Sunshine Act Meetings

Federal Register
Vol. 58, No. 141
Monday, July 25, 1994

This section of the FEDERAL REGISTER contains notices of meetings published under the "Government in the Sunshine Act" (Pub. L. 94-409) 5 U.S.C. 552b(e)(3).

U.S. CONSUMER PRODUCT SAFETY COMMISSION

TIME AND DATE: 2 p.m., Wednesday, July 27, 1994.

LOCATION: Room 420, East West Towers, 4330 East West Highway, Bethesda, Maryland.

STATUS: Open to the Public.

MATTER TO BE CONSIDERED:

FY 1996 Budget

The staff will brief the Commission on issues related to the Commission's budget for fiscal year 1996.

For a recorded message containing the latest agenda information, call (301) 504–0709.

CONTACT PERSON FOR ADDITIONAL INFORMATION: Sadye E. Dunn, Office of the Secretary, 4330 East West Highway, Bethesda, MD 20207 (301) 504–0800.

Dated: July 20, 1994.

Sadye E. Dunn,

Secretary.

[FR Doc. 94–18172 Filed 7–21–94; 3:03 pm]

BILLING CODE 6355–01–M

U.S. CONSUMER PRODUCT SAFETY COMMISSION

TIME AND DATE: Thursday, July 28, 1994.

LOCATION: Room 420, East West Towers, 4330 East West Highway, Bethesda, Maryland.

STATUS: Open to the Public.

MATTER TO BE CONSIDERED:

Children's Sleepwear

The staff will brief the Commission on a possible notice of proposed rulemaking to amend the standards for flammability of children's sleepwear to exempt close fitting garments and garments intended for infants.

For a recorded message containing the latest agenda information, call (301) 504–0709.

CONTACT PERSON FOR ADDITIONAL INFORMATION: Sadye E. Dunn, Office of the Secretary, 4330 East West Highway, Bethesda, MD 20207 (301) 504–0800.

Dated: July 20, 1994.

Sadye E. Dunn,

Secretary.

[FR Doc. 94–18173 Filed 7–21–94; 3:03 pm]

BILLING CODE 6355–01–M

U.S. CONSUMER PRODUCT SAFETY COMMISSION

TIME AND DATE: 9 a.m., Wednesday, July 29, 1994.

LOCATION: Room 420, East West Towers, 4330 East West Highway, Bethesda, Maryland.

STATUS: Open to the Public.

MATTER TO BE CONSIDERED:

Bicycle Helmets

The staff will brief the Commission and the Commission will consider proposed regulations that would implement the Children's Bicycle Helmet Safety Act of 1994.

For a recorded message containing the latest agenda information, call (301) 504–0709.

CONTACT PERSON FOR ADDITIONAL INFORMATION: Sadye E. Dunn, Office of the Secretary, 4330 East West Highway, Bethesda, MD 20207 (301) 504–0800.

Dated: July 20, 1994.

Sadye E. Dunn,

Secretary.

[FR Doc. 94–18174 Filed 7–21–94; 3:03 pm]

BILLING CODE 6355–01–M

FEDERAL ENERGY REGULATORY COMMISSION

The following notice of meeting is published pursuant to Section 3(a) of the Government in the Sunshine Act (Pub. L. No. 94–409), 5 U.S.C. 552b.

DATE AND TIME: July 27, 1994, 10:00 a.m.

PLACE: 825 North Capitol Street, NE., room 9306, Washington, DC 20426.

STATUS: Open.

MATTERS TO BE CONSIDERED: Agenda.

Note—Items listed on the agenda may be deleted without further notice.

CONTACT PERSON FOR MORE INFORMATION: Lois D. Cashell, Secretary, Telephone (202) 208–0400. For a recording listing items stricken from or added to the meeting, call (202) 208–1627.

This is a list of matters to be considered by the Commission. It does not include a listing of all papers relevant to the items on the agenda; however, all public documents may be examined in the Reference and Information Center.

Consent Agenda—Hydro, 614th Meeting—July 27, 1994, Regular Meeting (10 a.m.)

CAH–1.
Project No. 9222–005, Niagara Mohawk Power Corporation

CAH–2.
Omitted

CAH–3.
Project No. 4357–013, Clifton Hydro-Power Limited Partnership

CAH–4.
Project No. 11370–001, BAE Energy, Inc.

CAH–5.
Project No. 2984–022, S.D. Warren Company

CAH–6.
Docket No. UL94–1–000, Union Water Power Company
Docket No. UL94–3–000, Kennebec Water Power Company

CAH–7.
Project No. 1235–008, City of Radford, Virginia

Consent Agenda—Electric

CAE–1.
Docket No. ER94–6–000, Intercoast Power Marketing Company

CAE–2.
Docket No. ER94–1014–000, Central Maine Power Company
Docket Nos. ER94–1160–000 and ER94–1317–000, Northeast Utilities Service Company

CAE–3.
Docket No. ER94–1188–000, LG&E Power Marketing Inc.

CAE–4.
Docket No. ER94–1217–000, Consolidated Edison Company of New York, Inc.

CAE–5.
Docket No. ER94–1143–000, Interstate Power Company

CAE–6.
Docket No. ER94–108–000, Heartland Energy Services, Inc.

CAE–7.
Docket Nos. ER94–1150–000 and ER94–1129–000, Pacific Gas and Electric Company
Docket No. EL94–67–000, City of Redding, California v. Pacific Gas and Electric Company

CAE–8.
Docket No. FA91–53–001, New England Power Company

CAE–9.
Docket No. FA92–15–001, Southwestern Public Service Company

CAE–10.
Docket Nos. ER93–96–004 and EL93–11–000, Delmarva Power & Light Company

CAE–11.

Docket No. EL94–2–001, American Municipal Power-Ohio, Inc. v. Dayton Power & Light Company
CAE–12.
Docket Nos. ER92–595–004 and ER92–596–003, Pacific Gas and Electric Company
Docket No. ER92–626–004, Southern California Edison Company, Pacific Gas and Electric Company and San Diego Gas & Electric Company
CAE–13.
Docket No. ER94–1128–001, Entergy Services, Inc.
CAE–14.
Omitted
CAE–15.
Docket No. EL94–24–001, Consumer Advocate Division of the Public Service Commission of West Virginia, Maryland People's Counsel and Pennsylvania Office of Consumer Advocate v. Allegheny Generating Company
CAE–16.
Docket Nos. ER94–922–001 and EL93–22–004, Maine Yankee Atomic Power Company
CAE–17.
Docket No. EL89–44–003, Cajun Electric Power Cooperative, Inc. v. Gulf States Utilities Company
CAE–18.
Docket Nos. ER93–465–002 and ER93–922–001, Florida Power & Light Company
CAE–19.
Docket No. RM94–17–000, Interpretation and Amendment Clarifying Exemption to Qualifying Facilities From the Federal Power Act
CAE–20.
Docket No. EL94–31–000, Southwestern Public Service Company
CAE–21.
Docket No. EL94–57–001, Louisiana Public Service Commission, Attorney General of the State of Mississippi and Mississippi Public Service Commission v. Entergy Services, Inc.

Consent Agenda—Oil and Gas

CAG–1.
Docket No. PR94–10–000, AIM Pipeline Company
CAG–2.
Docket No. PR94–11–000, Olympic Pipeline Company
CAG–3.
Docket No. PR94–12–000, Overland Trail Transmission Company
CAG–4.
Docket No. PR94–13–000, Acacia Natural Gas Corporation
CAG–5.
Docket Nos. RP94–307–000 and RP94–264–002, Southern Natural Gas Company
CAG–6.
Docket No. RP94–300–000, CNG Transmission Corporation
CAG–7.
Docket No. RP94–302–000, Texas Gas Transmission Corporation
CAG–8.
Docket No. RP94–303–000, Texas Eastern Transmission Corporation
CAG–9.
Docket No. RP94–304–000, Algonquin Gas Transmission Company
CAG–10.
Docket No. RP94–308–000, Eastern Shore Natural Gas Company
CAG–11.
Docket No. RP94–309–000 and RP93–151–000, Tennessee Gas Pipeline Company
CAG–12.
Docket No. RP94–310–000, Carnegie Natural Gas Company
CAG–13.
Omitted
CAG–14.
Omitted
CAG–15.
Docket No. TM94–5–17–000, Texas Eastern Transmission Corporation
CAG–16.
Docket No. TM94–6–48–000, ANR Pipeline Company
CAG–17.
Docket No. TM94–14–29–000, Transcontinental Gas Pipe Line Corporation

CAG–18.
Omitted
CAG–19.
Docket No. RP94–120–004, Koch Gateway Pipeline Company
CAG–20.
Docket No. RP94–301–000, Stingray Pipeline Company
CAG–21.
Docket No. RP94–305–000, Natural Gas Pipeline Company of America
CAG–22.
Docket Nos. RP94–306–000 and 001, Mississippi River Transmission Corporation
CAG–23.
Docket No. TM94–6–28–000, Panhandle Eastern Pipe Line Company
CAG–24.
Omitted
CAG–25.
Omitted
CAG–26.
Omitted
CAG–27.
Docket Nos. RP94–37–001, RP93–198–000 and RS92–27–000, Alabama-Tennessee Natural Gas Company
CAG–28.
Docket No. RP94–214–000, Black Marlin Pipeline Company
Docket No. RP94–235–000, Richfield Gas Storage System
Docket No. RP94–265–000, Algonquin LNG, Inc.
CAG–29.
Docket Nos. RP94–43–004, 005 and 006, ANR Pipeline Company
CAG–30.
Docket No. TM94–3–8–000, South Georgia Natural Gas Company
CAG–31.
Docket Nos. RP93–4–015, RP94–68–004 and RP94–190–001, Mississippi River Transmission Corporation

CAG–32.
Docket Nos. RP94–145–000 and RP94–149–000, Pacific Gas Transmission Company
CAG–33.
Docket Nos. RP94–172–001 and RP94–205–001, Williams Natural Gas Company
CAG–34.
Docket No. RP94–186–002, Questar Pipeline Company
CAG–35.
Docket No. RP94–220–002, Northwest Pipeline Corporation
CAG–36.
Docket No. RP94–278–000, NorAm Gas Transmission Company

Docket No. TA91–1–31–013, Arkla Energy Resources, Inc.
CAG–37.
Docket No. TM94–4–17–001, Texas Eastern Transmission Corporation
CAG–38.
Docket No. TM94–4–28–001, Panhandle Eastern Pipe Line Company
CAG–39.
Docket Nos. RP90–109–012, 010, RP87–62–017 and RP86–148–012, Pacific Gas Transmission Company
CAG–40.
Omitted
CAG–41.
Docket Nos. RP85–209–000, CP86–246–000, CP88–6–000, CP88–329–000, CP88–440–000, CP88–478–000, IN86–5–000, RP84–42–000, RP86–93–000, RP86–158–000, RP87–34–000, RP88–8–000, RP88–27–000, RP88–92–000, RP88–263–000, RP88–264–000, RP88–265–000, RP89–138–000, RP90–91–000, RP91–198–000, TC88–6–000, RP89–147–000, RP90–132–000, RP92–189–000, Koch Gateway Pipeline Company
Docket Nos. CP87–524–000, RP88–177–000, RP88–230–000, TM89–2–18–000, TM89–3–18–000, TM89–4–18–000, RP90–64–000, TM90–3–18–000, TM90–5–18–000, TM90–6–18–000, RP91–100–000, RP91–101–000, RP91–102–000, RP91–134–000, Texas Gas Transmission Corporation
Docket Nos. RP91–72–000, 007, RP91–73–000, RP91–74–000, RP91–75–000, TM91–6–17–000, TM91–7–17–000, TM91–10–17–000, TM91–11–17–000, RP88–80–000, RP88–192–000, RP88–223–000, RP88–251–000, RP89–150–000, RP89–153–000, RP89–154–000, RP89–184–000, RP90–73–000, RP90–96–000, TM89–3–17–000, TM89–4–17–000, TM89–6–17–000, TM89–7–17–000, TM89–4–17–000, TM89–6–17–000, TM89–7–17–000, TM89–8–17–000, TM89–10–17–000, TM89–11–17–000, TM89–12–17–000, TM90–3–17–000, TM90–5–17–000, TM90–7–17–000, TM90–9–17–000, TM90–11–17–000, TM90–14–17–000, Texas Eastern Transmission Corporation
Docket Nos. RP91–80–000, 003, RP91–86–000, TM91–8–20 000, TM91–9–20–000, TM91–12–20–000, TM92–4–20–000, TM92–13–20–000, TM93–6–20–000, TM93–16–20–000, TM94–4–20–000, Algonquin Gas Transmission Company
CAG–42.
Docket Nos. RP94–224–001 and RP94–225–003, Texas Gas Transmission Corporation
CAG–43.

Docket No. GT94–35–001, Northwest Pipeline Corporation
CAG–44.
Docket No. RP94–223–002, Colorado Interstate Gas Company
CAG–45.
Docket No. RP94–149–001, Pacific Gas Transmission Company
CAG–46.
Docket No. RP94–137–003, Florida Gas Transmission Company
CAG–47.
Docket No. RP92–229–003, Northwest Pipeline Corporation
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Docket No. PR91–20–001, Prairie Producing Company v. Louisiana Intrastate Gas Corporation
CAG–49.
Docket Nos. TA93–1–86–004 and TQ93–5–86–002, Pacific Gas Transmission Company
CAG–50.
Docket No. RP94–219–002, Columbia Gulf Transmission Company
CAG–51.
Omitted
CAG–52.
Docket No. RP94–220–001, Northwest Pipeline Corporation
CAG–53.
Docket Nos. RP94–228–001 and RP94–251–001, National Fuel Gas Supply Corporation
CAG–54.
Docket Nos. RP91–47–006, 009, TM91–4–16–002, TM91–5–16–001, TM92–2–16–002, TM92–5–16–001 and TM94–4–16–001, National Fuel Gas Supply Corporation
CAG–55.
Docket Nos. ST88–2555–000, ST88–2905–000, ST88–3337–000, ST88–4985–000, ST89–229–000, ST89–1708–000 and ST89–1775–000, Louisiana Intrastate Gas Corporation
CAG–56.
Docket No. RP92–132–040, Tennessee Gas Pipeline Company
CAG–57.
Docket Nos. IS94–18–000, IS91–20–000, IS92–17–000, IS92–18–000, IS93–3–000 and IS94–36–000, Kuparuk Transportation Company
CAG–58.
Docket No. RO87–24–000, National Hydrocarbons Group, Inc., National Hydrocarbons Resources Corporation, National Hydrocarbons, Inc., Donald P. Lemoine, Warren E. Settegast, Jr., and Gregory P. Dillon
CAG–59.
Omitted
CAG–60.
Docket No. GP94–16–000, State of Louisiana, Office of Conservation—Geopressured Brine Gas Well Determinations, (FERC Nos. JD94–04615, *et al.*)
CAG–61.
Docket Nos. MG91–1–004 and 005, National Fuel Gas Supply Corporation
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Docket No. CP90–1777–007, TransColorado Gas Transmission Company
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Docket Nos. CP94–112–001 and CP88–94–009, National Fuel Gas Supply Corporation
CAG–65.
Docket No. CP92–165–006, Texas Eastern Transmission Corporation
CAG–66.
Omitted
CAG–67.
Docket Nos. CP93–565–001 and RP94–314–000, Texas Eastern Transmission Corporation
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Docket No. CP93–700–000, Paiute Pipeline Company
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Docket No. CP94–10–000, Penn-York Energy Corporation
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Docket No. CP91–2778–001, Valero Transmission, L.P.
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CAG–73.
Docket No. CP93–306–000, Caprock Pipeline Company
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Docket No. CP94–302–000, Northern Natural Gas Company
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Docket No. RP91–41–028, Columbia Gas Transmission Corporation

Hydro Agenda

H–1.
Project No. 2389–009, Edwards Manufacturing Company, Inc., and the City of Augusta, Maine. Order on application to amend annual license.
H–2.
Project No. 11264–000, Turbine Industries, Inc. Order on application for original license.
H–3.
(A) Project Nos. 2287–004 and 2288–005, Public Service Company of New Hampshire
Project Nos. 2300–004, 2311–004, 2326–004, 2327–005 and 2422–006, James River-New Hampshire Electric, Inc. Order on applications for new license.
(B) Project No. 2287–003, Public Service Company of New Hampshire. Order on application for new license.
(C) Project No. 2288–004, Public Service Company of New Hampshire. Order on application for new license.
(D) Project No. 2300–002, James River-New Hampshire Electric, Inc. Order on application for new license.
(E) Project No. 2311–001, James River-New Hampshire Electric, Inc. Order on application for new license.
(F) Project No. 2326–002, James River-New Hampshire Electric, Inc. Order on application for new license.
(G) Project No. 2327–002, James River-New Hampshire Electric, Inc. Order on application for new license.
(H) Project No. 2422–004, James River-New Hampshire Electric, Inc. Order on application for new license.

Electric Agenda

E–1.
Docket No. RM93–19–000, Inquiry Concerning The Commission's Pricing Policy For Transmission Services Provided By Public Utilities Under The Federal Power Act. Policy Statement.
E–2.
Docket No. EC94–7–000, El Paso Electric Company and Central and South West Services, Inc.
Docket No. ER94–898–000, Central and South West Services, Inc. Order on request to approve merger and amendment to system agreement.
E–3.
Docket No. TX94–2–000, El Paso Electric Company and Central and South West Services, Inc., as agent for Public Service Company of Oklahoma, West Texas Utilities Company, Southwestern Electric Power Company and Central Power and Light Company v. Southwestern Public Service Company. Complaint requesting wheeling order under section 211 of the Federal Power Act.
E–4.
Docket No. TX94–5–000, Old Dominion Electric Cooperative, Inc.
Docket No. ER94–1265–000, Delmarva Power & Light Company. Complaint requesting wheeling order under section 211 of the Federal Power Act.

Miscellaneous Agenda

M–1.

Docket No. RM94–19–000, Filing Requirements for Public Utility and Interstate Natural Gas Company Rate Schedules and Tariffs. Final Rule.

Oil and Gas Agenda

I. Pipeline Rate Matters

PR–1.
Docket No. RM93–11–001, Revisions to Oil Pipeline Regulations Pursuant to Energy Policy Act of 1992. Order on rehearing.

PR–2.
Docket No. RM94–2–000, Cost-of-Service Filing and Reporting Requirements for Oil Pipelines. Notice of Proposed Rulemaking.

PR–3.
Docket No. RM94–1–000, Market-Based Ratemaking for Oil Pipelines. Notice of Proposed Rulemaking.

PR–4.
Docket Nos. IS90–21–002, IS90–31–002, IS90–32–002, IS90–40–002, IS91–1–002, SP91–3–002, SP91–5–002, IS91–21–002, IS91–28–002, IS91–33–002, IS92–19–001 and OR93–1–000, Williams Pipe Line Company
Docket Nos. IS90–39–002, IS91–3–000 and IS91 32–000 (Phase I), Enron Liquids Pipeline Company. Opinion and order on initial decision.

PR–5.
Docket No. PL94–4–000, Pricing Policy For New and Existing Facilities Constructed by Interstate Natural Gas Pipelines. Notice of Public Conference.

II. Restructuring Matters

RS–1.
Reserved

III. Pipeline Certificate Matters

PC–1.
Reserved

Lois D. Cashell,

Secretary.

[FR Doc. 94–18140 Filed 7–21–94; 3:03 pm]

BILLING CODE 6717–01–P

NEIGHBORHOOD REINVESTMENT CORPORATION

Regular Meeting of the Board of Directors

TIME AND DATE: 2 p.m., Thursday, August 4, 1994.

PLACE: Federal Reserve System, 20th & C Street, NW., Eccles Building, Board Room, Washington, DC 20552.

STATUS: Open.

CONTACT PERSON FOR MORE INFORMATION: Jeffrey T. Bryson, General Counsel/ Secretary, (202) 376–2441.

AGENDA:

I. Call to Order
II. Approval of Minutes:
  May 13, 1994, Annual Mtg.
III. Budget Committee Report:
  a. FY 1994 Request for Budget Revision
  b. FY 1995 Budget Request
  c. FY 1996 Office of Management and Budget Submission
IV. Treasurer's Report
V. Executive Director's Quarterly Management Report
VI. Adjourn

Jeffrey T. Bryson,

General Counsel/Secretary.

[FR Doc. 94–18109 Filed 7–21–94; 10:15 am]

BILLING CODE 7570–01–M

federal register

Monday
July 25, 1994

Part II

Department of Labor

Occupational Safety and Health Administration

29 CFR Part 1915

Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment; Final Rule

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29 CFR Part 1915

[Docket No. S–050]

Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment

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

ACTION: Final rule.

SUMMARY: The previous Subpart B of part 1915 sets out requirements for work in explosive and other dangerous atmospheres in vessels and vessel sections and applies to shipbuilding, ship repairing, and shipbreaking operations and to related employment. The final rule being promulgated today extends the protection afforded by these previous rules to employees entering any confined or enclosed space or working in any other dangerous atmosphere in or out of a shipyard. The final rule also simplifies and clarifies some of the requirements in the previous standards.

The final rule includes requirements for a shipyard competent person, a Marine Chemist, a Certified Industrial hygienist, or a Coast Guard authorized person to evaluate conditions within a confined or enclosed space and to institute measures to ensure that entrants are protected. It also contains requirements for posting unsafe spaces, for safe performance of cleaning, cold work, and hot work, and for classifying a person as a shipyard competent person.

EFFECTIVE DATE: The Final Rule becomes effective on October 24, 1994.

ADDRESSES: In compliance with 28 U.S.C. 2112(a), the Agency designates for receipt of petitions for review of the standard the Associate Solicitor of Labor for Occupational Safety and Health, Office of the Solicitor, room S4004, U.S. Department of Labor, 200 Constitution Ave. NW., Washington, DC 20210.

FOR FURTHER INFORMATION CONTACT: Mr. James F. Foster, U.S. Department of Labor, Occupational Safety and Health Administration, room N3647, 200 Constitution Ave., NW., Washington, DC 20210 (202–219–8148).

SUPPLEMENTARY INFORMATION: The principal authors of this final rule are Joseph V. Daddura, Project Officer and Odet Shaw, Office of Maritime Standards; Michael B. Moore, Office of Fire Protection Engineering and Safety Systems; Paul Bolon, Office of Regulatory Analysis: and Claudia Thurber, Project Attorney, Office of the Solicitor, U.S. Department of Labor.

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VII. Federalism
VIII. State Plans
IX. Authority

I. Background

A. History of the Regulation

In May 1971, the Occupational Safety and Health Administration (OSHA), under authority granted by section 6(a) of the Occupational Safety and Health Act of 1970 (OSH Act, 84 Stat. 1590; 29 U.S.C. 655(a)), adopted established Federal standards issued under section 41 of the Longshore and Harbor Workers' Compensation Act (44 Stat. 1444, as amended; 33 U.S.C. 941), as standards applicable to ship repairing (29 CFR part 1915), shipbuilding (29 CFR part 1916), and shipbreaking (29 CFR part 1917) operations. Additionally, other Federal standards and national consensus standards were similarly adopted as general industry standards (29 CFR part 1910) and were made applicable to all aspects of shipyard operations not specifically covered by parts 1915, 1916, and 1917. On April 20, 1982 (47 FR 16984), parts 1915, 1916, and 1917 were consolidated into a single part 1915, for shipyard employment. The consolidated set of standards, entitled "Occupational Safety and Health Standards for Shipyard Employment," eliminated duplicate and overlapping provisions within the former three parts, but did not alter any substantive requirements. The consolidation had no effect on the applicability of the general industry standards, in part 1910, to hazards or conditions in shipyard employment not specifically addressed in the shipyard standards.

