<u>Further Comment on Positive Answers</u>
Asthma	_____	

Bronchitis \_\_\_\_\_  
 Hay Fever \_\_\_\_\_  
 Other Allergies \_\_\_\_\_

Yes or No      Further Comment on Positive  
Answers

Pneumonia \_\_\_\_\_  
 Tuberculosis \_\_\_\_\_  
 Chest Surgery \_\_\_\_\_  
 Other Lung Problems \_\_\_\_\_  
 Heart Disease \_\_\_\_\_  
 Do you have:

Yes or No      Further Comment on Positive  
Answers

Frequent colds \_\_\_\_\_  
 Chronic cough \_\_\_\_\_  
 Shortness of breath  
 when walking or  
 climbing one flight  
 or stairs \_\_\_\_\_

Do you:  
 Wheeze \_\_\_\_\_  
 Cough up phlegm \_\_\_\_\_  
 Smoke cigarettes \_\_\_\_\_

Packs per day \_\_\_\_\_ How many years \_\_\_\_\_

Date \_\_\_\_\_

Signature \_\_\_\_\_

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**APPENDIX E TO §1926.1101—CLASSIFICATION OF CHEST X-RAYS—MANDATORY**

(a) Chest X-rays shall be classified in accordance with the International Labour Organization (ILO) Classification of Radiographs of Pneumoconioses (revised edition 2011) (incorporated by reference, see §1926.6), and recorded on a classification form following the format of the CDC/NIOSH (M) 2.8 form. As a minimum, the content within the bold lines of this form (items 1 through 4) shall be included. This form is not to be submitted to NIOSH.

(b) All X-rays shall be classified only by a B-reader, a board eligible/certified radiologist, or an experienced physician with known expertise in pneumoconioses.

(c) Whenever classifying chest X-rays made under this section, the physician shall have immediately available for reference a complete set of the ILO Classification of Radiographs for Pneumoconioses (revised edition 2011) and the Guidelines for the use of the ILO International Classification of Radiographs of Pneumoconioses (revised edition 2011).

\* \* \* \* \*

## APPENDIX I TO §1926.1101—MEDICAL SURVEILLANCE GUIDELINES FOR ASBESTOS,

## NON-MANDATORY

\* \* \* \* \*

III. Signs and Symptoms of Exposure-Related Disease

The signs and symptoms of lung cancer or gastrointestinal cancer induced by exposure to asbestos are not unique, except that a chest X-ray of an exposed patient with lung cancer may show pleural plaques, pleural calcification, or pleural fibrosis, and may also show asbestosis (i.e., small irregular parenchymal opacities). Symptoms characteristic of mesothelioma include shortness of breath, pain in the chest or abdominal pain. Mesothelioma has a much longer average latency period compared with lung cancer (40 years versus 15-20 years), and mesothelioma is therefore more likely to be found among workers who were first exposed to asbestos at an early age. Mesothelioma is a fatal disease.

Asbestosis is pulmonary fibrosis caused by the accumulation of asbestos fibers in the lungs. Symptoms include shortness of breath, coughing, fatigue, and vague feelings of sickness. When the fibrosis worsens, shortness of breath occurs even at rest. The diagnosis of asbestosis is most commonly based on a history of exposure to asbestos, the presence of characteristic radiologic abnormalities, end-inspiratory crackles (rales), and other clinical features of fibrosing lung disease. Pleural plaques and thickening may be observed on chest X-rays. Asbestosis is often a progressive disease even in the absence of continued exposure, although this appears to be a highly individualized characteristic. In severe cases, death may be caused by respiratory or cardiac failure.

IV. Surveillance and Preventive Considerations

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(iii) A physical examination including a chest X-ray and pulmonary function test that includes measurement of the employee's forced vital capacity (FVC) and forced expiratory volume at one second (FEV(1)).

\* \* \* \* \*

■ 51. Revise paragraph (l)(4)(ii)(C) of § 1926.1127 to read as follows:

§ 1926.1127 Cadmium.