On November 29, 1988, OSHA published a proposed rule in the **Federal Register** (53 FR 48092) that would revise its previous standards on explosive and other dangerous atmospheres in vessels and vessel sections, contained in Subpart B of part 1915. The proposed standards covered safe entry into and work on board vessels and vessel sections in shipyards. The NPRM proposed the following revisions to the previous Subpart B:

* Expanding the scope so that the entire subpart applied to all phases of shipyard work on board vessels and vessel sections;

* Adding several definitions; changing the sequence of testing so that requirements for oxygen, flammability, and toxicity testing are presented in that order (the proposal would not, however, have required testing in that order);

* Increasing the oxygen content required for unprotected confined or enclosed space entry from 16.5 percent by volume to 19.5 percent by volume; adding a requirement that spaces containing concentrations of toxic contaminants above the permissible exposure limit be labeled "Not Safe for Workers";

* Adding a requirement for hot work that the concentration of oxygen not exceed 22 percent by volume; adding a requirement to label spaces if those spaces contain, or are adjacent to a space containing, concentrations of flammable gases or vapors at or above 10 percent of their lower explosive limit; and

* Adding two new appendices to aid employers and employees.

The NPRM also proposed a revision of § 1915.7, *Competent Person*. The previous § 1915.7, which is contained in Subpart A of the Shipyard Standards, defines a competent person for the purposes of Subparts B, C (Surface Preparation and Preservation), D (Welding, Cutting, and Heating), and H (Tools and Related Equipment). The proposed revision was intended to eliminate the paperwork burden involved in designating competent persons, to clarify the skills required of them, and to simplify requirements relating to logging of inspections and tests.

The notice of proposed rulemaking (NPRM) gave interested persons until February 27, 1989, to submit comments with respect to the proposal, to file objections, and to request a hearing. OSHA received over 40 comments in response to the proposed rulemaking. There were no hearing requests, and no hearing was held.

A short time after the shipyard proposed rule (Subpart B) was published, in November 1988, the Shipyard Employment Standards Advisory Committee (SESAC) was established to provide OSHA with guidance in revising its shipyard standards and in developing a vertical standard for the shipyard industry. At several SESAC meetings, the proposed rules in Subpart B were on the agenda.

Subsequently, on June 5, 1989 (several months after the comment period closed for the proposed revision

of Subpart B), OSHA published a proposed rule for permit-required confined spaces in general industry (54 FR 24080). This general industry permit space proposal was intended to apply to land-side (that is, other than on vessels or vessel sections) operations within shipyards, including all operations and work areas, such as fabricating shops, machine shops, and staging areas. As a result, shipyard employers would have been required to comply with one set of standards for shipboard operations (part 1915, Subpart B) and another for land-side operations (part 1910, § 1910.146).

The general industry permit space proposal was discussed at several SESAC meetings with a view toward incorporating applicable requirements into a vertical confined space standard for the entire shipyard. This would make it unnecessary for the general industry standard to apply to hazardous atmospheres in confined spaces in shipyards, as had been proposed in the 1910 rulemaking.

At SESAC's meeting of April 25–26, 1990, the Committee recommended that the scope of the proposed shipyard standard on vessels and vessel sections be expanded to include all confined and enclosed space operations within the shipyard (Tr. 102, 4/25/90). The committee also recommended that the title of the subpart, originally called "Explosive and Dangerous Atmospheres in Vessels and Vessel Sections," be changed to clarify that this standard addresses all confined and enclosed spaces and dangerous atmospheres encountered in shipyard employment. Additionally, SESAC recommended that several provisions similar to those proposed for general industry be added to subpart B to make it a comprehensive standard for shipyard employment. The provisions they recommended included a paragraph covering training requirements and duties of confined space entrants; a new paragraph on self-rescue and rescue teams; and a new paragraph addressing the duties of employers with respect to on-site contractors. As recommended by SESAC, the additional provisions would make subpart B a comprehensive set of requirements applicable to the hazards posed by confined and enclosed spaces and dangerous atmospheres encountered throughout shipyard employment.

In response to issues raised in various comments submitted to the docket concerning the general industry permit-required confined spaces proposal and to enable OSHA to place the SESAC recommendations into the subpart B rulemaking record, the Agency reopened the subpart B record for additional comment (57 FR 28152). In the notice reopening the record, which was published on June 24, 1992, OSHA invited public comment on seven issues. These issues were:

(1) Whether or not land-side confined and enclosed spaces and other dangerous atmospheres should be treated separately from spaces in vessels and vessel sections.

(2) What kind of training should shipyard confined space workers receive.

(3) Whether or not subpart B should require attendants for shipyard confined spaces.

(4) What should be a shipyard employer's duty with respect to rescue services.

(5) What should be a shipyard employer's duty with respect to contractors and other employers.

(6) Whether or not hot work permits should be required.

(7) What are the costs associated with applying requirements from the generic confined spaces standard to shipyards.

Interested persons were given until September 22, 1992, to submit comments. OSHA received 53 comments in response to the notice reopening the record on the revision of subpart B.

The final rule on general industry permit-required confined spaces was published in the **Federal Register** on January 14, 1993 (58 FR 4462). Shipyards were omitted from the scope of the final general industry standard because the Agency felt that it would be more appropriate to address them in the revision of subpart B of part 1915. The relationship between subpart B and § 1910.146 and OSHA's reasons for adopting a separate rule in subpart B are presented in the summary and explanation discussion of the scope and application section for subpart B (§ 1915.11).

The information OSHA relied upon to prepare the Notice of Proposed Rulemaking (NPRM), comments received in response to the (NPRM), to the notice of the reopening of the record, and the exhibits (including the written transcripts of relevant SESAC meetings) submitted during the period allowed for such submissions, constitute the rulemaking record for this proceeding. The entire record was carefully considered in the preparation of this final rule.

B. Significant Risk

The Occupational Safety and Health Administration (OSHA) has determined that there is a significant risk to the health and safety of workers who enter confined spaces in shipyards. According to the most recent data from the Bureau of Labor Statistics (BLS), SIC 3731 (Ship building and Repairing) has the highest lost workday case incidence rate for injuries of any industry ("Occupational Injuries and Illnesses in the United States by Industry, 1991," Bureau of Labor Statistics, May, 1993).

The industry as a whole therefore poses the highest risk of injury from all hazards for its employees in the U.S. Within shipyards, confined space operations are one of the riskiest activities, which is why the industry developed its own effective confined space procedures that were adopted by OSHA as subpart B in 29 CFR part 1915 in the early 1970s.

At the present time, work in confined spaces on vessels is covered by the current shipyard confined space regulations in subpart B of part 1915, but work in "land-side" confined spaces is not. This work on land-side operations is therefore not currently addressed by a specific OSHA regulation. These operations were originally included in the scope of the proposed general industry confined space rule (§ 1910.146) but were omitted in the final rule. In the preamble to that final rule, the Agency noted its intention to cover confined spaces, both on vessels and on land, in its revision of subpart B of part 1915. (58 FR 4471)

Confined space work on ships is extremely hazardous, and accidents and fatalities still occur when the procedures of subpart B are not adhered to. OSHA has recorded 20 deaths in the shipyard and boat-building industries from 1983 to 1992 from confined space accidents. The Agency has concluded that the new elements in final subpart B will address non-compliance and lack of discipline in applying subpart B and will reduce significant risk in confined and enclosed spaces and other dangerous atmosphere work. These new elements include training, duty to employers (contractors), and rescue. In addition, the Agency concludes that other additions in the final will reduce risk in confined and enclosed spaces and other dangerous atmospheres work, including: specifying the order of testing of atmospheres, increasing the required oxygen content from 16.5 percent to 19.5 percent by volume, restricting oxygen content of spaces for hot work to 22 percent by volume, and posting notification if spaces contain or are adjacent to spaces that contain, concentration of flammable gases or vapors at or above 10 percent of there LEL.

II. Summary and Explanation of the Final Rule

A. Introduction

The final rule consists of two parts—a revision of the previous shipyard competent person requirements found in subpart A and a revision of the requirements for explosive and other dangerous atmospheres found in subpart B. In this section of the preamble, OSHA is providing a brief explanation of these two revisions to help explain the final rule, together with a brief overview and explanation of the revised standards. A later section will provide a full summary and explanation of individual provisions, with complete details and discussion of the rulemaking record.

OSHA is revising § 1915.7, which sets out requirements for the designation and qualification of competent persons. Under this section, employers must designate one or more competent persons. The employer must provide a roster of competent persons, which must contain the names of these persons and the dates of their training. Competent persons are required to know and understand the requirements of subpart B (confined and enclosed spaces and other dangerous atmospheres), C (surface preparation and preservation), D (welding, cutting, and heating), and H (tools and related equipment); to know the locations and designations of spaces where work is to be performed; to have the ability to calibrate and use test equipment and perform the tests required by subparts B, C, D, and H; to be able to evaluate whether spaces need to be tested further by a Marine Chemist, Certified Industrial Hygienist, or Coast Guard authorized person; to have the ability to understand and carry out instructions and other information provided by Marine Chemists, Certified Industrial Hygienists, or U.S. Coast Guard authorized persons; and to have the ability to maintain the records required by § 1915.7. The final rule eliminates the requirement for the employer to complete OSHA Forms 73 *(Designation of Competent Persons)* and 74 *(Log of Inspection and Tests by Competent Person);* however, the employer must continue to keep records of all testing performed under subparts B, C, D, and H.

OSHA is also revising subpart B of part 1915. This subpart sets out requirements for safe entry into and work in shipyard confined spaces, enclosed spaces, and other dangerous atmospheres. The provisions of this subpart apply to spaces that might contain oxygen-deficient, oxygen-enriched, flammable, or toxic atmospheres. Examples of such spaces include spaces that have been sealed, spaces that contain or have contained materials that are flammable, toxic, corrosive, or irritant, and spaces that are adjacent to these spaces. These spaces must be tested by a competent person to determine whether or not it is safe for an employee to enter into and work within or on the space.

The revised subpart B uses a two-tiered approach for evaluating the hazards posed by confined and enclosed spaces and dangerous atmospheres. The initial evaluation of all spaces is performed by a shipyard competent person. When this evaluation discovers hazards greater than those that a competent person is capable of handling, the services of a Marine Chemist or certified industrial hygienist are necessary. The shipyard competent person and these other qualified individuals work in tandem to ensure the safe entry into and work in confined and enclosed spaces and other dangerous atmospheres.

If the tests demonstrate that it is safe, then employees may enter the space. If the tests show that it is not safe, then the space must undergo further evaluation by a Marine Chemist or certified industrial hygienist, and corrective action must be taken before employees may enter. After further evaluation, the space must be designated as "Not Safe for Workers—Enter with Restrictions" (for example, when ventilation is necessary to maintain flammable concentrations below 10 percent of the lower explosive limit of a gas or vapor) or "Not Safe for Workers" (for example, spaces with atmospheres that are immediately dangerous to life or health). Spaces designated as "Not Safe for Workers—Enter with Restrictions" or "Not Safe for Workers" must be posted with their designation so that employees do not enter the spaces accidentally.

Employees who enter confined or enclosed spaces or dangerous atmospheres must be trained to perform their work safely. The standard requires training in hazard recognition, in the use of protective equipment, and in self-rescue techniques. The employer must certify that entrants have been trained before they are allowed to enter confined and enclosed spaces or dangerous atmospheres. In addition, employers must provide for rescue, either by having an on-site rescue team or by arranging for the use of outside rescue services.

A space that has contained a flammable or toxic substance must be cleaned before it can be made "Safe for entry" without restrictions. The final rule sets requirements for performing the necessary cold work (such as cleaning, scraping, inspecting the structure, and surveying the space) usually to prepare the spaces for hot work. First, residues of hazardous materials must be removed (for example, flammable liquids are pumped out, then the space is cleaned). The atmosphere within the space must be tested for flammability, and these tests must be repeated as often as necessary throughout the course of work to ensure that the concentration of flammable gases and vapors is in a safe range. (These tests are in addition to the tests required before entry.) The standard also requires ignition sources to be controlled or eliminated during cold work to limit further the possibility of explosion or fire.

If hot work is to be performed, confined and enclosed spaces and dangerous atmospheres are classified in two groups. If the spaces contain or have contained flammable liquids or gases or if the spaces are adjacent to such spaces, then a Marine Chemist or Coast Guard authorized person must test and certify the space as safe for hot work. Other types of confined and enclosed spaces and hazardous atmospheres must be tested for safety by a competent person before hot work is allowed.

The standard also contains provisions for maintaining safe working conditions. Pipelines that carry hazardous materials must be blocked or flushed and cleaned to prevent hazardous materials from discharging into a space. The space must be tested periodically to ensure that safe working conditions are maintained. Additionally, work operations must be halted and the space exited when conditions change and the space no longer meets the criteria specified by the Marine Chemist or Coast Guard authorized person for safe work in or on the space.

The standard sets requirements for the posting of confined and enclosed spaces and dangerous atmospheres. The signs must be understood by all employees working in the area and must be posted at the means of access to the work area.

The following summary and explanation of the individual provisions within the standard discusses the important elements of the final standard, explains the purpose of the individual requirements, and explains any differences between the final rule and previous standards. This section also discusses and resolves issues that were raised during the rulemaking period, significant comments received as part of the rulemaking record, and substantive changes from the language

of the proposed rule. References in parentheses are to exhibits (Ex.) and transcripts (Tr.)[1] in the rulemaking record.

B. Subpart A, § 1915.7—Competent Person

In this final rule, OSHA is revising various requirements related to the designation and use of competent persons. Among the revised provisions are the following: allowing an employer to avoid designating competent persons if their tasks are always performed by a Marine Chemist; allowing employers to select the form in which they may keep records on competent persons; clarifying the criteria competent persons must meet; and simplifying the way the competent person's records of tests and inspections may be kept. In this regard, and as proposed, OSHA is only revising § 1915.7, which establishes both the duty for employers to designate competent persons and the criteria for designating such persons. The definition for competent person in § 1915.4 remains the same. The duties of competent persons, other than the duties contained in Subpart B and addressed below in this rulemaking, also remain the same.

In addition to substantive and editorial revisions to the regulatory text of § 1915.7 contained in the final rule, OSHA has reorganized the paragraphs for clarity and coherence. OSHA prefers to place paragraphs addressing the scope or application of a regulation at the beginning of the applicable paragraphs, sections, or subparts of that regulation. The previous paragraph addressing the application of § 1915.7 is contained in paragraph (d) located at the end of § 1915.7. To be consistent with other OSHA rulemaking, OSHA has redesignated the paragraphs of § 1915.7 so that the previous paragraph (d) entitled, "Application," becomes new paragraph (a) in the final rule. Previous paragraphs (a), (b), and (c) have been redesignated (b), (c), and (d), respectively.

Application. Paragraph (a) of the final standard sets forth the application of § 1915.7 that was previously contained in paragraph (d) as discussed above. In addition, editorial changes have been made to improve the language. For example, the old paragraph specified that application would be to "employers engaged in general ship repair, shipbuilding and shipbreaking" while in the new paragraph the general inclusive term "shipyard employment" is used. The coverage provided to employees by the new language is identical.

Designation of a competent person. In paragraph (b)(1), OSHA continues the requirement in old paragraph (a)(1) of § 1915.7 that the employer designate at least one competent person for the purpose of testing the atmospheres of work spaces in shipyard employment unless all of the employer's testing under Subpart B is performed by an NFPA Certified Marine Chemist.

OSHA also proposed to delete "National Fire Protection Association Certified Marine Chemist" in previous paragraph (a)(1) and to replace it with "Marine Chemist." The phrase "National Fire Protection Association Certified" which modifies "Marine Chemist" is redundant since the term "Marine Chemist" will be defined in the final rule as "an individual who possesses a current Marine Chemist Certificate issued by the National Fire Protection Association."

OSHA proposed to allow an employer to avoid designating competent persons when the employer states that atmospheric testing is done by other qualified individuals, who include NFPA Certified Marine Chemists. Some commenters (e.g., Exs. 6–3, 6–12, 6–15) asserted that competent persons were as capable as the Marine Chemist in performing the atmospheric tests required in Subparts B, C, D, and H. For example, Bay Shipbuilding Corp.

(Ex. 6–15) commented:

If an employer is just dealing with a common element like high flash point fuels, oxygen content, carbon monoxide, or hydrogen sulfide, which are easily detectable with electronic measuring devices, you do not need a skilled chemist, provided you have a well trained and equipped competent person.

OSHA agrees that a competent person is capable of testing atmospheric conditions and certifying spaces for entry, and that Marine Chemists are certainly capable of performing that testing. However, the proposal would also have allowed the employer not to designate a competent person if the testing were done by a Coast Guard authorized person. OSHA has determined that this would not promote adequate safety because the Coast Guard authorized person may not have been trained to have all the skills and knowledge of a competent person. In fact, Coast Guard authorized persons are only allowed to authorize someone to test and certify a space "Safe for Hot Work." (See the text of 46 CFR 35.01–1(a) through (c), 71.60(c)(1), and 91.50–1(c)(1) in Appendix B to subpart B). A shipyard that relied only upon Coast Guard approved persons would not have an individual who had all the skills and knowledge necessary to protect employees from atmospheric hazards in confined and enclosed spaces and other dangerous atmospheres. Therefore, consistent with the previous standard, an employer can only avoid designating a competent person(s) if the employer states that all testing will be done by a Marine Chemist.

In paragraph (b)(2), OSHA has carried forth most of the requirements of previous paragraph (a)(2), which addressed the recording of information on employees who have been designated competent persons. An employer is still required to keep a list of his or her competent persons, but the employer will have more flexibility in determining the form of the record, and instead of being required to send the list to the OSHA area office, employers will be required to maintain the list and make it available upon request.

Paragraph (a)(2) of the previous rule required the employer to indicate on a "Designation of Competent Person" (OSHA 73 form) either the names of employees designated as competent persons or that the prescribed functions of a competent person would always be carried out by a NFPA Certified Marine Chemist. In addition, a new OSHA 73 form had to be completed when additions or changes were made to the information concerning persons designated as competent persons and that it be filed with the local OSHA area office.

The exception in paragraph (b)(1) which allows an employer to designate "any person who meets the applicable portion of the criteria [for competent persons] set forth in paragraph (c)" in certain situations was in the previous standard at § 1915.7(d) *Application.*

OSHA proposed that the employer prepare a "certification record," that would include the employer's name, the identification of the designated competent person or a statement that a Marine Chemist or a Coast Guard authorized person would be used, the date of training, and that the employer maintain the most recent record on file. Coast Guard authorized persons were also to be added to the exception from designating a competent person. The proposal also eliminated the need to use an OSHA 73 form for recording the information required by the standard.

In this final rule, OSHA addresses the proposed requirements under three separate paragraphs. In paragraph (b)(2)(i) of the final rule, OSHA continues to require employers to keep a record of employees who have been

[1] Transcript of the SESAC meeting of September 2–3, 1992, Baltimore, MD.

designated as competent persons or a statement that the employer plans to use a Marine Chemist for the testing of atmospheres.

Paragraph (b)(2)(ii) continues the requirement that the record of designated persons be maintained but adds a requirement that the employer make the record available for inspection by OSHA, NIOSH, employees, or their designated representatives. This is consistent with other OSHA standards including §§ 1915.1025(l)(2) and 1915.1027(o), and with industry practice. OSHA believes it is imperative that competent persons be easily identified because their skills are critical for the provision and maintenance of a safe workplace. In addition, the new requirement will facilitate enforcement of the maintenance of records requirement.

OSHA has eliminated the requirement to use an OSHA 73 because OSHA believes that the OSHA 73 form requires more information than is necessary. The primary purpose of the "Designation of Competent Person" form was to provide the identification of employees designated as competent persons or to indicate that a Marine Chemist would be used to perform tests. OSHA believes that such information can be recorded and provided in other ways.

Since the OSHA 73 form is no longer required, it no longer needs to be provided to the OSHA area office each time a change is made. Now employers can maintain the record of designated employees at the place of employment or other location, such as the main office of the employer, so long as the record can be provided for inspection upon request.

The U.S. Coast Guard MIONY (Ex. 6–4) and Mr. Alan Spackman (Ex. 6–5) supported the elimination of OSHA Form 73, but only if the employer is required to maintain the alternative method of certification. Mr. Spackman (Ex. 6–5) stated,

> This action is acceptable only if the employer is required to either post or make the competent person's certification record available upon request and without retaliation to employee and other persons who may be in the workplaces. The proposal fails to give this assurance.

OSHA believes that by allowing alternative reporting media for identifying designated employees and by requiring that records be maintained and made available for inspection rather than submitted to the local OSHA area office, the final rule addresses Mr. Spackman's concerns. Bay Shipbuilding Corp. (Ex. 6–15) commented,

> Form 73 is non-productive and obsolete. The form could be revised to indicate information such as name, date, employment/experience in shipbuilding/repairs/ship breaking, and schooling or training * * *

Therefore, in the final rule, the employer is permitted to use any form or format of reporting that identifies the employees who are designated as competent persons and the date they were trained or that a Marine Chemist will be used to perform atmospheric testing. Under the final rule, OSHA will continue to recognize the OSHA 73 form as an acceptable recordkeeping medium, but will not require its use. Employers are free to use whatever recordkeeping medium they choose as long as the record contains the minimum information required in the final rule and can be presented for inspection upon request. By requiring that the record be made available for inspection upon request, OSHA is eliminating the need for employers to file new OSHA 73 forms or certifications of designated persons with the nearest OSHA area office as required in the previous language of § 1915.7(a)(2).

In paragraph (b)(2)(iii), OSHA has reorganized the requirements of the certificate designating employees as competent persons, keeping most that were proposed, but eliminating the requirement to include the date the record was made and adding a requirement to include the date the competent person was trained. As long as the list of competent persons represents the current situation, there is no need to know when it was created. However, knowing when a competent person was trained will enable OSHA to determine easily that the employee was trained, thus facilitating enforcement and ensuring that the employer is aware of the date the employee was trained.

Criteria for a competent person. In the proposal, the Agency requested public comment on whether there should be OSHA-approved or OSHA-required training for competent persons, whether competent persons should be certified, when such requirements could be implemented, and how many persons would need training and certification.

Several commenters believed that OSHA should not require training or certification of shipyard competent persons. For example, the Shipbuilders Council of America (SCA) (Ex. 6–3) and Newport News Shipbuilding (Ex. 6–6), commented:

> The vast majority of confined space entry incidents are the result of poor application of confined space entry procedures. There are few, if any, confined space incidents involving errors by a competent person. The criteria for designating competent persons in the present standard in § 1915.7 are sufficiently specific and rigorous to ensure qualified individuals, and should be retained.

SCA (Ex. 6–3) additionally suggested that,

> OSHA should continue to offer and support Shipyard Competent Person training courses. However, the fact that an individual has taken the course alone does not ensure competency.

Other commenters urged OSHA to institute mandatory training and certification (e.g., Ex. 6–14, 6–24, 6–31). For instance, NIOSH recommended that OSHA require and take responsibility for the certification and training of shipyard competent persons (Ex. 6–14).

The U.S. Navy's Environmental Health Center (Ex. 6–31) related the issue of shipyard competent persons to their Gas Free Engineers by stating that:

> OSHA should adopt a formal policy on this issue. Naval shipyards currently have a 3 week Gas Free Engineer (GFE) course which is given to Navy personnel so that they may perform as Gas Free Engineering Technicians.

Another commenter, Independent Testing and Consulting, Inc. (Ex. 6–24) expressed this viewpoint:

> The NFPA in conjunction with OSHA has re-introduced a voluntary training program for Competent Persons * * *. The provision of training by outside agencies lifts a burden from the employer and the benefits outweigh the costs.
>
> The requirements of 1915.7 are adequate but every effort should be made to provide employers with the opportunity to send personnel to training courses which should be OSHA approved. Such approval should require that persons be recertified periodically, say every 3–5 years. This would assure that competent persons keep abreast of changes in technology, law etc.

OSHA received support for periodic re-training and many suggestions with a variety of time limits (Ex. 6–4, 6–12, 6–14, 6–21, 6–22, 6–27, 6–28, 6–33, 6–36). For example, the U.S. Coast Guard MIONY (Ex. 6–4) and the Navy's Sea Systems Command (Ex. 6–12) believe that competent persons should attend initial training and then attend refresher training each year thereafter. NIOSH (Ex. 6–14) recommended that annual training of the competent person be required for recertification.

Several commenters, however, believed that the criteria for designating a competent person should remain the same as the previous standard. The NFPA (Ex. 6–10), for example, stated :

> * * * Emphasis should be placed upon enforcement of existing requirements (the performance requirements to be designated for a competent person) and that formal training be directed toward the existing duties and responsibilities of a competent person.

And as expressed by Delta Laboratory and Gas Testing, Inc. (Ex. 6–35):

> * * * the present system provides a tried and tested system of confined space entry and work * * *. To change the basic format of the system would be sheer folly and would benefit the few at the expense of many.

While OSHA supports the need for training requirements, OSHA agrees with the position of the majority of commenters that the competent person criteria contained in § 1915.7 achieve the same result, that is, a highly trained individual who has knowledge of the unique aspects of shipyard operations and the ability to carry out and perform the required atmospheric tests. The criterion in paragraph (c) of § 1915.7 requires the shipyard competent person to have the skill and knowledge necessary to perform atmospheric testing. Because each shipyard is unique, how much training a shipyard competent person must have and how often it must be repeated is left to the employer who is in the best position to determine what skills and knowledge must be reinforced and what resource information needs to be presented. As such, OSHA is of the opinion that by continuing the previous competent person criteria, employers will ensure that the necessary training will continue to be provided to shipyard employers who are so designated as competent persons. Furthermore, OSHA believes that this performance-oriented approach will allow the most flexibility in ensuring the availability of competent person services and in ensuring that the unique conditions in each shipyard can be addressed.

Paragraph (c)(1) is the same as previous paragraph (b)(1) except that the competent person is now required to be able to understand and carry out the written or oral instructions left by the Certified Industrial Hygienist as well as the Marine Chemist and the Coast Guard Authorized Person. Certificates issued by the Marine Chemist, Certified Industrial Hygienist, or Coast Guard authorized person are written instructions. OSHA had proposed to separate the requirements to understand certificates and to carry out verbal instructions left by the Marine Chemist or Certified Industrial Hygienist or Coast Guard authorized person but the Agency has concluded that the requirements are sufficiently interrelated that they can continue to be listed together in paragraph (c)(1).

Paragraph (c)(2) continues the requirement of previous paragraph (b)(3) that competent persons have a knowledge of Subparts B, C, D, and H of part 1915. OSHA did not propose to change this requirement, and has made only an editorial change in order to improve clarity.

Paragraph (c)(3) is the same as old paragraph (b)(4), requiring that competent persons have a familiarity with the structure and knowledge of the location and designation of spaces on the types of vessels on which repair work is done. OSHA did not propose to change this requirement but in the final rule reflects OSHA's decision to expand the scope of Subpart B to cover all phases of shipyard employment.

In paragraph (c)(4), OSHA continues to require competent persons to have the ability to use and interpret the readings of oxygen indicators, combustible gas indicators, and carbon dioxide indicators, but consistent with the proposal, the Agency has added a requirement that the competent person be able to calibrate the testing equipment and that the equipment not be limited to these monitors.

The proposed language in paragraph (b)(3) was performance-oriented in that it did not limit the testing equipment to the types recognized specifically in paragraph (b)(2) of the previous rule. As new technologies develop and new chemical hazards are encountered in the shipyard working environment, it becomes necessary for competent persons to use new types of environmental monitors and detectors. Skill in the use of this new equipment is necessary for competent persons to be able to identify sources of hazardous exposures in shipyard employment. In addition, OSHA believes that in order for the competent person to have the ability to read and interpret the readings of any type of chemical indicator that may be needed to test atmospheres in the shipyard, a competent person must be familiar enough with the instrumentation to capably calibrate it.

In paragraph (c)(5), OSHA continues the requirement contained in the first portion of paragraph (b)(5) in the previous rule. Paragraph (b)(5) of the previous rule contains two requirements and OSHA has decided to divide the previous rule into two separate requirements in the final rule: Paragraphs (c)(5) and (c)(7). Paragraph (c)(5) requires that competent persons must have the capability to perform the tests and inspections required by Subparts B, C, D, and H of part 1915. The requirement in the final rule is consistent with the language proposed in paragraph (b)(6) of the proposal. There were no comments objecting to this change and OSHA considers it to be editorial.

In paragraph (c)(6) OSHA is adding a new requirement to the final rule that coincides with shipyard industry practice. Paragraph (c)(6) requires competent persons to have the ability to evaluate spaces after a test to determine the need for further testing by Marine Chemists, Certified Industrial Hygienists, or by the U.S. Coast Guard authorized persons. OSHA has added this new language to make it clear that there may be atmospheric conditions present in the shipyard that can not be evaluated effectively by a person trained only to the competent person level and that more highly trained individuals may be needed to accurately evaluate an atmosphere. In such cases, OSHA believes this new language would make it clear that an individual such as a Marine Chemist, a Certified Industrial Hygienist, or a Coast Guard authorized person must be called for assistance.

The State of Washington, Department of Transportation (WADOT) (Ex. 6–26) noted the "tremendous responsibility" placed upon the competent person and even recommended further training.

WADOT commented,

> Regarding changes to 1915.7 Competent person: Throughout the existing and proposed regulation, the competent person is given tremendous responsibility to ensure worker safety through inspection and testing. * * *
>
> * * * a requirement should be added at 1915.7(b)(8): Knowledge of the physical hazards and the air contaminants which may be produced in the course of the work to be done, the means of preventing employee exposure to them." The regulation could even go so far as to require the competent person to attend a 2-day training class certified by the National Fire Protection Association. NFPA maintains a list of certified classes.

OSHA agrees that it may appear from the proposal that competent persons are expected to perform some duties equivalent to those of the Marine Chemist, Certified Industrial Hygienist, or Coast Guard authorized person. This was not the intent. OSHA does not believe, based upon the duties that are expected from a competent person, that it is necessary to specify the competent persons be trained by the NFPA as suggested by Washington State. Rather, OSHA believes the knowledge and training requirements in paragraph (c) are appropriate for the testing that a competent person is allowed to do. However, the competent person needs to be trained to recognize the need for more sophisticated assistance and must know how to call for that assistance. This new requirement makes it clear that competent persons, rather than perform all tests and evaluations alone, must have the ability to determine when the expert assistance of the Marine Chemist, Certified Industrial Hygienist,

or Coast Guard authorized person is needed.

In paragraph (c)(7) OSHA is continuing the requirement found in the second part of paragraph (b)(5) in the previous rule. Paragraph (c)(7) requires that a competent person must have the capability to maintain the records required by the standard. As noted earlier, OSHA has divided the previous requirements of paragraph (b)(5) into two separate paragraphs, (c)(5) and (c)(7). There were no objections to this change as it was proposed in paragraph (b)(6) and (b)(7). Therefore, OSHA considers paragraph (c)(7) to be an editorial change to previous paragraph (b)(5).

Recordkeeping. OSHA has redesignated the logging of inspections and test requirements as paragraph (d) Recordkeeping. The changes proposed to the requirements of previous paragraph (c) addressing logging of inspections and tests were contained in paragraph (c) of the proposal.

In paragraph (d)(1) OSHA has made substantive changes to the language of previous paragraph (c)(1). OSHA is requiring that the employer ensure that the competent person, Marine Chemist or Certified Industrial Hygienist performing any tests required by Subparts B, C, D, or H of this part, records the test locations, time, date, location of inspected spaces, and the operations performed, as well as the test results and any instructions. OSHA has combined paragraphs (c)(1) and (c)(2) of the proposal and eliminated the need for the OSHA 74 form. The new language continues the previous requirement that persons conducting tests and inspections record the results of those tests and inspections. However, it eliminates the mandated use of the OSHA 74 form. OSHA believes that the format or instrument of the test report is not important, so long as the information required by OSHA is contained in the record.

OSHA received a number of comments urging the Agency to allow other forms of reporting the atmospheric testing results in addition to the OSHA 74 form.

The Navy's Sea Systems Command (Ex. 6–12) commented that,

> [Section] 1915.7(c) requires that all tests be logged on the OSHA Form 74. Recommend insertion of the words "or equivalent" to allow for use of locally developed (e.g. computer-generated) forms which include at least all of the information required by the OSHA Form 74.

Marine Hydraulics International (Ex. 6–21), Colonna's Shipyard (Ex. 6–22), S.T.A.S. (Ex. 6–37) and Moon Engineering (Ex. 6–38) agreed and submitted identical comments that stated:

> We suggest that the following words be added to the end of this paragraph: "or equivalent." The OSHA 74 does not possess room for additional instructions to workers, and by allowing the use of an equivalent form, workers could be informed of other requirements that the Shipyard Competent Person may invoke.

In previous paragraph (c)(1), competent persons were required to make a record of the locations, operations performed and the date, time, and results of any test they performed on a "Log of Inspections and Tests by Competent Person" (OSHA 74 form). Competent persons were also required under previous paragraph (c)(1) to use a separate form for each vessel on which tests and inspections were made. By allowing the use of alternative forms to record atmospheric test results, the employer will have more flexibility in complying. However, employees will be protected and OSHA will be aided in its enforcement by the fact that employers will still be required to maintain records of tests and inspections.

In paragraph (d)(2) of the final rule, OSHA continues the maintenance of records requirement of previous paragraph (c)(2). OSHA is requiring the employer to ensure that records created to comply with the recordkeeping requirements of this section are posted in the immediate vicinity of the affected operations while work is progress and for a period of at least three months from the completion date of the specific job for which they were generated. OSHA considers the new language to be a non-substantive change.

In paragraph (d)(3) of the final rule, OSHA continues the availability of records requirement of previous paragraph (c)(2). Paragraph (d)(2) requires the employer to ensure that the records required in this section are available for inspection by the Assistant Secretary, Director, employees, or their representatives while work in the affected spaces is in progress. The new language contains editorial corrections for clarity and consistency with other OSHA record inspection requirements. OSHA considers the changes to this paragraph to be non-substantive.

C. Subpart B, Sections 1915.11 through 1915.16

1. § 1915.11 Scope and Application

The scope contained in previous § 1915.11 applies the requirements in Subpart B to vessels and vessel sections found in shipyards during ship repair and ship breaking; § 1915.16 applies to ship repair only. On November 29, 1988, OSHA proposed to amend its shipyard standards addressing safe entry into and work within spaces containing explosive and other dangerous atmospheres on board vessels and vessel sections in shipyards (53 FR 48092). Under this proposal, OSHA would have applied Subpart B to all types of shipyard work on vessels and vessel sections, including ship building, ship repair, and shipbreaking. The Agency proposed extending the scope of Subpart B in this manner to protect employees entering and working in explosive and other dangerous atmospheres, regardless of the type of work they were performing.

Subsequently, after the closing date for comments on this proposed shipyard rule, OSHA also proposed new rules for confined spaces in general industry (54 FR 24080, June 5, 1989). The general industry proposal would have had the effect of covering land-side (that is, other than shipboard) confined spaces in shipyards, such as piping systems in shops or confined spaces in staging areas.

As noted earlier, SESAC reviewed the general industry proposal and made recommendations regarding its possible application to shipyard work. In June 1992, OSHA reopened the record for Subpart B (57 FR 28172, June 24, 1992), to place the SESAC recommendations in the rulemaking record and to gather additional information on whether or not the proposed general industry confined spaces standard was appropriate for land-side confined spaces entered during shipyard work.

The scope of revised Subpart B has been expanded so that the final rule covers all shipyard work, and the title of the Subpart, originally called "Explosive and Other Dangerous Atmospheres in Vessel and Vessel Sections," has been changed to "Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment." OSHA believes this change more accurately reflects the scope of this Subpart, which now addresses all shipyard employment operations and which is not limited to confined spaces. The entire subpart applies regardless of whether shipbuilding, ship repair, or shipbreaking is being done.

The scope of the 1988 proposal differed from the previous standard in two major respects:

(1) The proposed standard would have extended coverage to employees in shipbuilding, who were not protected by previous §§ 1915.12 through 1915.16, and

(2) the proposed standard would have extended coverage to employees in shipbreaking who were not protected by the previous § 1915.16.

The notice of proposed rulemaking listed two reasons for extending the scope of Subpart B in this manner:

(1) That the national consensus standard corresponding to Subpart B (NFPA 306, *Control of Gas Hazards on Vessels*) imposes the same basic requirements to all shipyard work, regardless of whether ship building, ship breaking, or ship repair is being performed; and

(2) that the protective measures required under the previous §§ 1915.12 through 1915.16 are current industry practice in all aspects of shipyard work.

NFPA 306 (1988) is the national consensus standard that applies to work covered by revised Subpart B. Like Subpart B, it contains requirements for atmospheric testing, for cold work and hot work, and for maintaining safe atmospheres for employees while shipbuilding, shipbreaking, or ship repairing is being performed. Under section 6(b)(8) of the OSH Act, any standard that OSHA adopts in regard to atmospheric hazards on vessels must be at least as protective as the NFPA document unless another standard would be more consistent with the purpose of the act.[2] Expanding the scope of the current standard to all of shipyard employment is consistent with the scope of NFPA 306 and therefore providing at least equivalent protection.

Before the publication of the 1988 proposal, 30 groups, representing government agencies, employers, unions, and associations, commented on the first draft rewrite of Subpart B. All of these groups supported the concept of expanding Subpart B coverage to both shipbuilding and shipbreaking (53 FR 48094). As noted in the preamble to the proposal, OSHA believes that this is because the shipyard industry was already applying the requirements of previous Subpart B to the entire shipyard. In fact, the preliminary regulatory impact analysis identified no cost impact from the application of the proposal to shipbuilding, shipbreaking, and ship repair (53 FR 48104).

In response to the 1988 notice of proposed rulemaking, OSHA received no comments in opposition to the extension of this coverage and several expressions of support for applying the standard uniformly throughout the shipyard (Ex. 6–3, 6–6, 6–23). The position of the 39 commenters is best expressed by the following statements. The Shipbuilders Council of America (SCA) (Ex. 6–3), which represents 25 major U.S. shipyards that employ 95 percent of shipyard production workers, stated:

> * * * having a single standard addressing this issue would achieve the objective of providing employees and employers with one set of rules for given situations.

Newport News Shipbuilding (Ex. 6–6), the largest shipyard in the western hemisphere:

> * * * the industry treats confined spaces ashore and afloat in a similar manner.

The American Waterways Shipyard Conference (AWSC) (Ex. 6–23), representing the interests of small- to medium-sized commercial shipbuilding and repair industry stated:

> AWSC is very supportive of OSHA's efforts to develop this vertical standard. The end product will eliminate the confusion which currently exists concerning the applicability of the General Industry Standards to the shipbuilding and repair industry, and will up-date all standards to the existing technology level.
>
> * * * * *
>
> The alternative to the expansion of the scope of this subpart appears to be the institution of a different program for [shore-side] confined spaces. To introduce a new type of confined space entry program into a shipyard facility which already has a workable program seems ludicrous. Two programs would only confuse the employee. By extending the current program, employees will be protected and will immediately recognize the program.

OSHA has concluded that the requirements contained in revised Subpart B are necessary for the protection of employees exposed to hazardous atmospheres in shipyards, regardless of the type of work being performed. Hazardous atmospheres can be found in shipbuilding, as well as in shipbreaking and ship repair. The work practices implemented by employees working in vessels and vessel sections should be the same from one job to the next. The atmospheric hazards will basically be the same and the employees move from job to job within the entire shipyard, so the work practices should be consistent. Using one set of work procedures for atmospheric hazards in a shipbuilding job and another for the same hazards for a ship repair job would serve to confuse the employee and could easily lead to accidents. Therefore, revised Subpart B applies to shipbuilding, shipbreaking, and ship repair.

A short time after the November 1988 publication of the proposed rule on Explosive and Other Dangerous Atmospheres in Vessel and Vessel Sections, the Shipyard Employment Standards Advisory Committee (SESAC) was established. SESAC was chartered to provide OSHA with guidance in revising, consolidating, and modernizing the varying sets of regulations that were being applied in the shipyard industry into what is ultimately intended to be a truly vertical standard for all shipyard employment. Shipyard employers would be required to comply with a single set of occupational safety and health standards as opposed to a mixture of shipyard and general industry standards. Consequently, the newly developed shipyard employment standards would apply to all shipyard employment regardless of the type of work being performed (for example, vessel repair or fabrication of railroad cars) or location (for example, in the traditional shipyard or "up river" or on sea trials). As a step towards this goal, SESAC recommended that the scope of the proposed Subpart B be expanded beyond vessels and vessel sections, to cover all land-side confined space and hazardous atmosphere situations (Tr. 101, 4/25/90).

In order for OSHA to include SESAC's recommendations into the rulemaking record and to consider fully comments submitted to the docket concerning the general industry confined spaces proposal, OSHA reopened the record on Subpart B (57 FR 28152, June 24, 1992). The Agency raised a number of questions in the notice reopening the record. The most significant issue that underlines a number of the specific questions is rooted in the unique concept of confined space entry that has been the accepted practice in the shipyard industry for over 25 years (36 FR 10466, May 29, 1971). The fundamental basis of OSHA's shipyard standard has been a reliance on preventing employees from ever being exposed to confined space atmospheric hazards. This has been accomplished by the built-in system of testing and ventilating that has become industry practice and has been very successful at preventing confine and enclosed spaces and other dangerous atmospheres accidents.

The concept of a single standard, Subpart B, for all shipyard employment was unanimously endorsed by SESAC as well as supported by all of the commenters who addressed this issue in the June 1992, notice (Ex. 11–3, 11–4, 11–5, 11–6, 11–8, 11–10, 11–13, 11–14, 11–15, 11–16, 11–18, 11–19, 11–20, 11–

[2] Section 6(b)(8) of the OSH Act reads as follows: Whenever a rule promulgated by the Secretary differs substantially from an existing national consensus standard, the Secretary shall, at the same time, publish in the **Federal Register** a statement of the reasons why the rule as adopted will better effectuate the purposes of this Act than the national consensus standard.

21, 11–24, 11–26, 11–29, 11–31, 11–33, 11–34, 11–35, 11–39, 11–41, 11–48, 11–50). For example, the National Fire Protection Association (Ex. 11–19), a voluntary membership organization dedicated to the protection of people and property from fire and related hazards, set out this position as follows:

> NFPA favors the development of a single standard which provides for safety during entry and work in confined spaces within the shipyard.
>
> * * * * *
>
> In general, application of two distinctly different standards for vessels and [land-side] operations would be a burden on the industry and would be confusing to employees. Specific points are as follows:
>
> First, * * * employees in the shipyard are familiar with the dangers of all confined spaces, not just those confined spaces associated with tanks aboard ships. This has occurred due to the absence of prior safety requirements for general industry.
>
> The shipyards have already adapted the practices and procedures derived from the vessel requirements and applied them to the [land-side], as appropriate.
>
> Second, the shipyard industry has demonstrated the effectiveness of the current and proposed 29 CFR 1915, Subpart B requirements over the past 10 years.
>
> Third, requiring the 1910 general industry requirements for [land-side] activities instead of the current and proposed 1915 shipyard requirements complicates the training element, by necessitating dual procedures. The training for both sets of requirements will be incompatible, since the standards each take a different approach—1915 Subpart B utilizes a "performance oriented" approach, while 1910.146 relies on specifications to achieve its objectives.

Ingalls Shipbuilding (Ex. 11–20) agreed, stating:

> The SESAC recommendation stresses preventions, training and self-rescue. This approach, which relies on testing before entry and use of engineering controls to eliminate the hazards is, in our opinion, much safer than the general industry standard which requires the use of attendants at each confined space to summon rescue personnel when an emergency occurs. (SESAC'S recommendations put the emphasis on prevention). In addition to being safer it is also more economical than the general industry standard.

The industry has adopted a single approach to working in and around explosive and dangerous atmospheres throughout the shipyard for several reasons:

(1) The number and type of atmospheric hazards associated with products contained in the spaces is unpredictable. Some vessel repairers encounter over 100 different chemical cargoes (Ex. 11–27);

(2) The complexity of confined spaces is increased due to the extensive internal structures, adjacent spaces, pipelines, vent systems, heating coils, and the like (Ex. 11–7, 11–27); and

(3) The cross-contamination of previous and successive products complicates the atmospheric evaluation process (Ex. 11–7).

(4) The nature of the work associated with the confined space entry in shipyards tends to be more complex. This work frequently involves hot work which can greatly affect atmospheric conditions within the space (Ex. 11–7, 11–27).

Based on the record, OSHA has made a determination that a single standard should be applied for entry into confined and enclosed spaces and other dangerous atmospheres throughout the shipyard industry, following the Subpart B approach. OSHA has arrived at this conclusion for two basic reasons:

(1) A single procedure, applicable throughout the shipyard and addressing hazards related to confined and enclosed spaces and other dangerous atmospheres will best protect employees, and

(2) That the provisions adopted in revised Subpart B will provide shipyard employees with a comprehensive set of protective safety measures.

A single standard applying to all shipyard confined and enclosed spaces and other dangerous atmospheres will provide employees with one procedure for working in any shipyard location, whether on a vessel or on land. The commenters overwhelmingly agreed that this approach would best protect employees (Ex. 11–3, 11–6, 11–9, 11–13, 11–14, 11–15, 11–18, 11–19, 11–20, 11–24, 11–25, 11–26, 11–29, 11–35, 11–39, 11–41, 11–50). OSHA agrees with these commenters that two procedures for dealing with confined and enclosed space and dangerous atmosphere hazards would confuse employees who have to implement those procedures. The Agency is concerned that the confusion resulting from different standards for shipboard and land-side spaces would actually lead to accidents rather than prevent them.

As in the past, the primary focus of Subpart B will continue to be atmospheric hazards. Non-atmospheric hazards such as those relating to slips, trips, or falls are covered by other provisions of the shipyard standards. A more specific detailed discussion of non-atmospheric hazards is contained in the following paragraph.

OSHA believes that land-side confined spaces in shipyards pose hazards similar in nature to those found in vessels and vessel sections covered by revised Subpart B. The evidence in the record demonstrates that the atmospheric and non-atmospheric hazards in vessels and vessel sections are also present in land-side confined spaces (Ex. 11–19, 11–26, 11–27, 11–32, 11–39, 11–41, 11–47). The Agency agrees with the vast majority of commenters who stated that the procedures used to protect workers from these hazards in vessels and vessel sections could readily be adopted for use in land-side confined space operations (Ex. 11–1, 11–3, 11–6, 11–9, 11–10, 11–11, 11–13, 11–14, 11–15, 11–18, 11–19, 11–20, 11–24, 11–25, 11–26, 11–29, 11–30, 11–31, 11–32, 11–33, 11–34, 11–37, 11–39, 11–41, 11–42, 11–44, 11–45, 11–46, 11–47, 11–49, 11–50, 11–51).

A few commenters stated that vessels and vessel sections pose greater hazards (Ex. 11–7, 11–8, 11–11, 11–13, 11–22, 11–27, 11–30, 11–35, 11–46). They noted such differences as greater complexity with respect to the hazards involved in vessels and vessel sections, movement of the vessel (which causes movement of atmospheric hazards), the total number of spaces involved, the multitude of systems (for example, fuel, refrigeration, and compressed air) present on-board ships, and the interrelationships between adjacent vessel sections (that is, hazards in one section can affect procedures to be used in adjacent sections). Nonetheless, most of these commenters contended that the Subpart B requirements were still appropriate for land-side confined spaces (Ex. 11–11, 11–13, 11–30, 11–31, 11–35, 11–44, 11–46). They argued that the Subpart B provisions would afford employees with greater protection than would be provided by § 1910.146, and that procedures necessary to comply with Subpart B were already in place in most shipyards.