\* \* \* \* \*

- (l) \* \* \*
- (4) \* \* \*
- (ii) \* \* \*

(C) A 14 inch by 17 inch or other reasonably-sized standard film or digital

posterior-anterior chest X-ray (after the initial X-ray, the frequency of chest X-rays is to be determined by the examining physician);

\* \* \* \* \*

§ 1926.1129 [Removed and Reserved]

■ 52. Remove and reserve § 1926.1129.

Parts 1910, 1915, and 1926 [Amended]

■ 53. In addition to the revisions and amendments set forth above, in 29 CFR parts 1910, 1915, and 1926, remove words and punctuation from the following paragraphs and appendices as follows:

Words and punctuation to remove	29 CFR		
	Part 1910	Part 1915	Part 1926
and social security number .....	1910.120(f)(8)(ii)(A) ..... 1910.1001(m)(3)(ii)(A) ..... 1910.1017(m)(1) ..... 1910.1025(d)(5) ..... 1910.1025(n)(3)(ii)(A) ..... 1910.1025 App. B, ..... Sec. XII. .... 1910.1026(m)(4)(ii)(A) ..... 1910.1028(k)(2)(ii)(A) ..... 1910.1030(h)(1)(ii)(A) ..... 1910.1043(k)(2)(ii)(A) ..... 1910.1044(p)(2)(ii)(a) ..... 1910.1047(k)(3)(ii)(A) ..... 1910.1048(o)(3)(i) ..... 1910.1048(o)(4)(ii)(D) ..... 1910.1050(n)(5)(ii)(A) ..... 1910.1051(m)(4)(ii)(A) ..... 1910.1053(k)(3)(ii)(A) .....	1915.1001(n)(3)(ii)(A) ..... 1915.1026(k)(4)(ii)(A) .....	1926.60(o)(5)(ii)(A) ..... 1926.62(d)(5) ..... 1926.62(n)(3)(ii)(A) ..... 1926.62 App. B, ..... Sec. XII. .... 1926.65(f)(8)(ii)(A) ..... 1926.1101(n)(3)(ii)(A) ..... 1926.1126(k)(4)(ii)(A) ..... 1926.1127(d)(2)(iv) ..... 1926.1153(j)(3)(ii)(A) .....
social security numbers, .....	1910.1043(k)(1)(ii)(C) ..... 1910.1048(o)(1)(vi) .....		
social security number, .....	1910.1028(k)(1)(ii)(D) ..... 1910.1050(n)(3)(ii)(D) ..... 1910.1052(m)(2)(ii)(F) ..... 1910.1052(m)(2)(iii)(C) .....		
social security number .....	1910.1001(m)(1)(ii)(F) ..... 1910.1047(k)(2)(ii)(F) ..... 1910.1050(n)(4)(ii)(A) ..... 1910.1051(m)(2)(ii)(F) ..... 1910.1052(m)(3)(ii)(A) .....		
social security number, .....	1910.1018(q)(1)(ii)(D) ..... 1910.1018(q)(2)(ii)(A) ..... 1910.1025(n)(1)(ii)(D) ..... 1910.1025(n)(2)(ii)(A) ..... 1910.1026(m)(1)(ii)(F) ..... 1910.1027(n)(1)(ii)(B) ..... 1910.1027(n)(3)(ii)(A) ..... 1910.1029(m)(1)(i)(a) ..... 1910.1029(m)(2)(i)(a) ..... 1910.1044(p)(1)(ii)(d) ..... 1910.1045(q)(2)(ii)(D) ..... 1910.1053(k)(1)(ii)(G) .....	1915.1001(n)(2)(ii)(F) ..... 1915.1026(k)(1)(ii)(F) .....	1926.60(o)(4)(ii)(F) ..... 1926.62(n)(1)(ii)(D) ..... 1926.62(n)(2)(ii)(A) ..... 1926.1101(n)(2)(ii)(F) ..... 1926.1126(k)(1)(ii)(F) ..... 1926.1127(n)(1)(ii)(B) ..... 1926.1127(n)(3)(ii)(A) ..... 1926.1153(j)(1)(ii)(G) .....