OSHA has concluded that it is appropriate to apply revised Subpart B to all phases of shipyard work. The Agency has determined, based on the record, that shipyard employers can readily adapt their ship-side procedures which already conform to these requirements, for use in land-side confined space entry, as well.

OSHA has included the phrase "regardless of geographic location" in the scope only as a clarification since it has been the Agency's position that this section, and indeed the entire Part 1915, apply to inland shipyard employment.

SESAC examined requirements proposed in the general industry confined space standard § 1910.146, to determine to what extent that proposal should address shipyard work and to determine whether or not specific provisions within that proposal were appropriate for application to work in shipyard confined and enclosed spaces

and other dangerous atmospheres. The committee agreed that a single standard should apply to this work and recommended the addition to Subpart B of several provisions based on proposed § 1910.146 so that the shipyard standard would be as comprehensive as its part 1910 counterpart (Tr. 102, 4/25/90). As noted earlier, OSHA reopened the record on the proposed revision of Subpart B to request comments on SESAC's recommendations in this regard, as well as to explore the possible expansion of the scope of Subpart B to all aspects of shipyard work. The issues raised in the notice reopening the record addressed how Subpart B could be revised to make it as protective as the general industry permit space standard.

Paragraph (c)(1) of § 1910.146 requires employers to evaluate the workplace to determine if any spaces are permit-required confined spaces. Paragraph (c)(6) of that standard requires employers to reevaluate non-permit confined spaces whenever there are changes that might increase the hazards to entrants. The notice reopening the record on Subpart B requested comments on whether or not shipyard employers should similarly evaluate their workplaces.

Most commenters agreed that the shipyard standard should not adopt requirements comparable to paragraphs (c)(1) and (c)(6) of § 1910.146 (Ex. 11–1, 11–3, 11–6, 11–7, 11–9, 11–10, 11–11, 11–13, 11–14, 11–15, 11–18, 11–19, 11–20, 11–22, 11–24, 11–25, 11–26, 11–29, 11–30, 11–31, 11–34, 11–39, 11–41, 11–42, 11–45, 11–47, 11–49, 11–50, 11–51). They argued that proposed Subpart B was adequate since it already required testing before initial entry of all confined spaces that could contain atmospheric hazards and additional frequent testing to ensure that atmospheric conditions are maintained. A few contended that the shipyard industry treated all confined spaces alike, evaluating them for hazardous conditions before entry (Ex. 11–13, 11–19, 11–31, 11–49). For example, Mr. Joseph J. Ocken (Ex. 11–31) stated:

> The present practice is to consider ANY confined space NOT SAFE until currently tested and posted otherwise. This is a simple fail-safe work practice for workers. To expect every space to have been evaluated and posted properly invites simple error to lead to catastrophe. There are too many confined spaces in shipyards to count on 100% perfection at all times. Enclosed spaces can also contain confined space hazards and must be approached with suspicion by workers as well.

On the other hand, a few commenters stated that OSHA should adopt requirements similar to those in § 1910.146 for evaluating confined spaces (Ex. 11–2, 11–28, 11–33, 11–37, 11–38). They believed that evaluating confined spaces for the types and extent of hazards is a useful tool in any confined space program. Con-Space Communications, Ltd. (Ex. 11–28), argued as follows:

> Evaluation of a workplace to determine if it contains Confined Spaces is the very first step that an employer must take in a serious company wide entry program. An inventory of Confined Spaces would be a permanent reference which, if updated on each entry, could be a useful planning tool. In the event of a rescue, this information would be invaluable especially if the Confined Space is assigned a number along with a list of potential hazards associated with it and special equipment needed for safe entry. Physical attributes of the space could also be listed.

Section 1910.146 places confined spaces into two categories: permit-required confined spaces and non-permit-required confined spaces. The purpose of paragraphs (c)(1) and (c)(6) of § 1910.146 is to ensure that employers have properly identified confined spaces posing hazards to entrants. The large class of confined spaces are determined not to be permit entry spaces, are evaluated only as required in these two paragraphs. Entry into such spaces is essentially performed without reference to the permit entry procedures of § 1910.146 (unless the entrants bring a hazard into the space or create one during entry operations).

By contrast, Subpart B treats all confined spaces and other spaces that might contain a hazardous atmosphere equally. Initial testing and inspection, followed by continuous ventilation and further testing, is required of all these spaces to ensure the safety of employees working within them. Because of these additional protection which Subpart B requires on a routine bases, OSHA has determined that no separate, formal evaluation requirements need be adopted in Subpart B.

Paragraph (e) of § 1910.146 requires general industry employers to institute a permit system for permit space entry operations. This paragraph requires the employer to document, by means of a permit, the completion of measures required for the safety of entrants. A permit must be completed before entry is allowed into any permit space. The notice, reopening the record on Subpart B, requested comments on whether or not such permits should be required for entry into spaces addressed by the shipyard standard.

The vast majority of commenters stated that a permit system as set out in proposed § 1910.146 was unnecessary for incorporation into Subpart B (Ex. 11–1, 11–3, 11–6, 11–7, 11–9, 11–10, 11–11, 11–13, 11–14, 11–15, 11–18, 11–19, 11–20, 11–22, 11–24, 11–25, 11–26, 11–29, 11–31, 11–32, 11–35, 11–36, 11–39, 11–40, 11–41, 11–42, 11–44, 11–45, 11–46, 11–47, 11–49, 11–50, 11–51). They argued that shipyard employee safety would not be increased through the imposition of such a requirement. Many also argued that the system in use in shipyards and required by proposed Subpart B was the equivalent of a permit system (Ex. 11–3, 11–6, 11–10, 11–11, 11–13, 11–14, 11–18, 11–20, 11–24, 11–25, 11–26, 11–29, 11–32, 11–35, 11–36, 11–39, 11–41, 11–44, 11–49, 11–50, 11–51). These commenters noted that the only spaces employees were permitted to enter were those designated as "Safe for Workers" after initial inspection and testing. For example, Moon Engineering Co., Inc. (Ex. 11–14), stated:

> Moon Engineering feels a permit system is necessary for any confined space entry aboard vessels or any land-side operations. We do not believe the proposed system described in 1910.146 is feasible for shipboard applications.
>
> The system, used successfully by Moon Engineering since the early 1970's, is simple and applicable to our operation. The individual shipyard shops communicate with the Safety Department on a daily basis and advises what spaces they will be working the following day. The Safety Department uses OSHA Competent Persons and/or NFPA certified Marine Chemist to test all spaces due to be worked for that particular day. The results of inspection are posted at the entrance of the space and highlight inspection date, time, tester and whether the space is SAFE FOR WORKERS/SAFE FOR HOT WORK or whatever the status. This designation is consistent with the language of the existing 1915 standard. This Log of Inspections is available and it is the responsibility of all employees to view this documentation prior to beginning their work. This system works and has an excellent track record.

Other commenters believed that a permit system similar to that required under § 1910.146(e) should be imposed (Ex. 11–2, 11–28, 11–30, 11–33, 11–34, 11–37). NIOSH (Ex. 11–33) explained this position as follows:

> NIOSH recommends that entry into a confined space be by permit only. * * * The permit is an authorization and approval in writing that specifies the location and type of work to be done, certifies that all existing hazards have been evaluated by the qualified person, and that necessary protective measures have been taken to ensure the safety of each worker. The permit requirements will vary by the nature of the space, the nature of the hazard, and the work to be performed. All confined spaces should

be evaluated by appropriately trained and qualified persons to determine that the space involved and the work to be performed will not present a hazard to the worker; the permit system ensures that this evaluation has been performed.

OSHA has not incorporated a requirement for a formal permit system in the final revised subpart B. The Agency agrees with the commenters who stated that subpart B provides an informal permit system that contains evaluation mechanisms, tracking criteria, and control measures that are as protective as the formal one required under § 1910.146(e). Confined and enclosed spaces on vessels and vessel sections that might contain a dangerous atmosphere are certified "Safe for Workers" when they are safe for employees to enter, and entry is not permitted until that certification. Shipyard employees are also trained to remain outside of any space not so certified. Additionally, under § 1915.14(a)(1), a Marine Chemist (or, with certain restrictions, a Coast Guard authorized person) must inspect and test the space and certify its safety before work in the most hazardous conditions can begin. Furthermore, OSHA believes that imposing a § 1910.146-type permit system for shipyard work because of the content and placement of the permits could undermine the effectiveness of the Marine Chemist's certificate, which is the primary vehicle for certifying certain spaces "Safe for Hot Work."

Paragraph (d)(6) of § 1910.146 requires at least one attendant outside a permit space while entry operations are underway. This attendant monitors entrants and conditions inside and outside the space, prevents the entry of unauthorized persons, and summons rescue services in an emergency. The notice reopening the record requested comments on whether attendants should be required for "permit-required" confined spaces covered by Subpart B.

Nearly every commenter stated that attendants were unnecessary for the safety of employees performing work in dangerous atmospheres or in confined or enclosed spaces in shipyards (Ex. 11–1, 11–2, 11–3, 11–6, 11–7, 11–9, 11–10, 11–11, 11–13, 11–14, 11–15, 11–18, 11–19, 11–20, 11–22, 11–24, 11–25, 11–26, 11–29, 11–30, 11–31, 11–33, 11–34, 11–36, 11–37, 11–38, 11–39, 11–40, 11–41, 11–42, 11–43, 11–44, 11–45, 11–46, 11–49, 11–50, 11–51). They argued that the procedures required by Subpart B would make spaces safe for workers and that, as a result, there would be no need for an attendant. Many of these commenters also contended that the cost of providing attendants for every entry, if such would be necessary, would be prohibitive (Ex. 11–1, 11–3, 11–11, 11–13, 11–25, 11–29, 11–43, 11–44, 11–49, 11–50).

One commenter supported a requirement for an attendant to monitor any confined space that was designated as a permit space (Ex. 11–28). Other commenters, who opposed a general requirement for attendants, acknowledged that there is a need for an attendant to monitor spaces posing unusual hazards, such as entry into IDLH atmospheres, entry by an employee working alone, and non-routine entry (Ex. 11–2, 11–3, 11–7, 11–10, 11–13, 11–14, 11–15, 11–18, 11–19, 11–20, 11–24, 11–25, 11–29, 11–30, 11–31, 11–33, 11–34, 11–41, 11–51). The statement of the NFPA (Ex. 11–19) typified these comments, as follows:

> NFPA believes that the permit described in proposed 1910.146(b)(9) contains information that is not needed by entrants into confined spaces and could be confusing. NFPA believes that such a permit would not be feasible for confined spaces in the vessel construction and repair industry, for either vessel or shore-side activities. The proposed 1910.146 permit systems, described in 1910.146(d) establishes specifications for a permit system designed to satisfy several problems with one form.
>
> Accident statistics indicate that workers do not recognize the dangers of confined spaces. Statistics also point out that workers involved in accidents have commonly been authorized to enter the space (source (NIOSH FACE study). Additionally, a high percentage of fatalities in confined space incidents are personnel attempting to effect worker rescue. OSHA, with this permit system, has attempted to alert the worker (entrant), establish a control point (person authorizing entry), and ensure safe rescue attempts are performed by specifying relevant information on one form.
>
> Throughout the industry, shipyards have adapted entry permit systems to make the system simple. Frequently, shipyards have incorporated a color-coded tag and sign system. The foundation for the various shipyard systems is linked to the Marine Chemist Certificate and Shipyard Competent Person Inspection Form (OSHA 74 Log of Inspections and Tests). This allows individual shipyards to tailor their system to the type of confined spaces and work performed at their yard. In the larger shipyards, the permit and sign system has been incorporated throughout the yard, including both vessel and shore-side work sites.
>
> NFPA believes that a specification requiring a permit system as described in 1910.146 would be excessive for many shipyards since the nature of the spaces and hazards is so variable. NFPA also believes that such a requirement would not provide any increase in the level of safety. The key to the effectiveness of any permit system will be its simplicity and the training of workers on its implementation. The 1910.146 proposed system introduces increased confusion for many of the shipyard applications and will not necessarily result in increased safety. OSHA needs to recognize that the shipyard industry currently uses a dual permit system for documenting initial and follow-up conditions for its vessel confined space activities. The advantage of this system has been the lack of specification, thus enabling individual shipyards to adapt their systems with the performance requirements of current proposed Subpart B. This approach would work in land-side confined spaces within the shipyard, as well. Use of one system throughout the shipyard facilitates the training of all workers.

The final revised Subpart B does not require the presence of an attendant for confined and enclosed spaces or for work in dangerous atmospheres. OSHA notes that the purpose of Subpart B is to ensure that a space is completely safe to enter and work in. In this regard, § 1910.146(c)(5) of the general industry generic confined space standard sets detailed requirements for atmospheric testing and ventilation for some spaces, and also, recognizes that there are some permit spaces which can be made safe for entry without the need for written permits or attendants. Final revised Subpart B provides equivalent requirements for confined and enclosed spaces and for work in dangerous atmospheres in shipyards. If the testing requirements contained in Subpart B do not indicate a safe atmosphere, then entry is restricted to emergencies and periods of short duration to accomplish ventilation and additional precautions are required (such as posting the space as Not Safe for Workers, continuous monitoring, and the absence of ignition sources), by § 1915.152 (such as air line respirators, attendants and life lines) and by § 1915.94 (frequent checks of employees working in a confined or enclosed space or alone in an isolated location). Once the hazard is removed and the space is safe for entry, the employer is required to test frequently to monitor and maintain the space as safe for workers. As a result, OSHA does not believe it is necessary to require attendants in Subpart B as well.

Paragraph (c)(2) of § 1910.146 requires general industry employers to post signs or use other effective means of informing employees about the existence and location of and the danger posed by permit spaces; paragraphs (c)(3) and (d)(1) require general industry employers to take measures to prevent unauthorized entry into permit spaces; and paragraph (i)(8) requires attendants to take measures to keep unauthorized persons out of permit spaces. The notice reopening the record requested comments on whether or not shipyard

employers should be required to take measures, such as those proposed in § 1910.146, to prevent unauthorized entry into work areas covered by Subpart B.

The commenters agreed that the systems being employed by the shipyard industry have been effective at preventing unauthorized access under the previous Subpart B (Ex. 11–3, 11–6, 11–7, 11–10, 11–11, 11–13, 11–14, 11–15, 11–18, 11–19, 11–20, 11–24, 11–25, 11–26, 11–31, 11–32, 11–39, 11–41, 11–42, 11–43, 11–44, 11–45, 11–49, 11–50). They contended that all spaces are made safe before entry and that the posting and training requirements proposed in Subpart B and outlined in the notice reopening the record would keep employees from entering unsafe areas. The Jonathan Corporation (Ex. 11–18) presented these arguments as follows:

> As a result of routine training, our employees are cognizant of the fact that only spaces which have been tested and posted as being SAFE FOR WORKERS are cleared for entry. This system has served our company very well. This proposal does not recognize our daily involvement with confined spaces.

Mr. Joseph J. Ocken (Ex. 11–31) agreed, stating:

> Any expectation that every confined space (or enclosed space presenting confined space hazards) will somehow be properly barricaded courts disaster. My Coast Guard training emphasizes a straight forward safe work practice: ANY SPACE presenting confined space hazards must be RECENTLY tested by THOROUGHLY trained and equipped individuals and have appropriate ENGINEERING CONTROLS applied BEFORE ENTRY. Any other space, REGARDLESS OF BARRIERS, is treated as UNSAFE.

OSHA concurs with these comments. The revised Subpart B protects employees from "unauthorized" entry through the use of several protective techniques. First, § 1915.12(d) requires employees to be trained to recognize the characteristics of confined spaces and the hazards involved. They are also required to be trained to perform their duties safely (§ 1915.12(d)) and to understand all warning signs and labels (§ 1915.16(a)). Second, confined spaces and spaces containing dangerous atmospheres must be tested and found safe before entry under paragraphs (a), (b), and (c) of § 1915.12. Third, under these same paragraphs, spaces found not to be safe for entry are labeled "Not Safe for Workers". Under the unique conditions of shipyard employment, these measures are effective at preventing unauthorized employees from entering spaces containing dangerous atmospheres. To illustrate, when a space is marked "Not Safe for Workers," the only authorized entrants are those who are entering for emergencies or for short durations to accomplish ventilation to make the space safe. It is not until the space is retested and certified as "Safe for Workers" that employees are allowed to do work in the space.

Under the general industry standard, only a confined space containing a hazard that may expose an employee to the risk of death, incapacitation, or impairment of ability to self-rescue is deemed to be a permit space, requiring the adoption of the protective measures set out in § 1910.146. The general industry standard addresses hazards that are exacerbated by the lack of adequate means of access and egress and by the enclosing nature of the space. By contrast, Subpart B treats all confined and enclosed spaces and other dangerous atmospheres that could present an atmospheric hazard as having this potential, and requires protective measures before entry takes place. In the shipyard context, this approach provides an effective means of protecting employees who must enter confined and enclosed spaces and other dangerous atmospheres.

Section 1910.146 also requires employers to consider non-atmospheric hazards, such as engulfment and internal configuration of the space, in determining whether or not a confined space is a permit space. The proposed revision of Subpart B did not address non-atmospheric issues. Because OSHA was considering the expansion of Subpart B to land-side confined spaces in lieu of applying § 1910.146, the notice reopening the record requested comments on whether or not Subpart B, as expanded, would adequately address non-atmospheric hazards that may be encountered in confined space work (Specific Issue B–1, Question J).

The vast majority of commenters agreed that Subpart B, in combination with other requirements in part 1915, adequately protected employees (Ex. 11–2, 11–3, 11–6, 11–9, 11–13, 11–14, 11–15, 11–18, 11–19, 11–20, 11–24, 11–25, 11–26, 11–28, 11–29, 11–30, 11–31, 11–35, 11–37, 11–39, 11–40, 11–41, 11–45, 11–47, 11–49, 11–50). These commenters contended that non-atmospheric hazards are readily identified, are covered by other part 1915 standards, and are the responsibility of line supervisors and employees. The statement of Ingalls Shipbuilding (Ex. 11–30) was typical of these comments:

> Ingalls believes that such non-atmospheric hazards are adequately addressed by their current respective standards.
>
> Ingalls further believes the foreman or supervisor of the workers is responsible for the above listed non-atmospheric hazards. Subsequent to an 'inspection by the competent person, non-atmospheric hazards may develop as a result of ongoing work (for example, a welder installing his welding leads which create a tripping hazard). The foreman or supervisor is responsible for the health and safety of his employees and for the actions of his employees on a continual basis throughout the workday. Non-atmospheric hazards are obvious without the need for special instrumentation, whereas, the tests performed by the competent person are used to detect unseen atmospheric hazards using specialized instrumentation.

The Department of the Navy (Ex. 11–30) noted that while Subpart B does not address non-atmospheric hazards, it should not be amended to address such hazards:

> As proposed, Subpart B does not address other dangers in confined spaces. However, the dangers from slips, falls, electricity, machine guarding etc. are not unique to or necessarily intensified in confined spaces. Precautions to guard against general non-atmospheric shipyard hazards should be specified for the entire shipyard (all workplaces). Therefore, it is recommended that Subpart B not be expanded to include general safety hazards; rather, these should be covered elsewhere in 29 CFR 1915 (e.g., Subpart E/Access and Egress, Subpart F/ General Working Conditions, and/or Subpart M/Fall Protection).

OSHA does believe that a confined or enclosed space can exacerbate the risk faced by an employee working in a confined space containing serious non-atmospheric hazards. If an employee is injured in a confined space the limited means of access and egress makes emergency medical assistance problematic. For this reason, OSHA adopted language in § 1910.146 for general industry so as to define permit-required confined space "in the broadest possible terms" so that employers are required to protect affected employees from any serious hazards which may be confronted in a permit space [58 FR 4478–4479]."

The Agency believes that shipyard employees will be adequately protected under revised Subpart B without incorporating additional requirements directed towards non-atmospheric hazards. As part of the pre-entry test, the competent person is required to make a visual inspection of the confined or enclosed space. At this time, they can alert the employer to non-atmospheric hazards that are addressed by other standards. For further information, see the discussion of visual inspection in the preamble to § 1915.12 below.

The notice reopening the record on Subpart B also requested comments on whether or not OSHA should adopt various provisions from proposed

§ 1910.146 that SESAC had recommended for inclusion in revised Subpart B. These provisions included those on training, rescue, and exchanging information between employers. The summary and explanation of § 1915.12 discusses comments received on these provisions. Additionally, OSHA requested comments on whether any other requirements from proposed § 1910.146 would be appropriate for inclusion in revised Subpart B. No one suggested the adoption of any proposed § 1910.146 provisions other than those relating to attendants, permits, and unauthorized entry discussed earlier.

Paragraph (b) of § 1915.11 sets definitions for revised Subpart B. These definitions, derived in large part from NFPA 306, are intended to facilitate compliance with the revised standard.

Previous Subpart B contains no definitions. The few definitions relating to the previous subpart are contained in § 1915.4, which defines the following Subpart B related terms: hazardous substance, competent person, confined space, enclosed space, hot work, and cold work.

In § 1915.11(b), the NPRM proposed to add definitions specifically applicable to revised Subpart B. This paragraph in the proposed rule included the terms "competent person" and "hot work," which as noted previously, are also defined in existing § 1915.4. The NPRM also raised issues regarding the definitions of "inert or inerted atmospheres," "Marine Chemist," and "Not Safe for Workers."

The definitions contained in revised Subpart B are discussed in the following summary and explanation of § 1915.11(b). This discussion provides a brief explanation of each defined term, justifies any differences between the existing or proposed definitions and those contained in the final rule, and discusses comments received regarding the three terms that were raised as issues in the NPRM (no substantive comments were received on any other terms proposed in § 1915.11(b)).

"Adjacent spaces" means spaces bordering another space in all directions. The wording of the definition of this term has been revised editorially from the definition in the proposal for consistency with NFPA 306. Additionally, the final rule defines the term "adjacent spaces," whereas the proposal defined the term "adjacent compartments or spaces," because the final rule does use the term "adjacent compartments".

The final rule includes a definition of the term "Assistant Secretary", which means the Assistant Secretary of Labor for Occupational Safety and Health or his or her designated representative. This term is used in revised Subpart B, so OSHA has adopted a definition based on § 1910.2.

OSHA has not carried forward into the final rule the proposed definition of "bulk". The Agency believes that a definition of this term is not necessary to the meaning of the standard.

"Certified Industrial Hygienist" (CIH) means an industrial hygienist certified by the American Board of Industrial Hygiene. This definition is unchanged from the proposal.

A "Coast Guard authorized person" is one who meets the U.S. Coast Guard regulations concerning persons designated to perform the functions of a Marine Chemist when a Marine Chemist is not reasonably available. The definition in the final rule is essentially the same as that contained in proposed § 1915.11(b); however, substantive requirements proposed in that definition have not been carried forward, as they are inappropriate for use in a definition.

OSHA has not carried forward into the final rule the proposed definition of "competent person". As noted earlier, this term is defined in § 1915.4, and this definition is appropriate for application to revised Subpart B.

"Dangerous atmosphere" means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (i.e., escape unaided from a confined or enclosed space), injury, or acute illness. Although no definition of this term was proposed, the Agency believes that it is essential for employers and employees to know what a dangerous atmosphere is in the application of revised Subpart B.

The final rule includes a definition of the term "Director", which means the Director of the National Institute for Occupational Safety and Health or his or her designated representative. This term is used in revised Subpart B, so OSHA has adopted a definition based on Section 3 of the OSH Act.

The term "entry" refers to the act by which a person passes through an opening into a space and to the work performed in that space. Entry is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space. This term was not included in the proposed revision of Subpart B, but OSHA believes that its inclusion is necessary for clarity. The definition has been taken from § 1910.146(b).

The term "Enter with Restrictions" denotes a space where entry is only permitted under specified conditions of engineering controls, personal protective equipment, clothing, and time. Although this term was not defined in the proposal, the definition of this term has been included in the final rule to help clarify when entry is permitted and when it is prohibited.

In the NPRM, the term "Not Safe for Workers" was used to describe compartments or spaces that do not meet the minimum safety criteria necessary to permit unrestricted entry. The term was used to describe either of two situations that occur. In the first, the space was not safe for workers to enter unless personal protective equipment was worn or unless the length of time of employee exposure was limited. In the second, the space was not safe for entry under any circumstances, regardless of whether personal protective equipment was worn. To address this seeming contradiction, OSHA requested comments on the issue of whether or not a separate category of "Safe with Restrictions" should be included in proposed Subpart B.

Three commenters opposed the adoption of an additional category of spaces (Ex. 6–4, 6–5, 6–8). They argued that the term "Safe with Restrictions" might not be understood by all workers and that the term "Not Safe for Workers" was not only more appropriate, but safer as well. For example, Sound Testing, Inc. (Ex. 6–8), stated:

> If everyone, or even if most people, in the shipyards wore respirators, I would see "safe with restrictions" as a primary designation. But, that's not the case. Moreover, some one third of shipyard workers are reputed to be functionally illiterate. Thus, "Safe with Restrictions" needlessly complicates certificate language. In the most simple terms, a tank is either safe or not safe, and the workman deserves to be told straightforwardly which is the case.

Other commenters supported the additional designation (Ex. 6–10, 6–13, 6–15, 6–18, 6–21, 6–22, 6–23, 6–24, 6–27, 6–28, 6–33, 6–34, 6–37, 6–38). They believed that the extra designation would recognize existing safe work practices under the OSHA standard. For example, the U.S. Department of Transportation (Ex. 6–13) stated:

> Engineering controls are not always capable of reducing confined space hazards to "safe" levels. By recognizing and addressing the existing use of certificates with restrictions, additional protection may be realized. Particular restrictions will be placed on a space after consideration by the Marine Chemist and an employer's representative.
>
> Such certificates should not be issued for convenience or for the purpose of avoiding the use of preferred control measures. In

addressing this practice under Part 1915, OSHA should specify that entering such spaces is only allowed when preferred engineering controls are used to the greatest extent feasible and found to be inadequate.

Some of these rulemaking participants believed that the term "Enter with Restrictions" was a more appropriate description of the type of location involved (Ex. 6–10, 6–21, 6–22, 6–23, 6–24, 6–27, 6–28, 6–33, 6–34, 6–37, 6–38). NFPA (Ex. 6–10) stated their reasoning behind this suggested term, as follows:

> NFPA supports the addition of some provision for "restricted entry". NFPA does not support the use of the word "safe" in this case since it may be misconstrued and it would be inconsistent with the "Enter With Restrictions" designation in NFPA 306.

OSHA agrees with the commenters who supported the use of the term "Enter with Restrictions". The Agency believes that this term better describes the intent of requirements that are intended to limit rather than strictly prohibit employee entry under all conditions. For example, § 1915.12(c)(3) recognizes that a Marine Chemist or a Certified industrial hygienist may designate a space as "Enter with Restrictions" and may provide a list of protective measures to be taken before entry is allowed. Additionally, this term is consistent with the terminology used in NFPA 306, with which most shipyard employers are familiar and with which they are complying. For these reasons, OSHA is incorporating this term in revised Subpart B wherever entry is permitted under certain conditions and is using the term "Not Safe for Workers" wherever entry is strictly forbidden.

"Hot work" means any activity involving fire- or heat-producing operations, such as riveting, welding, and burning. The definition of this term also indicates that grinding, drilling, abrasive blasting, and similar spark-producing operations are also considered to be hot work unless they are isolated from atmospheres containing a concentration of any flammable or combustible substance greater than 10 percent of the lower explosive limit of that substance. While the definition in the final rule is substantially the same as that contained in the proposed standard, it has been editorially revised for clarity. It should be noted that the definition of "hot work" in revised Subpart B will be applied to Subpart B whereas the definition of the same term in § 1915.4 applies to the rest of part 1915.

"Immediately dangerous to life or health"[3] (IDLH) means an atmosphere that poses an immediate threat to life or that is likely to result in acute or immediate severe health effects. This definition has been adopted without substantive change from the proposal.

"Inert or inerted atmosphere" means an atmospheric condition in which:

(1) The oxygen content of the atmosphere is maintained at a level less than or equal to 8 percent by volume or at a level of 50 percent of the amount required to support combustion, whichever is lower, or

(2) The space is flooded with water and the vapor concentration of flammable or combustible materials in the free space above the water line is less than 10 percent of the lower explosive limit for the material. This definition has been adopted without substantive change from the proposal.

In the NPRM, OSHA raised the issue of whether or not the proposed definition of "inert or inerted atmosphere" was appropriate, especially with respect to the maximum permissible level of oxygen. The Agency asked for guidance on whether or not specific oxygen levels for various substances should be published along with the rule.

The persons who commented on this issue felt that OSHA should not publish specific levels in the final rule (Ex. 6–10, 6–18, 6–23, 6–24, 6–27, 6–28, 6–33, 6–34). They argued that since a Marine Chemist would be the person authorizing and monitoring the inerting of atmospheres and since Marine Chemists are thoroughly familiar with the selection of appropriate procedures involved, specifying oxygen levels in the OSHA standard was unnecessary. Endorsing this view, NFPA (Ex. 6–10) stated:

> Inerting in the marine industry is overseen by Marine Chemists in accordance with the requirements of the "Control of Gas Hazards on Vessels—NFPA 306 (1988)." The provisions for inerting as contained in NFPA 306, 2–3.7(a), are based upon the industry accepted practice for inerting. It takes into account the theoretical lower limit for the amount of oxygen to support combustion, which is approximately 11% by volume for most petroleum products. The procedure specifies either reducing the oxygen content to 8% by volume or 50% of the amount to support combustion, whichever is less. In practice, because the value of 50% of the amount to support combustion is usually less than 8% by volume, an even greater margin of safety is achieved. The minimum oxygen for combustion values are contained in Appendix B, "Explosion Prevention Systems—NFPA 69 (1986)". NFPA 306 requires in 2–3.7(a), (c) that the selection and disposal of the inert gas medium be acceptable to the Marine Chemist who provides specific instructions on his/her Marine Chemist Certificate.
>
> NFPA supports the addition of the definition for inerting and the levels as specified in the definition since these levels are industry accepted and provide for an adequate level of safety when administered by a Marine Chemist in accordance with NFPA 306.

The Marine Chemist Association, Inc. (Ex. 6–34), agreed stating:

> The Marine Chemist Association feels that inerting is not a procedure free of potential hazards and that inerting for hot work should only be attempted with the proper skill to determine each of the above mentioned factors. If OSHA provides only partial details of these factors, it may lead to unauthorized personnel attempting the procedure outside current regulatory requirement, and could possibly result in the generation of hazardous situations.

For the reasons stated by NFPA and the Marine Chemist Association, OSHA is not specifying the precise levels of oxygen acceptable under the definition of "inert or inerted atmosphere", either directly in the definition or in an appendix. Under § 1915.14(a), an atmosphere to be inerted must be tested and certified by a Marine Chemist or a U.S. Coast Guard authorized person, who would be thoroughly familiar with the proper techniques involved. The Agency fully concurs with the Marine Chemist Association that setting out these levels within the standard itself might encourage unqualified persons to undertake the inerting of a hazardous atmosphere, possibly leading to a severe accident.

"Labeled" means identified with a sign, placard, or other form of written communication that informs all employees of the status or condition of the work space to which it is attached. This term was not included in the proposed revision of Subpart B, but OSHA believes that its inclusion is necessary for clarity.

"Lower explosive limit" (LEL) means the minimum concentration of vapor below which propagation of a flame does not occur in the presence of an ignition source. This definition is unchanged from the proposal.

"Marine Chemist" means an individual who possesses a current Marine Chemist Certificate issued by the National Fire Protection Association. This definition is substantially the same as the one in the proposal.

In the NPRM, OSHA requested comments related to the definition of "Marine Chemist". Although some

[3] The definition of "immediately dangerous to life or health" in § 1910.146 reads as follows:

Immediately dangerous to life or health (IDLH) means any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

comments were received on this subject, they all related to the issue of whether or not anyone else could perform the duties required of a Marine Chemist. These comments are discussed under the summary and explanation of §§ 1915.12(c)(3) and 1915.14(a)(1), later in this preamble.

"Nationally Recognized Testing laboratory" (NRTL) means a laboratory recognized by OSHA as meeting the provisions of Appendix A of § 1910.7. In the previous standard, OSHA referred to "Underwriters Laboratories" as one of the organizations that could approve lamps for use in Class I, Group D atmospheres. Since OSHA has promulgated the NRTL standard, laboratories meeting that standard are the appropriate organizations to approve such lamps.

"Not Safe for Hot Work" denotes a space where hot work may not be performed. This definition is substantially the same as the one in the proposal.

"Not Safe for Workers" denotes a space that employees may not enter. The proposed definition of "Not Safe for Workers" contained criteria to be used to determine whether or not a space was safe for entry. OSHA has not carried these criteria forward into the definition of this term in the final rule. The same criteria also appeared under the proposed definition of "Safe for Workers". OSHA believes that removing the redundancy will help clarify revised Subpart B. (See the summary and explanation of the definition of "Enter with Restrictions", earlier in this preamble, for additional discussion of issues regarding the use of the term "Not Safe for Workers".)

"Oxygen-deficient atmosphere" means an atmosphere having an oxygen concentration of less than 19.5 percent by volume. "Oxygen-enriched atmosphere" means an atmosphere that contains 22.0 percent or more oxygen by volume. These two definitions have been carried forward from the proposal without substantive change.

"Safe for Hot Work" denotes a space that meets the following criteria:

(1) The atmosphere is not oxygen-enriched;

(2) The concentration of flammable vapors in the atmosphere is less than 10 percent of the LEL;

(3) Residues or materials within the space, under existing atmospheric conditions in the presence of hot work and while maintained as directed by the Marine Chemist or competent person, are not capable of producing a higher concentration of oxygen or flammable vapors than permitted under the first two criteria; and

(4) All adjacent spaces have been cleaned or inerted or otherwise treated sufficiently to prevent the spread of fire.

The definition in the final rule is substantively the same as the corresponding definition in the proposal; however, the language has been improved for clarity.

"Safe for Workers" denotes a space that meets the following criteria:

(1) The atmosphere is neither oxygen-deficient nor oxygen- enriched;

(2) The concentration of flammable vapors is below 10 percent of the LEL;

(3) Any toxic materials associated with cargo, fuel, tank coatings, inerting mediums, or fumigants are within permissible concentrations at the time of inspection; and

(4) Residues or materials associated with the work authorized by the Marine Chemist, Certified Industrial Hygienist, or competent person will not produce uncontrolled toxic materials under existing atmospheric conditions while maintained as directed.

The definition in the final rule is substantively the same as the corresponding definition in the proposal, except that the language has been improved for clarity and the "exception" in the proposal regarding the concentration of flammable vapors has not been carried forward. OSHA believes that this exception, which is recognized in § 1915.13(b)(6) in the final rule, more properly falls under the new term "Enter with Restrictions".

"Space" means an area on a vessel, vessel section or within a shipyard such as, but not limited to, a cargo tank or hold, pump or engine room, storage locker, tank containing flammable or combustible liquids, gases, or solids; a room within a building, crawl space, tunnel, and accessway. Although no definition of this word was proposed, its meaning is essential to the content of revised Subpart B. The final rule uses the word "space" broadly to encompass all the different types of areas in a shipyard where dangerous atmospheres might be found. The definition of this word in the final rule is intended to convey this meaning to employers and employees who must comply with the standard.

"Upper explosive limit" (UEL) means the maximum concentration of flammable vapor above which propagation of flame does not occur on contact with a source of ignition. This definition is unchanged from the proposal.

"Vessel section" means a subassembly, module, or other component of a vessel being built, repaired, or broken. This definition is unchanged from the proposal.

"Visual inspection" means the physical survey of the space, surroundings and contents by the competent person, Marine Chemist, or Certified Industrial Hygienist to identify hazards such as, but not limited to, restricted accessibility, residues, unguarded machinery, and piping or electrical systems that could create or enhance hazards. This term is defined in the final rule to clarify what is required of the person preforming the inspection.

OSHA has not carried forward into the final rule the proposed definition of "weather deck". The Agency believes that a definition of this term is not necessary to the meaning of the standard.

2. § 1915.12 Precaution Before Entering Spaces.

OSHA has made several significant changes to § 1915.12. First, OSHA has reformatted this section to address more appropriately the order of atmospheric testing to be conducted by competent persons when determining hazards within confined and enclosed spaces and other dangerous atmospheres prior to employee entry. Second, OSHA has raised the minimum level of oxygen for entry and addressed oxygen-enriched atmospheres in this section. Third, the Agency has specified when and under what conditions an employee may enter a space that has been found "not safe for workers." Finally, OSHA has added new paragraphs to this section to address: (1) The training of individuals who enter dangerous and confined spaces (paragraph (d)), (2) rescue teams (paragraph (e)), and (3) the exchange of hazard information between employers (paragraph (f)).

OSHA is also making the requirement to visually inspect each space explicit in this final standard. In the NPRM, comments were solicited on whether the shipyard competent person should be required to conduct a physical examination of the tank and pipelines when making an inspection. Many commenters supported OSHA's decision (Ex. 6–4, 6–10, 6–12, 6–13, 6–15, 6–18, 6–24, 6–28, 6–31, 6–33, 6–34). For example, NFPA (Ex. 6–10) stated:

> NFPA strongly supports the inclusion of a requirement that in addition to atmospheric testing the shipyard competent person should also be required to conduct a physical examination of the space and associated pipelines. NFPA 306, 2–1 requires the Marine Chemist to conduct a physical inspection and to conduct test within the space. For high flash point, low vapor pressure products such as diesel, a test for flammable or combustible vapors is not sufficient, since at atmospheric temperatures there are not enough vapors being evolved for

the combustible gas indicator to detect. It is essential that physical inspections be conducted.

OSHA has decided that a visual inspection is a crucial element in ascertaining that confined and enclosed spaces and other dangerous atmospheres are safe for entrants. Based on the visual inspection and other information available to the employer about non-atmospheric hazards, the employer is required to take specific actions as required by other subparts. For example, precautions to be taken for electrical hazards are covered by § 1915.181 (shipboard) and § 1910.147 (shipboard) and machinery is addressed by § 1915.164 (for vessels) and § 1910.212 (land-side).

In paragraphs (a), (b), and (c) of final § 1915.12, OSHA is requiring atmospheres to be tested for oxygen content first, flammability second, and toxicity third. The format of the previous standard implied that atmospheres be tested for flammability first, toxicity second, and oxygen deficiency third.

Even before the revision of Subpart B was proposed, Newport News Shipbuilding and Harbor Testing Laboratory commented that the proper sequence is testing for oxygen, then flammability, then toxicity (53 FR 48096). To address this problem, OSHA proposed to present the testing requirements in the proper sequence. However, as noted in the NPRM, the proposed rule would not have required testing in any particular order.

OSHA believes that it is important for atmospheric testing to be conducted in the proper sequence. The Agency reached the same conclusion in the rulemaking on § 1910.146, which adopted a rule requiring atmospheric testing in the correct order in that final rule, for the following reasons:

> A test for oxygen must be performed first because most combustible gas meters are oxygen dependent and will not provide reliable readings in an oxygen deficient atmosphere. In fact, the Johnson Wax Company (Ex. 14–222) stated that "there is [a] specific (sensor dependent) oxygen level below which the combustible gas sensor will *not* respond at all [emphasis was supplied in original]." Combustible gases are tested for next because the threat of fire or explosion is both more immediate and more life threatening, in most cases, than exposure to toxic gases. [53 FR 48096]

This reasoning applies to the revision of Subpart B as well. Atmospheric testing in confined and enclosed spaces and other dangerous atmospheres in shipyards is basically the same as atmospheric testing in general industry permit spaces. Therefore, the revision of § 1915.12 requires shipyard employers to perform atmospheric testing in the following sequence: oxygen content, flammability, toxicity.

In paragraph (a)(1), OSHA continues the requirement (in § 1915.12(c)(1)) for competent persons to test atmospheres of specific spaces that may contain oxygen-deficient atmospheres. These spaces are listed specifically as follows:

(1) Spaces that have been sealed,

(2) Spaces and adjacent spaces that contain or have contained combustible or flammable liquids or gases,

(3) Spaces and adjacent spaces that contain or have contained liquids, gases, or solids that are toxic, corrosive, or irritant,

(4) Spaces that have been fumigated, and

(5) Spaces containing materials or residues that could create an oxygen-deficient atmosphere. This final rule adopts the language from the NPRM to require competent persons to test atmospheres of these spaces for "oxygen content" rather than just "oxygen deficiency." Paragraph (a)(2) of final § 1915.12 addresses the maximum permissible oxygen concentration within confined and enclosed spaces and other dangerous atmospheres. Therefore, the testing to be performed must be for content rather than for oxygen deficiency alone. (The rationale for adopting a requirement for maximum permissible oxygen exposure is discussed under the summary and explanation of final § 1915.12(a)(2).)

In the previous rule § 1915.12(c)(1) required tests to be conducted "[b]efore employees are initially permitted to enter" any of the regulated spaces. Paragraphs (b)(1) and (c)(1) contain this identical language for pre-entry testing for flammable gases and vapors and for toxic substances. The NPRM used the language "prior to initial entry" in proposed § 1915.12(a)(1) and the language "prior to entry" in proposed § 1915.12 (b)(1) and (c)(1). The preamble to the proposal noted that questions had arisen regarding what was intended by "initial entry" in the previous standard and that the Coast Guard had interpreted the OSHA standard to require retesting if more than 24 hours had elapsed since the previous testing. The NPRM raised the issues of whether "initial entry" should be defined in Subpart B and, if so, what that definition should be.

Several commenters believed that OSHA should not specify the maximum time permitted to elapse before additional testing is required (Ex. 6–3, 6–6, 6–8, 6–12, 6–18). They argued that the length of time between testing and entry could vary depending on the space and the possible hazards involved. For example, Mr. Charles K. Klein, representing Newport News Shipbuilding, stated:

> OSHA should not specify a time limit regarding re-certification of spaces after "initial entry" certification has been given. The Coast Guard's interpretation for re-certification is based on a 24-hour lapse period since a tank has been previously determined safe for entry. However, we feel that as long as conditions have not changed since the space was certified for "initial entry", additional certification is not required. Periods longer than 24 hours may be appropriate in cases where a confined space does not contain a hazardous substance, is not connected to a system which contains a hazardous substance and has not been closed except for an air or hydrostatic test. However, certain evolutions involving hazardous substances in or near confined spaces may require testing on a shift basis or more often. A time limit imposed on "initial entry" is unnecessarily restrictive and reduces the employer's flexibility in providing a safe and healthful work environment in an effective, cost-efficient manner. [Ex. 6–6]

Two commenters maintained that the certificate issued by a Marine Chemist would control whether or not a space had to be retested beyond a certain period (Ex. 6–8, 6–18). They believed that retesting was unnecessary unless conditions changed or unless the Marine Chemist's certificate required it. Sound Testing, Inc., expressed this position as follows:

> It should be made clear that a Marine Chemist's certificate is voided not by the passage of time, but by the change of conditions. Therefore, if a competent person can ascertain that conditions have not drastically changed, the chemist's certificate remains in force, regardless of how long between competent person inspections. The corollary of this is that there should be no explicit time limit on the chemist's certificate unless the chemist himself sees a reason for such a limit. [Ex. 6–8]

Other rulemaking participants argued that the regulation should clarify what constitutes initial entry or when additional testing is required before the first entry into the space (Ex. 6–4, 6–5, 6–10, 6–13, 6–21, 6–22, 6–24, 6–27, 6–28, 6–33, 6–34, 6–37, 6–38). Several of these commenters stated that the standard should specify the maximum interval permitted before additional testing would have to be performed (Ex. 6–4, 6–5, 6–10, 6–24, 6–27). The intervals suggested ranged from immediately before the entry (Ex. 6–24) to 24 hours (Ex. 6–27). For example, the U.S. Coast Guard stated:

> It has been our experience that if a minimum is not set the retesting is not done or is done infrequently because of the competent person's other work obligations.

Our policy does not prohibit the inspector from requiring additional testing if he feels the conditions warrant. We have required additional retesting because of rises in temperature, excess quantity of cargo residues, and lack of confidence in the competent person. [Ex. 6–4]

Other commenters thought that a definition of "initial entry" would clarify the standard (Ex. 6–21, 6–22, 6–23, 6–28, 6–33, 6–34, 6–37, 6–38). Four of them recommended that "initial entry" refer to the first entry after testing and that additional testing be required for entry on subsequent days to ensure that safe conditions are still present (Ex. 6–21, 6–22, 6–37, 6–38). Two of them suggested that it refer to the time immediately after the initial opening of a space, when the tests and inspections performed to determine whether or not the space is safe for entry are conducted (Ex. 6–28, 6–34). The American Waterways Shipyard Conference (AWSC) maintained that "initial entry" should be defined as the first entry by shipyard personnel after the space has been certified by the Marine Chemist (Ex. 6–23). They explained the reasons for their position as follows:

The United States Coast Guard has interpreted the term to mean "more than 24 hours have elapsed since a tank has been determined safe for entry and/or hot work." If that time period has elapsed then the tank must be recertified. However, this interpretation does not take into account the shipyard facility's requirements to maintain conditions. The shipyard facility must commence work on the vessel within 24 hours, after the certificate has been issued or the Marine Chemist certificate becomes invalid. As long as the conditions listed on the certificate are maintained, then the certificate is valid. However, if the conditions, as specified on the certificate change, then the Marine Chemist is recalled to recheck the space.

Including the definition for initial entry recommended by AWSC will eliminate confusion within the industry and impose a standard practice around the country. [Ex. 6–23]

OSHA believes that it is important to clarify the term "initial entry" so that employers and employees understand clearly what OSHA means by the term. With respect to spaces that require certification by a Marine Chemist, it is OSHA's intent that "initial entry" means the first entry into a certificated space after the Marine Chemist's certificate has been posted. The period of time during which the Marine Chemist's certificate is valid is established by the Marine Chemist and is logged on the certificate as posted. OSHA believes that the Marine Chemist performing the tests and inspection of a space to be entered is in the best position to determine the duration of the permit's validity. With respect to spaces that must be tested but need not be certificated by a Marine Chemist, the Agency will interpret the "initial entry" to be the very first entry into the space after testing is performed. (No entry is allowed before those tests have been performed.) In addition, the tests must be performed close enough to the time of entry to ensure that they accurately reflect conditions in the spaces. To meet this standard, testing will nearly always be done just prior to entry by employees; seldom will tests be performed prior to an hour before employees are to enter a space.

There are also requirements in § 1915.15 for periodic monitoring and maintaining atmospheric conditions within a space as found by the Marine Chemist, Coast Guard authorized person, or competent person. Tests must be repeated as often as necessary to ensure that the required atmospheric conditions within the space are maintained (paragraphs (c) and (e)). Additionally, when a change occurs that could alter conditions within a tested space, work in the space must stop and employees must exit, and the area must be retested (paragraphs (b), (d), and (f)).

OSHA believes it is unnecessary to establish within the regulatory text of § 1915.12 a specific time limit beyond which the initial entry is not permitted after pre-entry testing. As noted in several comments, periods longer than 24 hours may be appropriate if a confined or enclosed space or other dangerous atmosphere does not contain a hazardous substance, is not connected to a piping or exhaust ventilation system that contains a hazardous substance, and has not been closed except for an air or hydrostatic test (Ex. 6–3, 6–6). OSHA has determined that the need for testing is directly related to the potential for change to occur within spaces. The duty to test as conditions warrant is imposed by § 1915.12 and § 1915.15, in combination. These two sections require that, in all cases, testing of the space must be conducted before employees enter the space and as often as necessary to monitor conditions within the space as work progresses. Obviously, any change in conditions that could affect the designation of a space as "Safe for Workers" require reinspection, retesting, and recertification of the space by the competent person or Marine Chemist.

Therefore, for the purposes of this rule, the term "initial entry" is interpreted by OSHA to mean the first entry into a space. The time period between pre-entry testing and initial entry may vary. However, the space must be reinspected, retested, and recertified any time conditions in the space might have become unsafe for employees.

As noted earlier, in paragraph (a)(1), OSHA is continuing the previous requirement (in § 1915.12(c)(1)) for competent persons to test atmospheres of specific spaces that may contain oxygen-deficient atmospheres. The following paragraphs describe each of the spaces itemized in paragraph (a)(1).

Paragraph (a)(1)(i) of final § 1915.12 lists spaces that have been sealed, e.g., those that have been coated and closed up and those that have been painted and that lack ventilation. OSHA has combined the spaces listed in paragraphs (c)(1) (ii), (iii), and (iv) of the previous § 1915.12 into one paragraph because OSHA considers the hazards within these spaces to be similar. The primary hazard of these spaces is the lack of proper ventilation and the resultant possible lack of oxygen. OSHA considers the consolidation of the previous paragraphs into one paragraph to be an editorial change for clarity because none of the spaces currently listed have been deleted nor have any been added.

Paragraph (a)(1)(ii) lists spaces and adjacent spaces that contain or have contained combustible or flammable liquids or gases. Paragraphs (a)(1)(iii) and (a)(1)(iv) list spaces and adjacent spaces that contain or have contained liquids, gases, or solids that are toxic, corrosive, or irritant or that have been fumigated. These three paragraphs refer to spaces that were included under the previous § 1915.12(c)(1)(i), which reads as follows:

(i) Spaces in which the test[s] required by paragraphs (a) and (b) of this section indicate that no flammable or toxic contaminants are present in the atmosphere.

Under this previous provision, spaces that require flammability and toxicity testing must also be tested for oxygen deficiency. In revised subpart B, OSHA has simply named the spaces that are covered under the previous § 1915.12 (a) and (b) in lieu of specifying them by reference. Additionally, the final rule requires these spaces to be tested for oxygen regardless of whether they are found to be safe with respect to the hazards of flammable and toxic substances. Under the previous standard, which implied that the flammability and toxicity tests were performed before the oxygen test, once a space was found to be unsafe due to the presence of flammable gases or vapors or toxic air contaminants, further testing for oxygen deficiency was unnecessary. Under the final rule, tests

for oxygen content are conducted first and must always be performed.

Paragraph (a)(1)(v) lists spaces containing materials or residues that could create an oxygen-deficient atmosphere. The previous § 1915.12(c)(1)(v) covers only cargo spaces containing cargoes or residues that can create an oxygen-deficient atmosphere. The corresponding paragraph in the proposal (proposed § 1915.12(a)(viii)) also addressed only cargo spaces. The proposed and previous language also provide examples of cargos that can absorb oxygen and create an oxygen-deficient atmosphere (scrap iron, fresh fruit and molasses, and various vegetable drying oils).

As noted in the summary and explanation of final § 1915.11(a), earlier in this preamble, the scope of subpart B is being expanded to address all confined and enclosed spaces and other dangerous atmospheres throughout shipyard employment. While the previous standard recognizes that the hazard of oxygen deficiency may be found in cargo spaces, many other confined and enclosed spaces in shipyard employment also pose this hazard. OSHA believes that it is essential that all such spaces be tested for oxygen content before entry to assure their safety. Therefore, the Agency is eliminating the reference to cargo spaces and is requiring all spaces containing materials or residues that could create an oxygen deficiency to be tested.

Paragraph (a)(2) requires spaces that have been tested and found to contain oxygen-deficient atmospheres to be labeled "Not Safe for Workers." Spaces found to be oxygen-enriched are required to be labeled "Not Safe for Workers—Not Safe for Hot Work." If employees are to enter a space that has an oxygen-enriched or oxygen-deficient atmosphere, then ventilation must be provided to maintain the oxygen content of the atmosphere at or above 19.5 percent and below 22.0 percent by volume. After the ventilation produces an acceptable level of oxygen, the warning signs may be removed.

The previous § 1915.12(c)(2) only requires ventilation for spaces containing less than 16.5 percent oxygen by volume. It does not require spaces with oxygen-deficient or oxygen-enriched atmospheres to be labeled, nor does it address oxygen-enriched atmospheres. Additionally, it requires ventilation to be provided only when the oxygen content in the space is below 16.5 percent by volume, rather than below 19.5 percent.

Unlike either the proposal or the previous rule, the final rule addresses hazards associated with oxygen-enriched atmospheres. Oxygen-enriched atmospheres create significant risks to employees entering confined and enclosed spaces and other dangerous atmospheres, and precautions must be taken before entry into such atmospheres. The proposal would have required atmospheres to be tested for oxygen content rather than for oxygen deficiency alone. No rulemaking participant objected to this requirement. NFPA 306, in Section 2–3.1, sets the criteria for compartments and spaces to be found "Safe for Workers." The first criterion listed in this section is that the oxygen content of the space be "at least 19.5 percent and not greater than 22 percent by volume." Thus, OSHA is consistent with the existing national consensus standard which has adopted provisions restricting entry into oxygen-enriched atmospheres.

The hazards of working in an oxygen-enriched atmosphere are widely recognized. The presence of greater than normal amounts of oxygen increases the flammability of materials and lowers the flash point of flammable materials. An ignition source, such as a spark, that would ordinarily be of insufficient energy to ignite a flammable mixture may ignite such mixture in oxygen-enriched atmospheres. The presence of greater than normal amounts of oxygen can also increase the chances of spontaneous combustion of flammable materials. Thus, an oxygen-enriched atmosphere in a confined or enclosed space or other dangerous atmosphere can place employees at an unacceptable risk of injury due to fire or explosion. Employers must take measures to find the source of oxygen and then eliminate that source and ventilate the space in order to control the hazards involved.

For the foregoing reasons, OSHA has adopted requirements in final § 1915.12(a) that are intended to eliminate the hazards posed by oxygen-enriched atmospheres. The Agency has adopted NFPA's criterion for oxygen enrichment (that is, an oxygen concentration of 22 percent or more by volume). Thus, the final rule sets a standard that protects employees to a level equal to that provided by the relevant national consensus standard for the work involved.

The proposed rule, under § 1915.12(a)(4) and (a)(5), would have required labeling spaces with oxygen-deficient (that is less than 19.5 percent oxygen) atmospheres, but would have permitted employees to enter such spaces provided they were wearing respirators.

The final rule raises the minimum acceptable concentration of oxygen from 16.5 percent to 19.5 percent by volume. As noted earlier, the NPRM proposed raising the minimum acceptable level of oxygen, and several rulemaking participants commented on this issue (Ex. 6–3, 6–6, 6–10, 6–11, 6–15, 6–18, 6–24, 6–28, 6–33). All of them agreed with the proposed minimum oxygen level. For example, the Shipbuilders Council of America (Ex. 6–3) stated:

> Routine entry should be allowed only if the oxygen level is at least 19.5 percent.

Northwest Marine Chemist (Ex. 6–18) maintained that the existing minimum acceptable concentration of oxygen in § 1915.12(c)(1) was outdated, as follows:

> The use of 16.5% oxygen by OSHA is archaic, and not used in the industry in my area.

Additionally, OSHA's generic confined space standard, in § 1910.146(b), defines "oxygen-deficient atmosphere" as "an atmosphere containing less than 19.5 percent oxygen by volume."

OSHA has previously concluded that permitting employees to work in atmospheres in which the concentration of oxygen is below 19.5 percent by volume presents an unacceptable risk of acute adverse health effects. In the preamble to final § 1910.146, OSHA described the possible results of exposure to oxygen-deficient atmospheres as: dizziness, tiredness, difficulty in breathing, confusion, unconsciousness, and death (58 FR 4476). Considering these possible consequences, the Agency continues to believe that the minimum acceptable concentration of oxygen, in the absence of control measures, is 19.5 percent by volume.

As noted earlier, § 1915.12(a)(2) requires spaces containing oxygen-deficient and oxygen-enriched atmospheres to be labeled "Not Safe for Workers" or "Not Safe for Workers—Not Safe for Hot Work," respectively. The previous standard does not require such labeling. The proposed rule would have required labeling only for oxygen deficiency, under § 1915.12(a)(5). No one objected to the labeling requirement proposed in § 1915.12(a)(5), and OSHA believes that this labeling is necessary to warn employees to keep out of spaces containing insufficient oxygen to work safely. Therefore, the Agency is carrying forward the proposed provision that spaces with oxygen-deficient atmospheres be labeled "Not Safe for Workers." Because OSHA has found it necessary and appropriate to prohibit entry into oxygen-enriched atmospheres, the Agency also believes that it is necessary to label spaces containing such atmospheres. Because

of the increased risk of fire and explosion associated with these atmospheres, the final rule requires them to be labeled as "Not Safe for Hot Work" as well as "Not Safe for Workers."

Final § 1915.12(a)(2) requires ventilation to be provided to maintain the oxygen content of the atmosphere in a safe range. Paragraph (c)(2) of the previous § 1915.12 contains the same requirement, except that it applies only when an oxygen deficiency is found. The proposed revision of Subpart B would not have required ventilation but would have permitted employees to enter oxygen-deficient atmospheres if they were wearing respirators (proposed § 1915.12(a)(4)).

OSHA has decided not to allow employees to enter confined or enclosed spaces or other dangerous atmospheres that are designated "Not Safe for Workers," except under tight restriction. (See the summary and explanation of final § 1915.12(c)(3), later in this preamble, for a discussion of issues related to employee entry into such spaces.) Therefore, the final rule adopts a requirement, similar to the one in the previous § 1915.12(c)(2), for ventilation to be provided any time a space is hazardous because of oxygen deficiency or oxygen enrichment. Once the ventilation brings the oxygen content to a safe level, signs labeling the space as "Not Safe for Workers" or "Not Safe for Workers—Not Safe for Hot Work" may be removed.

Paragraph (a)(3) of final § 1915.12 prohibits employees from entering any confined or enclosed space or other dangerous atmosphere that is oxygen-deficient or is oxygen-enriched. Exceptions are granted for emergency rescue and for entries of short duration to install ventilation equipment, provided that the atmosphere is continuously monitored for oxygen content and that respiratory protection and other personal protective equipment and clothing are provided in accordance with Subpart I of part 1915.

The previous § 1915.12 prohibits entry into IDLH atmospheres. Paragraph (d) of that section presents exceptions to the general prohibition which recognize emergency entries and short duration entries performed for the purpose of installing ventilation equipment or starting operations, provided the work is performed in accordance with paragraphs (a) and (b) of the previous § 1915.152 (contained in Subpart I) relating to respiratory protection.

Proposed § 1915.12(d) presented the same exceptions as the previous rule, but with three additional provisos:

(1) That no ignition sources are present, and

(2) That the atmosphere in the space is maintained above the upper explosive limit, and

(3) That the atmosphere is monitored continuously.

The reference to the Subpart I requirements was placed in a note following the proposed paragraph. As noted earlier, proposed § 1915.12(a)(4) would also have allowed entry into oxygen-deficient atmospheres by employees wearing respirators in accordance with Subpart I of part 1915. No restrictions on the purpose or length of entry were proposed.

The NPRM requested comments on the issues of whether or not work in IDLH atmospheres should ever be permitted and on what control measures are necessary for the protection of employees working in IDLH atmospheres. In the preamble to the NPRM, OSHA recognized that atmospheres containing flammable vapor concentrations greater than the UEL for a particular vapor do not present a fire or explosion hazard to employees because the atmosphere is too rich in flammable vapors or gases to burn. However, OSHA expressed concern about employees who work in such atmospheres because such atmospheres may contain chemical exposures from the flammable vapor that are above the permissible exposure limit (PEL) for the particular chemical creating the vapors.

Only one commenter supported OSHA's proposal to allow work in IDLH atmospheres. The American Waterways Shipyard Conference (Ex. 6–23) stated that OSHA should not put a time limit on "short duration" and that the proposal was appropriate, as follows:

> Due to the vast differences in vessel design, it would be extremely difficult to define an "emergency work" situation. Similarly, a time limit for "brief duration" would be difficult to ascertain since the work to be performed differs in every situation. By instituting a time factor for work of brief duration, shipyard employees may be required to skip safety steps in order to finish the work in the required time frame.
>
> Work in atmospheres in the Upper Explosive Limit (UEL) should not be prohibited. The work done in an UEL atmosphere is done on a very infrequent basis, but it is work that could not be done otherwise such as entry of a cargo tank during tank cleaning operations to set a cargo suction hose.

By contrast, many other rulemaking participants believed that work in IDLH atmospheres is unnecessary and should be prohibited, either under all conditions (Ex. 6–4, 6–15, 6–18, 6–24, 6–31) or under all but emergency conditions (Ex. 6–7, 6–8, 6–10, 6–12, 6–21, 6–22, 6–28, 6–33, 6–34, 6–37, 6–38). Independent Testing and Consultation, Inc. (Ex. 6–24), presented the following arguments against work in atmospheres above the upper explosive limit for a flammable gas or vapor:

> The paragraph 1915.12(d) should be deleted for the following reasons.
>
> (a) There is no way to keep the atmosphere above the upper explosive limit (UEL). If entry to the tank is required, it follows that there must be a region where the tank atmosphere mixes with the outside atmosphere. In this region the concentration of gas will be in the explosive range.
>
> (b) The equipment used to measure gas concentrations above the UEL is not usually available.
>
> (c) All ignition sources cannot easily be eliminated. There remains possible ignition due to static electricity. It has been my experience that owners and operators would rather clean or otherwise make safe a tank or compartment even if the work required in the compartment is of the briefest duration.

NFPA (Ex. 6–10) addressed work in IDLH atmospheres as follows:

> NFPA does not believe that work in IDLH atmospheres should be encouraged, except for the purposes of emergency rescue. NFPA does not support the proposal of working in UEL atmospheres. The potential hazards associated with ignition sources, such as static electricity, and the introduction of air to bring an atmosphere above the UEL within the flammable range, are significant and difficult to control. The additional testing requirements would also be significant. NFPA 306 only permits such a practice in the case of inerting for flammable compressed gas as described in 2–3.8. In this case now work is permitted on the tank or pipelines.

OSHA agrees with the commenters who stated that working in IDLH atmospheres or in atmospheres containing concentrations of flammable gases or vapors above their UEL is very hazardous. The limitations on maintaining an atmosphere above a gas's or vapor's UEL, as noted by Independent Testing and Consultation, Inc., are severe indeed. If a mistake is made in such an atmosphere, an explosion will almost certainly result. Atmospheres that are IDLH because of toxicity also present a very serious danger to employees. A failure of the respiratory protective equipment protecting an employee in this type of atmosphere could quickly lead to his or her death.

OSHA further believes that conditions somewhat less hazardous than those posed by IDLH atmospheres pose unnecessary dangers for shipyard employees. The generic permit-required confined space standard, in § 1910.146(b), defines a hazardous atmosphere, in part, as follows:

Hazardous atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

(1) Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL);

* * * * *

(3) Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;

OSHA has already determined that these conditions constitute serious hazards, ones that are tightly regulated in the generic permit-space standard in § 1910.146. These conditions can also be found in confined and enclosed spaces and in other dangerous atmosphere in shipyard work. In order for Subpart B to be as protective as the general industry permit-space standard, which permits employees to work in hazardous atmospheres using a system of permits and attendants not required by Subpart B, OSHA believes that Subpart B must require measures that ensure that employees are not exposed to such hazardous conditions. For this reason, the Agency is adopting requirements in final Subpart B that prohibit employee entry into confined and enclosed spaces and other dangerous atmospheres presenting an oxygen-deficient or oxygen-enriched atmosphere or containing concentrations of flammable gases or vapors greater than or equal to 10 percent of the gas's or vapor's lower explosive limit.

OSHA concludes, however, that entry into such spaces can safely be permitted under certain conditions. First, in emergencies, where persons are endangered, entry might be necessary to save the life of an entrant or the lives of every person on that transport. Second, because these spaces will have to be ventilated to make the atmosphere safe for employees, entry might be necessary to set up the proper ventilation equipment. For these reasons, final Subpart B permits entry into IDLH and other hazardous atmospheres for emergency rescue and for periods of short duration to install ventilation equipment necessary for normal entry.

During such emergency or short duration entries, however, additional precautions must be taken to protect the entrants. The additional precautions to be taken must be appropriate for the hazards presented by the particular space involved. Thus, the final rule treats oxygen enrichment and deficiency, the presence of flammable gases and vapors, and atmospheres containing toxic contaminants at IDLH levels separately. For oxygen-enriched and oxygen-deficient atmospheres, the space must be continuously monitored for oxygen content (so that appropriate control measures can be taken if it changes), and respiratory protection and other personal protective equipment and clothing must be provided in accordance with Subpart I (so that appropriate personal protective equipment is provided and so that an attendant will be present if the oxygen content makes the space IDLH). The hazards of flammable atmospheres and toxicity are treated separately in their respective paragraphs (final § 1915.12 (b)(3) and (c)(4)).

Paragraph (b) of final § 1915.12 sets precautions to be taken before employees enter areas that present hazards related to flammable atmospheres. Paragraph (b)(1) applies to spaces that contain or have contained combustible or flammable liquids or gases and to spaces (called, appropriately, "adjacent spaces") that are adjacent to those spaces. These spaces must be: (1) inspected by a competent person to determine whether or not combustible or flammable liquids are present, and (2) tested by a competent person before entry by any employee to determine the concentration of flammable gases and vapors within the space. These precautions also apply to adjacent spaces.

Previous § 1915.12(a)(1) requires the same spaces to be tested by a competent person to determine the concentration of flammable gases and vapors.

The proposed rule contained requirements equivalent to the previous standard in paragraphs (b)(1), (b)(2), and (b)(3) of proposed § 1915.12.

The final rule differs from the previous and proposed rules only in that § 1915.12(b)(1) includes a requirement for the competent person to inspect the space, as well as test it, for the presence of combustible or flammable liquids. The inspection is necessary so that the competent person will be more likely to be made aware of any malfunction in the testing instrument. Obviously, if the inspection reveals the presence of a flammable liquid, a flammability test can be expected to result in some detectable concentration of flammable gases or vapors. The lack of any such reading from the test instrument would be an indication that the device might be defective and should lead to further investigation of the problem. The inspections will also be necessary if a hazardous concentration of flammable gases or vapors is found so that the proper precautions can be taken to eliminate the hazard. Although in the previous § 1915.12(a) does not specify that an inspection is to take place, in the previous § 1915.7(c), which requires tests *and inspections* to be entered into the "Log of *Inspections* and Tests," implies that the competent person is to perform inspections in addition to any tests that are required.

Paragraph (b)(2) requires spaces that have been tested and found to contain concentrations of a flammable gas or vapor greater than or equal to 10 percent of the gas's or vapor's lower explosive limit (LEL) are required to be labeled "Not Safe for Workers—Not Safe for Hot Work." If employees are to enter a space that has flammable gases or vapors in such concentrations, then ventilation must be provided to ensure that the concentration of these gases or vapors is maintained below 10 percent of their LELs. After the ventilation produces an acceptable atmosphere, the warning signs may be removed.

Paragraph (a)(2) of the previous § 1915.12 requires spaces containing hazardous concentrations of flammable gases or vapors to be ventilated until the concentration drops below 10 percent of the gas's or vapor's LEL before workers are permitted to enter the space. No labeling of these spaces is required under the previous standard.

Paragraph (b)(5) of proposed § 1915.12 would have required labeling of spaces in a manner equivalent to that required under the final rule. Paragraph (b)(4) of proposed § 1915.12 would have prohibited entry when the concentration of flammable gases or vapors was at or above 10 percent of the LEL, but the proposal did not specifically require ventilation in § 1915.12. Ventilation requirements related to flammable atmospheres were proposed in § 1915.13(b)(8).

No rulemaking participant objected to the proposed labeling requirement. Therefore, OSHA has carried it forward into the final rule. The final rule, unlike the proposal, continues to require spaces that are hazardous because of the presence of flammable gases or vapors to be labeled even when employees are permitted to enter for emergency purposes or for short durations to install ventilation. The proposal did not require the spaces to be labeled during these entries (in effect permitting employers to remove the signs at these times). However, such entries require the adoption of special precautions (see the summary and explanation of final § 1915.12(b)(3), later in this preamble). OSHA believes that the labeling must be maintained during these entries so that unauthorized, unprotected entry is prevented.

Paragraph (b)(3) of final § 1915.12 prohibits employees from entering spaces containing concentrations of flammable gases or vapors at or above their LELs. However, employees may enter these spaces for emergency rescue or for a short duration for the installation of ventilation equipment provided that:

(1) No ignition sources are present,

(2) The atmosphere in the space is monitored continuously;

(3) The concentrations of flammable gases and vapors in the atmosphere in the space are maintained above their upper explosive limits (UEL), and

(4) Respiratory protection and other personal protective equipment and clothing must be provided in accordance with Subpart I of part 1915.

Previous § 1915.12(a)(2) prohibits workers from entering areas containing concentrations of flammable gases or vapors at or above 10 percent of their LELs. The only exception to this rule is contained in the previous § 1915.13(a)(2) for highly volatile residues. (This provision has not been carried forward into the final rule. See the summary and explanation of final § 1915.13, later in this preamble, for a discussion of the reasons why this exception has been dropped.)

The proposal also contained a general prohibition against employees entering spaces containing hazardous concentrations of flammable gases or vapors. However, as noted earlier, proposed § 1915.12(d) also provided exceptions for emergencies and for brief duration entries. The proposal would have required the same precautionary measures required by the final rule, except that respiratory equipment and other personal protective equipment was identified as being required, under Subpart I, through means of a note following proposed § 1915.12(d)(3).

As explained earlier, OSHA has decided to permit entries for emergency rescue and for short duration entries to install ventilation equipment even if the space contains a hazardous atmosphere. No one objected to the precautionary measures proposed in § 1915.12(d), and they have been carried forward into the final rule. The proposed note regarding the use of respiratory protection and other personal protective equipment has been converted into a requirement (§ 1915.12(b)(3)(iv)). Even though employers are already obligated to comply with these requirements under Subpart I, OSHA believes that providing a mandatory reference in the text of the regulation will serve to emphasize the importance of the required personal protective equipment.

The Agency has concluded that entry made following the requirements contained in the exception to § 1915.12(b)(3) will protect employees by controlling and minimizing the hazards involved. No ignition sources may be present in the space so that, if the atmosphere becomes flammable, there will be no energy source to ignite it. The atmosphere in the space must be maintained above the UEL, and the atmosphere must be continuously monitored to minimize the possibility that a flammable atmosphere could develop. Lastly, personal protective equipment must be worn to protect the employee from exposure to the hazardous materials involved.

Paragraph (c) of final § 1915.12 sets precautions to be taken before employees enter areas that present hazards related to toxic atmospheres. Paragraph (c)(1) of final § 1915.12 requires spaces and adjacent spaces that contain or have contained gases, liquids, or solids that are toxic, corrosive, or irritant to be:

(1) Inspected visually by a competent person to determine whether or not toxic, corrosive, or irritant residue contaminants are present, and

(2) Tested by a competent person before initial entry by any employee, to determine the concentration of toxics, corrosives, and irritants in the air within the space.

The previous § 1915.12(b)(1) requires the following spaces to be inspected and tested by a Marine Chemist, industrial hygienist, or other qualified person:

(1) Cargo spaces and other spaces containing or having last contained bulk gases, liquids, or solids of a toxic, corrosive, or irritant nature,

(2) Spaces that have been fumigated, and

(3) Spaces immediately adjacent to these two types of spaces.

Paragraphs (c)(1), (c)(2), and (c)(3) of proposed § 1915.12 would have continued the previous language without change, except that the proposal specified that the tests had to be performed by a Marine Chemist, a certified industrial hygienist, or a U.S. Coast Guard authorized person. Although this may have appeared to be a departure from the previous standard, the NPRM explained that the proposal simply codified OSHA interpretation of the previous standard. The NPRM also requested comments on the proposed definition of "certified industrial hygienist."

Most commenters agreed that a Marine Chemist or a Certified Industrial Hygienist was qualified to perform the toxicity tests required under § 1915.12(c) (Ex. 6–10, 6–12, 6–13, 6–20, 6–23, 6–24, 6–28, 6–33). They noted that the intensive training in toxicology and in appropriate control measures these persons receive makes them uniquely qualified to test and inspect confined and enclosed spaces and other dangerous atmospheres.

OSHA agrees with these comments, and the final rule recognizes that tests and inspections for the presence of toxic, corrosive, or irritant substances may be performed by Marine Chemists and Certified Industrial Hygienists.

The rulemaking participants expressed some disagreement, however, over whether or not a Coast Guard authorized person had the proper qualifications to test and inspect areas for hazards related to the toxicity of various chemicals. Some believed that a Coast Guard authorized person would be qualified to perform the required tests and inspections (Ex. 6–24, 6–28, 6–33). These commenters stated that the use of a Coast Guard authorized person would be limited to situations in which a Marine Chemist or certified industrial hygienist was not available. Several other commenters argued that a Coast Guard authorized person is not required to receive training in hazards related to the toxicity of various chemicals (Ex. 6–13, 6–15). In fact, the U.S. Department of Transportation (Ex. 6–13), which administers requirements in Title 46 of the Code of Federal Regulations related to Coast Guard authorized persons, stated:

> Testing required by 46 CFR 35.01, 71.60, and 91.50 is primarily concerned with oxygen deficiency and combustibility prior to conducting hot work. "Coast Guard authorized persons" who would be expected to conduct such testing under Coast Guard regulations should not be considered equivalent to a Marine Chemist or Industrial Hygienist for the purpose of evaluating toxic hazards in shipyards.
>
> These persons would be acting under authority of a Coast Guard license or document for compliance with regulations contained in 46 CFR, but it is not clear that they could be effectively held accountable for their performance related to OSHA regulations.

Coast Guard authorized persons do not typically have training in hazards related to the toxicity of various chemicals. Since such training is necessary so that the required tests and inspections are performed safely and appropriately, OSHA concludes that the final rule should not automatically permit these persons to perform tests and inspections under § 1915.12(c).

Three commenters urged OSHA to include language permitting any qualified person to perform the tests and inspections required under § 1915.12(c) (Ex. 6–3, 6–6, 6–12). They argued that

requiring these tests to be performed by a Marine Chemist or a certified industrial hygienist would unnecessarily restrict an employer's means of complying with the standard. The Shipbuilders Council of America (Ex. 6–3) stated this position as follows:

SCA recommends that OSHA utilize performance-oriented language and require a "qualified person" perform the testing.

The required testing has been performed in the Shipbuilding, Ship Repairing and Shipbreaking Industry for years without incident. With proper training, competent or other qualified persons can test and inspect for toxic substances and provide for safe entry into confined spaces. The proposed wording will require shipyards to utilize either a Marine Chemist or Certified Industrial Hygienist (CIH) for all confined spaces entries or a competent person and a Marine Chemist or CIH for confined space entry. This requirement is overly restrictive and unnecessarily expensive on the declining Shipbuilding, Ship Repairing and Shipbreaking Industry without adding any additional degree of safety. SCA recommends that OSHA delete all references to Marine Chemists and Certified Industrial Hygienists and specify that a "qualified person" perform all required tests (see Issue #2).

OSHA has concluded that a two-pronged approach is necessary for the protection of employees working in confined and enclosed spaces and other dangerous atmospheres from hazards related to the toxicity of various chemicals. First, the initial tests and inspections must be performed by a competent person (paragraph (c)(1)). Using the results provided by the competent person, the employer can then install ventilation, if necessary, to render the space safe for entry (paragraph (c)(2)). Second, if ventilation fails to bring concentrations of air contaminants to acceptable levels, a Marine Chemist or Certified Industrial Hygienist must be brought in to develop and implement control measures to protect employees entering the space (paragraph (c)(4)).

Under final § 1915.7, competent persons have the following skills and knowledge (among others):

(1) The ability to understand and carry out instructions of Marine Chemists and certified industrial hygienists,

(2) Knowledge of the requirements of Subpart B,

(3) Knowledge of the structures, locations, and designations of spaces where work is to be performed,

(4) Ability to calibrate and use test instruments, including carbon monoxide and carbon dioxide indicators,

(5) Ability to perform all required tests and inspections required of competent persons by Subpart B, and

(6) Ability to inspect, test, and evaluate spaces to determine the need for further testing by a Marine Chemist or a Certified Industrial Hygienist.

These skills and this knowledge provide the competent person the ability to perform the initial tests and inspections necessary to determine whether or not a space contains hazardous quantities of toxic substances, as required by final § 1915.12(c)(1). Once the space has been determined to contain hazardous quantities of toxic substances, it is then the employer's responsibility to make the space safe for entry through ventilation under final § 1915.12(c)(2). If the space cannot be made safe for entry through the use of ventilation, OSHA believes that it is necessary to require a Marine Chemist or certified industrial hygienist to develop and implement appropriate control measures to protect employees from the hazards involved. On the basis of the record, OSHA has concluded that these two groups of persons are the only ones capable of establishing appropriate control measures to protect shipyard employees under these circumstances. Considering the complexity of the hazards involved and the protective techniques that need to be applied, the Agency believes that other, less qualified, individuals cannot be relied on to take all the steps necessary to protect employees fully.

Paragraph (c)(2) of final § 1915.12 requires spaces containing a concentration of any substance exceeding its permissible exposure limit (PEL) or, if the substance has no PEL, its IDLH value, to be labeled "Not Safe for Workers". Ventilation must then be provided to ensure that air concentrations of these substances are maintained within their PELs or below their IDLH values. After the ventilation renders the atmosphere safe for entry, paragraph (c)(2) permits the signs to be removed.

The previous § 1915.12(b)(2) requires spaces to be ventilated if they contain a substance in concentrations above a level that is IDLH. The ventilation is required to bring the concentration below that level.

The NPRM proposed to continue these previous requirements in § 1915.12(c)(4). Requirements for labeling spaces containing concentrations of toxic substances above their PELs were proposed in § 1915.12(c)(6). The previous standard contains no labeling requirement.

OSHA received no objection to the proposed labeling requirement, and it has been incorporated into the final rule.

The final rule, unlike the previous standard, permits competent persons to test and inspect confined and enclosed spaces and other dangerous atmospheres for the presence of toxic substances. The previous standard requires these tests and inspections to be performed by a Marine Chemist or by an industrial hygienist.

Entry into a confined or enclosed space or other dangerous atmosphere for the performance of work is permissible only as long as concentrations of toxic materials are maintained below their PELs. As noted earlier, OSHA has concluded that a competent person is capable of testing and inspecting spaces for hazards related to the toxicity of various chemicals. Thus, the competent person can make a determination based on these observations and tests that a space is or is not safe for entry. If ventilation is necessary, the competent person can make this threshold determination, as well. However, the competent person is not normally capable of developing the specific control measures necessary to protect employees from exposure to any substance above its PEL. If a confined or enclosed space or other dangerous atmosphere exposes an employee to a substance at concentrations above the permissible exposure limit, a Marine Chemist or a Certified Industrial Hygienist is required to establish the procedures to be used to protect employees. The final rule makes this concept mandatory.

For spaces in which ventilation cannot maintain an acceptable atmosphere, paragraph (c)(3) of final § 1915.12 requires a Marine Chemist or certified industrial hygienist to retest the space until it can be certified as "Enter with Restrictions" or "Safe for Workers."

The previous standard, under § 1915.12(b)(3), requires employers to comply with the respiratory protection requirements of Subpart I whenever concentrations of toxic substances are above their PELs but below IDLH levels. The NPRM proposed to continue this requirement in § 1915.12(c)(5). However, OSHA believes, as noted in the summary and explanation of final § 1915.11(a), that employees should not enter, on a routine basis, any confined or enclosed space or other dangerous atmosphere containing a serious hazard. Atmospheres containing concentrations of toxic substances above their permissible exposure limits can pose serious hazards, especially to employees working in the exposure area for extended periods of time. As noted earlier, many of the rulemaking participants asserted that shipyard

employees are better protected by industry practice, under which routine entry is permitted only if the space involved is certified safe for workers, than by the general industry permit space standard. OSHA agrees that the shipyard approach provides safety for employees, and is codifying that practice in final § 1915.12(c)(3) and (c)(4) (discussed next).

Paragraph (c)(4) of final § 1915.12 prohibits entry into spaces that are "Not Safe for Workers" (under paragraph (c)(1)), except for emergency rescue or for a short duration for the installation of ventilation equipment provided that:

(1) The atmosphere in the space is monitored continuously, and

(2) Respiratory protection and other necessary and appropriate personal protective equipment and clothing are provided in accordance with Subpart I of part 1915.

As explained earlier, OSHA has decided to permit entries for emergency rescue and for short duration entries to install ventilation equipment even if the space contains a hazardous atmosphere, which in this case refers to toxic substances. The procedures required will protect employees from hazards associated with exposure to these toxic substances. The atmosphere must be monitored continuously during this limited entry to ensure that the control measures are working as intended and that the entrant is aware of any changes in conditions in the space. Final § 1915.12(c)(4) requires personal protective equipment to protect employees from the adverse effects of exposure to toxic substances. This control measure is already required by existing Subpart I. However, OSHA believes that providing a mandatory reference in the text of the regulation will serve to emphasize the importance of the required personal protective equipment.

The Shipyard Employment Standards Advisory Committee (SESAC) reviewed OSHA's proposal and made several recommendations concerning new areas of shipyard employment that should be regulated in § 1915.12 (Tr. 79–80, 90, 99; 4/25/90). These recommendations included adding requirements to address the training and duties of employees entering confined and enclosed spaces and other dangerous atmospheres, rescue teams, and exchanging hazard information between employers. SESAC voted unanimously to include training, and overwhelmingly supported provisions for rescue teams and exchanging hazard information between employers. As noted earlier in this preamble, the notice reopening the record on Subpart B published the text of the recommended provisions and requested public comment on them.

Paragraph (d) of final § 1915.12 contains requirements for the training and duties of employees entering confined and enclosed spaces and other dangerous atmospheres.

The rulemaking participants overwhelmingly approved the adoption of the training requirements listed in the notice reopening the record (Ex. 11–2, 11–3, 11–4, 11–5, 11–6, 11–9, 11–13, 11–14, 11–15, 11–18, 11–19, 11–20, 11–24, 11–25, 11–26, 11–29, 11–30, 11–35, 11–37, 11–39, 11–41, 11–45, 11–47, 11–49, 11–50, 11–51). These rulemaking participants advocated that the SESAC recommendations be incorporated in their entirety. They stated that training was essential in preventing accidents and in promoting self-rescue. The Norfolk Shipbuilding and Drydock Corporation (Ex. 11–6) expressed this view as follows:

> We feel that training is essential to employees understanding the potential dangers in entering confined spaces which have not been checked and verified as being safe. We support the SESAC recommendations.

No commenter objected to any of SESAC's recommended requirements. Therefore, these provisions have been incorporated into the final rule.

A few rulemaking participants suggested that the final standard also include some requirements in addition to those proposed by SESAC. Three commenters recommended the inclusion of provisions requiring the training of shipyard competent persons (Ex. 11–10, 11–11, 11–44). Marine and Environmental Testing, Inc. (Ex. 11–10), best represented the arguments of these commenters as follows:

> Lack of training was evident in all of the confined space accidents which I have investigated. The current 1915 standard is not adequate when addressing training requirements. While the 1915 standards state that the SCP [shipyard competent person] must have certain abilities it does not require formal training. There are also no formal training requirements for personnel working in confined spaces. These deficiencies should be addressed.
>
> The SCP should receive formal training on testing, ventilation, fire and explosive and toxic hazards as is being currently covered by NFPA SCP courses. General workers do not require the same level of training but should be instructed as to the hazards associated with confined spaces and the employer's testing, entry, hot work and space labeling or identification program. [Ex. 11–10]

OSHA's requirements for shipyard competent persons are contained in final § 1915.7, which is discussed earlier in this preamble. The employer is responsible for ensuring that these designated individuals have knowledge and skills appropriate for determining whether or not a confined or enclosed space or other dangerous atmosphere is safe to enter. The employer cannot have the necessary information to designate a person as a competent person unless that employer either provides the necessary training or ensures that the person has already received it. In addition, if the competent person is not an employee, the employer will not usually be the source of that person's training. Therefore, rather than specifying shipyard competent person training this final rule focuses on the abilities and skills of the competent person and holds the employer responsible for determining that the competent person meets those requirements.

Other commenters suggested that OSHA require all exposed shipyard employees to receive training as outlined in the SESAC recommendation (Ex. 11–19, 11–30, 11–50). They argued that all workers that work in areas containing confined or enclosed spaces or other dangerous atmospheres should be aware of the hazards of unrestricted entry into those spaces. For example, the U.S. Department of the Navy (Ex. 11–30) stated:

> All workers except those who will never be involved with confined space entry/work should be trained. Minimum knowledge should be a well understood concept of what a confined or enclosed space is, what the potential hazards are, and the need for space evaluation by a knowledgeable individual and, in some cases, certification by a "qualified person" prior to entry and work.

One commenter, the International Brotherhood of Electrical Workers (IBEW) (Ex. 11–51), suggested that the standard specify that employees receive classroom-type training. They were concerned that employees would receive a simple briefing rather than actual training. They stated their concerns as follows:

> The ability to have specific directions to train and provide annual review with classroom type instruction, and where the instructor has direct inter-play with the employee, is the most desirable, as well as preferred. One of the big problems that we have always felt has been the issue in training is the addressing of specific training. In the training of employees at our facility, stand-up safety briefings are used for training in Haz Com. The employee is asked to sign the back of this briefing to show they have attended and received the training. In the briefings given, the person giving the briefing has had little or no formal training on the subject material, making it a perfect "paper program". The only way we know it does not work is through interviews with the employees. It is therefore imperative that the

recommendations of SESAC be followed, as they are most inclusive and specific, and that the instructors be knowledgeable of the subject material.

OSHA has not adopted the IBEW's suggestion. Employers may use classroom or "on-the-job" instruction or a combination of the two in complying with final § 1915.12(d). The primary objective of final § 1915.12(d) is to ensure that employees will be familiar with the subjects listed under paragraphs (d)(1) through (d)(3). There may be wide variations in the combinations of classroom and on-the-job training that may be necessary for different work sites, configurations, and control measures. On the other hand, OSHA shares IBEW's concern that some employers might try to comply with the standard through simple briefings that impart little knowledge to employees. In enforcing final revised Subpart B, the Agency will determine whether employees have learned the subject matter addressed by the standard by interviewing employees and reviewing the employer's procedures for dealing with communicating hazard information and ensuring employees have the skills necessary to do their jobs. In addition the Agency will examine the employer's certification that the training has been provided as required by final § 1915.12(d)(5). It should be noted that, whatever the method of training that is provided, it must be provided before an employee enters a confined or enclosed space or other dangerous atmosphere, as required by final § 1915.12(d)(4).

The requirements adopted in final § 1915.12(d) are based on the recommendations of SESAC as presented in the notice reopening the record on Subpart B. The purpose of these requirements, along with an explanation of any differences between the final rule and SESAC's proposed language, is presented in the following discussion.

In paragraph (d)(1), OSHA is requiring employers to ensure that employees who must enter confined or enclosed spaces or other dangerous atmospheres are trained to perform their duties safely. This provision is intended to ensure that employees are familiar with the duties imposed by final revised Subpart B so that the work practices they use will conform to the standard and will protect them from hazards posed by these spaces.

In paragraph (d)(2), OSHA is requiring employers to ensure that each employee who must enter confined or enclosed spaces or other dangerous atmospheres is trained to recognize and understand the hazards or hazardous conditions he or she may encounter during entry. The specific hazards or hazardous conditions that OSHA addresses are found in paragraphs (d)(2)(i) through (d)(2)(vii) and they include the following:

(1) Recognition of the characteristics of the space,

(2) Anticipation and awareness of the hazards that may be encountered during entry,

(3) Recognition of the signs, symptoms, or other adverse health effects that may be caused by exposure to hazards,

(4) Understanding of the physical signs and reactions of exposure to hazards,

(5) Knowledge of the types of personal protective equipment that may be needed for safe entry into and exit from the space,

(6) Knowledge of how to use personal protective equipment, and

(7) When necessary, awareness of the presence and proper use of barriers or other devices that may be needed to protect an entrant from hazards.

The final rule combines SESAC's proposed paragraphs (e)(1) and (e)(2) to present all the general topics in which employees should be instructed in one place. Additionally, the SESAC proposal addressed confined spaces only. Because final revised Subpart B covers enclosed spaces and other dangerous atmospheres, as well as confined spaces, OSHA has applied the training requirements to all employees that enter confined and or enclosed spaces or other dangerous atmospheres.

In paragraph (d)(3), OSHA is requiring the employer to ensure that an employee who must enter confined or enclosed spaces or other dangerous atmospheres is trained to exit the space under certain conditions. The specific conditions for which an entrant must be trained to exit include:

(1) Upon order of the employer,

(2) Upon the sounding of an evacuation signal, or

(3) Whenever the entrant perceives that there is a danger or threat to his or her safety.

In paragraph (d)(4), OSHA is requiring employers to ensure that employees who must enter confined or enclosed spaces or other dangerous atmospheres receive their training:

(1) Before they begin work addressed by this section and

(2) Whenever there is a change in operations or in an employee's duties that present a hazard about which the employee has not been trained previously. This provision was not included in SESAC's recommendations on training. Their recommendation specified that "appropriate training" be provided to confined space entrants. OSHA believes that it is essential to spell out when the training required under paragraph (d)(1) through (d)(3) must be provided and that employees must receive this instruction before they are exposed to the working conditions and operations covered by the training. To address this issue, the Agency has incorporated language based on § 1910.146(g)(2) (i) through (iii) of the generic permit-space standard, so that the final rule ensures that employees will be trained before exposure to the hazards posed by confined or enclosed spaces or other dangerous atmospheres.

In paragraph (d)(5), OSHA is requiring that the employer certify that the training required by paragraphs (d)(1) through (d)(4) has been accomplished. The rule also lists the information that must be provided on the certification: the employee's name, the name of the trainer, and the date or dates of the training. Paragraph (d)(5) requires the certification of training to be available for inspection by the Assistant Secretary, the Director of NIOSH, the employees, and their representatives.

A certification requirement was not included in SESAC's recommendations. However, OSHA believes that its inclusion in the final rule is necessary for several reasons. Certification of employee training provides a valuable record to employers who need to be able to keep track of who has been trained. Also, the certification enables employees to determine whether or not the employer has accurately recorded their training. Lastly, the certification facilitates OSHA's enforcement of the standard. Standards on employee training routinely incorporate requirements for the certification of training, and OSHA has found that such requirements ensure that employees are indeed trained in accordance with these standards.

Paragraph (e) of final § 1915.12 contains requirements for rescue teams.

The rulemaking participants overwhelmingly approved the adoption of the rescue team requirements listed in the notice reopening the record (Ex. 11–1, 11–2, 11–3, 11–4, 11–5, 11–6, 11–9, 11–13, 11–14, 11–15, 11–18, 11–19, 11–20, 11–24, 11–25, 11–26, 11–29, 11–35, 11–37, 11–39, 11–41, 11–45, 11–47, 11–49, 11–50, 11–51). These rulemaking participants advocated that the SESAC recommendations be incorporated in their entirety. They stated that training was essential in preventing accidents and in promoting self-rescue.

Paragraph (e) requires that employers either make provisions for a shipyard rescue team or make an arrangement under which an outside rescue team

will respond promptly to a request for rescue service.

Some commenters urged OSHA to consider addressing the response time of rescue teams (Ex. 11–10, 11–28, 11–30, 11–51). These commenters realized the difficulty involved in specifying an exact response time; however, they felt that it was important for rescue efforts to begin promptly. For example, Con-Space Communications Ltd. (Ex. 11–28) stated their recommendations as follows:

> This could be a difficult thing to regulate but, minimum requirements should be set to ensure that trained personnel and equipment are available in the event of an incident. Response time is the hard item to determine. Obviously the faster the better for the person in difficulty, but if OSHA allows outside rescue services to be used, response time would be longer than if the rescue team was in-house.
>
> Response time of an outside rescue service would be totally dependant on its distance from the problem site.
>
> * * * * *
>
> Proposed paragraph 1915.12(f) is a practical solution to a difficult problem. Plant rescue teams should be able to respond more quickly than outside teams but the cost of maintaining an in-plant [shipyard] team could be excessive. We are left with a simple question, "is the risk of slow response higher than the possible risk to the life of the person waiting for help?"
>
> If the outside rescue team receives more calls for help than it can handle, who waits and who gets penalized, the employer or the contracted rescue team or more important—who dies?
>
> Consideration should be given to a two tier rescue system where the employer is required to have a small rescue unit (two man team) trained by the outside rescue team for immediate response to a problem. Their level of involvement could be dictated by the rescue contractor who could also determine what rescue equipment should be maintained on-site.

Most commenters argued that response times should not be addressed in the standard (Ex. 11–6, 11–9, 11–11, 11–14, 11–15, 11–18, 11–19, 11–22, 11–24, 11–26, 11–29, 11–31, 11–36, 11–38, 11–39, 11–40, 11–41, 11–43, 11–44, 11–50). These commenters argued that there were too many variables involved in shipyards for OSHA to be able to specify an appropriate response time. Mr. Joseph J. Ocken (Ex. 11–31) went further, suggesting that stressing the importance of rescue would lead to even more deaths, as follows:

> This entire issue focuses on rescue teams: inside and outside teams, team procedures, response times, and protocols/planning. I have strong reservations about regulating or mandating rescue operations in this manner. There are numerous confined space entries made on a daily basis while there are very few rescue attempts made. Even so, most confined space deaths are associated with rescue attempts. Intentionally or unintentionally the tone of the proposed language seems to communicate very dangerous messages:
>
> RESCUE ATTEMPTS ARE MANDATORY. This may not be intended by OSHA but the language could be misconstrued to suggest it. Many concerned safety professionals have devoted a lot of energy to communicate the opposite message! These teams should not even be referred to as "rescue teams" but rather "recovery or retrieval teams" in order to avoid any confusion on this point.
>
> HURRY! OSHA's intent is important in that employers need to be reasonable in designating outside rescue resources. The response time message however, is that rescuers must hurry. Given the poor effectiveness statistics for rescue attempts the emphasis should be placed on QUALITY OF RECOVERY rather than SPEED OF RESCUE. Employers should be most concerned with selecting a qualified team and supporting their familiarization with the shipyard, training and drills to avoid further tragedies.
>
> RELIANCE ON RESCUE. It might be argued that the proposed rescue provisions require such attempts to be quite different from the haphazard rescue attempts that are notorious for additional fatalities (rather than the desired "rescue"). This argument needs to be considered in the context of the environment where it will be applied. The very need for a confined space rescue implies that a FAILURE HAS ALREADY OCCURRED IN THE PROGRAM. Objectively we should be concerned that such a demonstrated failure to ensure safe entry in the first place also calls into question the ability to safely conduct a much more dangerous rescue attempt. A confined space entry standard is being proposed specifically to address a grim body of statistics which also tells us that rescue in confined spaces is even more dangerous. Rescue teams will be made up of workers needing protection too. We should be looking to improve other backups rather than emphasizing rescue.

OSHA has concluded that it is important for rescue attempts to be initiated as soon after an accident occurs as possible. If rescue attempts are delayed too long, the rescue team could become a body retrieval team instead. OSHA also believes that rescue teams must be properly equipped and trained so that the dangers noted by Mr. Ocken are minimized. Fatalities involving rescuers typically have involved untrained or poorly trained individuals who are not properly equipped for entry into confined or enclosed spaces or other dangerous atmospheres. Final revised Subpart B, generic general industry permit-space standard, § 1910.146, ensures that rescue personnel are properly equipped and fully trained to perform rescue. To address the issue of timeliness in responding to requests for emergency services, the introductory text to final § 1915.12(e) requires employers to provide a shipyard rescue team or to arrange for an outside rescue service that can respond promptly. OSHA believes that this requirement places a responsibility on employers to take whatever actions are necessary to rescue entrants (rather than retrieve bodies) from spaces covered by Subpart B. Employers must consider such factors as the response time, equipment, and state of training for rescue services not composed of the host employer's own employees when he or she chooses to arrange for such services. The rescue service selected by the employer must be able to arrive at the worksite quickly enough to perform rescue and must be equipped to perform rescue for the employer to be in compliance with the standard.

In paragraph (e)(1), OSHA is requiring that shipyard rescue teams meet certain criteria. These criteria are intended to ensure that shipyard rescue teams are properly trained and equipped to perform rescue. Outside rescue services are already covered under the generic permit-space standard in § 1910.146(k)(1). Employers providing these services are general industry employers (not shipyard employers) who will be covered under the general industry standards for the vast majority of their work. Therefore, the Agency believes that it is reasonable and appropriate to apply existing § 1910.146(k)(1) to these employers rather than to adopt separate requirements for outside rescue services in the shipyard standards.

Paragraph (e)(1)(i) requires each employee assigned to the shipyard team to be provided with and trained to use the personal protective equipment they will need to perform their function safely, including respirators and any rescue equipment necessary for making rescues from confined or enclosed spaces or other dangerous atmospheres.

Paragraph (e)(1)(ii) requires that employees assigned to the shipyard rescue team be trained to perform their rescue functions safely including entry into confined and enclosed spaces and other dangerous atmospheres.

Paragraph (e)(1)(iii) requires that shipyard rescue teams practice their skills at least once every 12 months. This provision also requires practice drills that include the use of mannequins and rescue equipment during simulated rescue operations involving physical facilities that approximate closely those facilities from which rescue may be needed. OSHA has included a note following this paragraph to explain that the standard recognizes the performance of an actual

rescue as an acceptable substitute for practice drills.

Paragraph (e)(1)(iv) requires that at least one employee on each rescue team maintain current certification in basic first aid skills that include maintenance of an airway, control of bleeding, maintenance of circulation and cardiopulmonary resuscitation (CPR) skills.

Paragraph (e)(2) requires the employer to inform outside rescue services of the hazards that their teams may encounter when called to perform rescues from confined or enclosed spaces or other dangerous atmospheres at the employer's facility. The outside rescue service can then use this information to train and equip their rescue teams appropriately. This will help to ensure the protection of the rescue service's employees and to minimize the time needed to rescue an injured employee. OSHA has included a note following final § 1915.12(e)(2) to encourage employers to use the criteria listed in paragraph (e)(1) to evaluate the skills of the outside rescue service and to determine what in-house hazard information would be most helpful to that service.

In the notice reopening the record on Subpart B, OSHA requested comments on whether or not the standard should require the use of any protocols (such as preplanning with local rescue services) to accompany the use of an outside rescue service.

The rulemaking participants agreed that, while preplanning with outside rescue services was necessary, the standard should not specify any particular protocol (Ex. 11–3, 11–6, 11–13, 11–14, 11–15, 11–18, 11–20, 11–22, 11–24, 11–25, 11–29, 11–35, 11–37, 11–47). For example, the Shipbuilders Council of America (Ex. 11–29) stated:

> We believe that the inclusion of this subject matter will not contribute significantly to an increase in the quality or response time of a rescue team. Furthermore, such protocols, may be inconsistent with ensuring that shipyards have the flexibility to independently work out joint efforts that are compatible with local conditions.

Several commenters, however, believed that the standard should require cooperation and planning between the shipyard employer and the rescue service (Ex. 11–30, 11–39, 11–49, 11–50). These commenters argued that this cooperation and planning was necessary, if an employer chooses an outside rescue service, in order to ensure effective rescue. The U.S. Department of the Navy (Ex. 11–30) presented this view as follows:

> In those cases where the employer does not have an in-house rescue team, OSHA should require the employer to preplan with the outside authority who is expected to provide the rescue services. The outside authority must be familiar with the employer's facility so that delays in performing a rescue will be avoided or minimized. It is recommended that OSHA require periodic drills to document that a rescue by an outside authority can be performed in a meaningful time frame.

OSHA agrees with these commenters that planning and cooperation is necessary between employers and outside rescue services. Without planning, the rescue service will be hindered in getting to the rescue site and in equipping their rescue teams. Without cooperation, the outside service's rescue team will be on their own when an emergency arises. Several commenters stated their belief that the language in SESAC's recommendation already required employers to plan for rescue by outside services and to cooperate with these services to ensure that the rescue teams are properly trained and equipped (Ex. 11–9, 11–26, 11–39). OSHA agrees with these commenters, and final § 1915.12(e)(2) adopts the SESAC recommended language with only minor editorial changes.

Paragraph (f) of final § 1915.12 contains requirements for exchanging hazard information between employers. This paragraph requires that each employer whose employees work in confined or enclosed spaces or other dangerous atmospheres ensure that all available information on the hazards, safety rules, and emergency procedures concerning those spaces is exchanged with other employers whose employees may occupy the same spaces. The purpose of this new rule is to assure that knowledge of the hazards in the place of employment, particularly those hazards that may change daily or with each new contractor or subcontractor, has been communicated to all employees.

The rulemaking participants overwhelmingly approved the adoption of the requirements related to exchanging hazard information between employers as listed in the notice reopening the record (Ex. 11–1, 11–2, 11–3, 11–4, 11–5, 11–9, 11–13, 11–15, 11–19, 11–20, 11–24, 11–26, 11–29, 11–35, 11–37, 11–39, 11–47, 11–49, 11–50, 11–52, 11–53). These rulemaking participants advocated that the SESAC recommendations be incorporated in their entirety. They maintained that cooperation and the exchange of information between contractor and employer was essential for the protection of all workers involved. Dreadnought Marine, Inc. (Ex. 11–52), expressed this view as follows:

> It is essential that contractors who perform work in confined spaces be provided this information by the employer. Contractor personnel who work near [confined] spaces need to understand and adhere to the signs, placards, or other warnings posted by the employer. DMI agrees with SESAC's proposed additions entitled "(g) Duty to other employers."

A few commenters believed that OSHA should also require contractors to inform the shipyard employer of any hazard the contractor introduces into the space (Ex. 11–30, 11–51). They argued that, because the contractor can bring hazards into confined or enclosed spaces or other dangerous atmospheres that endanger all employees in the space, the standard should impose duties on the contractor which correspond to those imposed on the employer. The IBEW (Ex. 11–51) expressed their recommendations as follows:

> We concur with the statements made in paragraph (C) noting the last statement, "Contractors working on a job site can endanger not only their employees, but other employers' employees as well." With this in mind, we feel that a contractor is also obligated to inform the host employer of the hazards they will introduce into the work area or confined space.

OSHA agrees with the IBEW. Contractors create hazards or bring hazards into the space which affect the safety of all employees working in the space. Therefore, the final rule incorporates the SESAC recommendation modified as necessary to obligate all employers to exchange necessary hazard information.

3. § 1915.13 Cleaning and Other Cold Work

This section sets forth locations and further testing and precautions that must be observed before and during cleaning and cold work.

In paragraph (a) of the final rule, OSHA describes the spaces to which this section applies. The old standard referred to those spaces in § 1915.12(a)(1) (i) and (ii) and (b)(1) (i) through (iii). The Agency proposed minor editorial changes, the most important of which involved listing the spaces that must be tested, and ventilated if necessary, before cleaning and cold work is begun. OSHA believes that specifying the spaces that will be affected by § 1915.13 in the first paragraph will enable the employer to easily determine the scope of the section. This listing, which replaces the reference to locations, is an editorial revision of the previous requirements.

Paragraph (b)(1) provides that liquid residues in the tanks shall be removed as thoroughly as practicable before manual cleaning starts. As in the previous standard, special care is required to be taken to prevent the spilling or the draining of these materials into the water surrounding the vessel. For consistency with the expanded scope, OSHA has added the requirement to take special care to prevent spills onto the surrounding work area. If liquid residues were allowed to contaminate the surrounding water or worksite, employees would be endangered.

Paragraph (b)(2) requires that tests to determine the concentration of flammable, combustible, toxic, corrosive, or irritant vapors must be done by a competent person prior to starting cold work. This provision has been brought forward from previous § 1915.13(a)(3), which required tests to maintain flammable vapors below 10 percent of the LEL. OSHA believes that simply requiring tests does not give the employer enough guidance about what tests are necessary to protect workers during cleaning and other cold work. Therefore, OSHA is specifying that tests be done for flammable, combustible, toxic, corrosive, or irritant vapors.

Paragraph (b)(3)(i) of the final rule requires that when the concentration of flammable or combustible vapors is equal to or greater than 10 percent of the LEL, ventilation must be provided at flow rates sufficient to keep the concentration of flammable vapors at a level less than 10 percent of the LEL. Toxic, corrosive, or irritant vapors are required to be maintained within the permissible exposure limits and below IDLH levels by paragraph (b)(3)(ii).

The previous rule at § 1915.13(a)(2) and the proposed rule at § 1915.13(a)(8) (53 FR 48108) allowed employers to ventilate only major portions of a compartment when, due to the high volatility of residues, concentration of flammable or combustible vapors of less than 10 percent LEL could not be achieved. In these circumstances, employers had to continually monitor the major portion of the space as pockets of hazardous vapor could shift into the work area thereby putting workers at risk. OSHA does not believe such an approach to the monitoring provides adequate protection for employees. The Agency believes that a compartment in which any portion is above 10 percent of the LEL is unsafe. In addition, conditions at or above 10 percent of the LEL could result in air concentrations which exceed the OSHA PEL or IDLH. This was clearly illustrated by Marine Chemists, Inc. (Ex. 7–24FF):

> Many flammable products are also toxic or contain toxic ingredients and in many cases 10 percent of LEL is well above the recommended PEL and in some cases may exceed the IDLH, for example:
>
> *STYRENE* The LEL is 1% Styrene=10,000 ppm, 10% LEL=0.1% Styrene=1,000 ppm, PEL for Styrene=100 ppm
>
> In other words 10 percent for Styrene is 10 times the recommended PEL.

Ventilating only portions of a compartment can mean that pockets of hazardous atmospheres containing a variety of unknown levels of flammable vapors can remain within a compartment providing a significant potential for fire or explosion. Ignition could occur through scraping or blasting. For example, the National Fire Protection Association (Ex. 6–10) noted that ignition may occur from static electricity.

> NFPA does not believe that work in IDLH atmospheres should be encouraged, except for the purposes of emergency rescue. NFPA does not support the proposal of working in UEL atmospheres. The potential hazards associated with ignition sources, such as static electricity, and the introduction of air to bring an atmosphere above the UEL within the flammable range, are significant and difficult to control. The additional testing requirements would also be significant.

This concern was also expressed by Independent Testing and Consultation, Inc. (Ex. 6–24).

> All ignition sources cannot easily be eliminated. There remains possible ignition due to static electricity. It has been my experience that owners and operators would rather clean or otherwise make safe a tank or compartment even if the work required in the compartment is of the briefest duration.

The Department of the Navy (Ex. 6–31) stated that the possibility of an explosion could still be present when only the major portions of a compartment are required to be ventilated. They noted that ventilation should be used to alleviate a hazardous atmosphere and that continuous monitoring alone will not prevent the possibility of an explosion.

One commenter, Sound Testing, Inc. (Ex. 6–8), questioned OSHA's acceptance of the 10 percent LEL level.

> It distresses me that even today we are still using the 10% LEL in helping to determine whether a space is "Safe for Workers". I have written about 10,000 Marine Chemist certificates, involving tens of thousands of compartments and I cannot recall a single instance where I wrote "Safe for Workers" about a tank reading even 2% LEL. Why, then, is OSHA giving a "reference point" significance to 10% LEL as "Safe for Workers" criterion?

OSHA agrees with NFPA, Independent Testing and Consultation, Inc. and the Navy and is therefore, persuaded that an entire compartment must be ventilated sufficiently to bring the level of flammable and combustible materials below 10 percent of the LEL. Because the ventilation to maintain conditions in the major portion of a compartment would already be in place, increasing or redirecting the ventilation so that it now adequately ventilates the entire compartment would put little or no additional burden on employers.

As to the use of the "less than 10 percent LEL" as the level to be achieved before employees may work in a space, that level is adopted from the applicable national consensus standard (NFPA 306, Appendix A), which reflects current practices and sampling technology. The shipyard industry has followed this standard for the past 23 years, and OSHA believes that it provides a sufficient margin of safety. Of course, employers are free to use a lower level in their workplaces for additional margins of safety.

Paragraph (b)(4) of the final rule requires that the flammability tests be conducted by a competent person "as often as necessary" during cleaning or cold work to determine the concentration of flammable or combustible vapors present in the work space. This provision in the final rule is based on the proposal (53 FR 48098, 48102; Specific Issue 7). The previous standard required a competent person to test prior to commencement of cold work and with sufficient frequency thereafter, in accordance with temperature, volatility of the residues, and other existing conditions in and about the spaces to ensure that the concentrations of flammable vapors were below ten (10) percent of the LEL. As explained in the preamble to the proposal, some interested parties requested clarification of the term "frequently" contained in the previous § 1915.13(a)(3). (53 CFR 48098) They asked OSHA to specify in the regulation how often tanks should be checked. However, many more commenters (Ex. 6–3, 6–5, 6–10, 6–12, 6–13, 6–15, 6–24, 6–28, 6–33, 6–34) urged the Agency to keep the standard flexible enough to enable employers and employees to take into consideration all the factors which may influence the need to recheck space conditions, including temperature, work being performed in the space, time elapsed, unattended tanks, work breaks, and ballasting or trimming. For example, Bay Shipbuilding Corp. (Ex. 6–15) stated:

Frequency of testing must be based on the area conditions and complexity of the hazard. Ventilation capability is also a major factor in hazard control. Once an area has been made safe, and air quality can be maintained with natural or mechanical ventilation, there are no further steps needed unless the condition is modified by some events such as a spill, leak, or injection of an environmentally altering element. Otherwise, the only thing to do is to continue monitoring (which is cost prohibitive); or base the checks on the HMIS scale for health, flammability, and reactivity of the product. The higher the HMIS rating, the more frequent the checks.

The Department of the Navy (Ex. 6–31) commented:

The term frequently is too vague and should be redefined to specify that, re-testing should be dependent on alteration of specific atmospheric conditions, manipulation of valves, or opening of manholes at the worksite.

Another commenter, Bath Iron Works Corporation (Ex. 6–28), also in support of flexibility, stated:

No easy definition exists for all circumstances requiring additional "frequent" testing. This is a situation which requires the judgment of the Marine Chemist, based on his knowledge of the last three cargoes, their properties and the effectiveness of the cleaning procedures used. Some cargoes, such as alcohols, light fuel oils, etc., leave no harmful residues after adequate tank cleaning and ventilation. Under such situation, testing every 24 hours is adequate. Other cargoes leave residues, or, particular tank coatings partially absorb cargo residues, only to release vapors slowly over time, regardless of how the cleaning operations were conducted. These conditions require atmospheric testing more frequently.

OSHA agrees with the commenters' views that the frequency of testing an atmosphere is best determined by the specific situation encountered and that a requirement to recheck a tank at specified intervals would not necessarily raise the level of safety. However, it is imperative that the atmosphere be checked often enough to ensure that it is safe for workers. To that end, Appendix A to Subpart B in the final rule provides supplementary information to assist employers and employees in determining the frequency with which a tank must be tested in order to ensure atmospheric conditions are being maintained. The six most common factors (temperature, work in the tank, period of time elapsed, unattended tanks, work breaks, and ballasting or trimming) are discussed, and examples are provided as guidance. Appendix A is unchanged from the proposal (53 FR 48110).

Paragraph (b)(5) requires releases of flammable, combustible, toxic, corrosive, irritant, and fumigant materials to be cleaned up as work progresses. The requirement that liquid residues of flammable and toxic materials, which includes all of the contaminants described above, were to be cleaned up as work progresses was brought forward from the previous provision § 1915.13(a)(1). In this final rule, OSHA has listed additional materials, corrosive, and irritant, that must be cleaned up as work progresses because they can be dangerous to employees working in these hazardous atmospheres.

Paragraph (b)(6) prohibits entry into spaces where the concentration of flammable or combustible vapors equals or exceeds 10 percent of the lower explosive limit and specifies the limited exceptions under which an employee may enter or work in such spaces. The exception is unchanged from the previous rule, § 1915.12(d), but has been placed in the cleaning and other cold work section for clarification. An employee may enter the space for emergency rescue or for a short duration to install the ventilation required to start operations. In those instances there must be no ignition sources present, the space must be monitored continuously, the atmosphere in the space must be maintained above the UEL, and appropriate personal protective equipment must be provided. A note has been added as a reminder that other provisions for work in IDLH and other dangerous atmospheres are located in Subpart I, Personal Protective Equipment, of this part.

Paragraph (b)(7) of the final rule requires that a competent person test ventilation discharge for possible accumulation in concentrations that may be hazardous to employees.

Paragraph (b)(8) requires that when the test required in paragraph (b)(7) above indicates that concentrations of exhaust vapors that are hazardous to employees are accumulating, all work in the contaminated area shall be stopped and the employees evacuated until the vapors have dissipated or been removed. These two requirements are the same as the existing requirements in § 1915.13(a)(5). OSHA has separated these two requirements for clarity, redesignating them as proposed paragraphs (b)(9) and (b)(10) and as paragraphs (b)(7) and (b)(8) of the final rule.

Paragraph (b)(9) of the final rule requires that only approved explosion-proof, self-contained portable lamps shall be used in spaces described in paragraph (a) of this section before the spaces have been certified as "Safe for Workers." The previous rule, § 1915.13(b), had the same requirement. Paragraphs (b)(7), (b)(8) and (b)(9) of the final rule are being promulgated with several editorial changes for clarity.

Paragraph (b)(10) of the final rule requires that signs that can be understood by all employees and that prohibit sources of ignition be posted. Sources of ignition include smoking and open flames that were specified in the previous § 1915.13(c). This requirement merely states what was implicit before; that is, that signs must be clearly understood by all employees. Numerous comments were received on the subject of signs (Ex. 6–3, 6–4, 6–6, 6–8, 6–10, 6–12, 6–15). A common concern was expressed by the U.S. Coast Guard who said that in their area, most shipyard workers possessed a limited command of the English language. They noted that these workers tended to avoid reading long or confusing documents and that for them, a simple statement at each space would be most effective (Ex. 6–4). OSHA is addressing this problem by requiring that the sign be understood by all employees.

The previous standards required signs prohibiting smoking and the use of open flames to be posted on the open deck adjacent to the access to spaces described in § 1915.14(a). With the expansion of the scope to include land-side operations, the final rule deletes the reference to decks and substitutes directions for posting that apply to the entire shipyard. Signs must now be prominently posted at the entrance to those spaces, in adjacent spaces, and in the open area adjacent to those spaces. Signs must be "prominently posted," i.e., clearly visible to affected employees. For example, signs posted behind a door do not effectively advise or warn employees of the working conditions. The purpose and intent of the language in paragraph (b)(10) of the final rule is to ensure that all employees are made aware of the danger of ignition sources in the workplace.

Paragraph (b)(11) of the final rule requires that all air moving equipment and component parts that are capable of generating a static electrical charge of sufficient energy to create a source of ignition be bonded electrically to the structure of a vessel or vessel section or, in the case of land-side spaces, grounded to prevent unintentional discharge of a static charge. This requirement is the same as the previous rule, § 1915.13(d), except that land-side operations are now covered.

Paragraph (b)(12) of the final rule requires that fans have non-sparking blades and that portable air ducts be of non-sparking materials. This requirement is unchanged from the previous rule, § 1915.13(e). In its effort

to make regulatory text more concise, OSHA has combined proposed paragraphs § 1915.13(b)(14) and (15) as paragraph (b)(12) of the final rule.

The Note OSHA proposed to include at the end of this section has been rewritten in note format and is carried forward into this final rule as follows:

> Note: See § 1915.12(c) of this part and applicable requirements of 29 CFR part 1915, subpart Z for other provisions affecting cleaning or cold work.

By including this final note in § 1915.13, OSHA is reminding employers of other Subparts of part 1915 as well as paragraphs of this Subpart that may apply.

4. § 1915.14 Hot Work

This section addresses the safety precautions that must be taken prior to starting hot work in or on spaces and adjacent spaces that contain or have contained combustible or flammable liquids or gases, related piping and accessories. The requirement that certain spaces must be certified "Safe for Hot Work" by a Marine Chemist or a Coast Guard authorized person before hot work is permitted is retained from the previous standard. This section also clearly identifies those locations within shipyard employment where a shipyard competent person is allowed to approve hot work.

The scope has been expanded to cover land-side confined and enclosed spaces and other dangerous atmospheres in the shipyard as well as vessels and vessel sections, in other words, all of shipyard employment. The original section covered employees engaged in shiprepairing, with certain sections covering only shipbreaking. OSHA proposed to expand coverage to all shipbuilding, shipbreaking, and ship repair (53 FR 48094) and with the reopening of the record OSHA sought comment on expanding the scope to all shipyard employment.

OSHA requested public comment on whether permits should be required for hot-work in all of shipyard employment, and, if so, whether the permits need to be posted (57 FR 28155, June 24, 1992). Over 30 commenters responded (Ex. 11–2, 11–3, 11–6, 11–14, 11–15, 11–18, 11–19, 11–20, 11–21, 11–24, 11–25, 11–26, 11–27, 11–28, 11–30, 11–36, 11–37, 11–38, 11–39, 11–40, 11–41, 11–43, 11–44, 11–29, 11–30, 11–31, 11–34, 11–35, 11–45, 11–47, 11–49, 11–50, 11–51, 11–53). Most of the comments set forth the steps that must be taken before hot work may be done, regardless of whether a formal permit is issued. They noted that the spaces must be evaluated and tested to determine their conditions before entry or hot work can begin. For confined spaces determined to be "safe for hot work," they said a certificate is issued by a Marine Chemist and posted at the work site. They asserted that this practice is followed throughout the maritime industry. Most indicated that requiring hot work permits in addition to the certificate would not increase the safety of hot work.

The need for hot work permits in shipyards was considered and unanimously rejected by SESAC at their September 3, 1992, meeting (Tr. 470). Chairman Linwood Temple, CMC, argued that a permit system would be useless and less protective (SESAC, Tr. September 3, 1992, 468–469). Lt. Commander Joe Ocken from the 5th Coast Guard District testified that OSHA "should not * * * take the general industry standard language [on permits] and carry that over into 1915.12" (SESAC Tr. September 3, 1992, 461). Captain Lawrence Reed, representing NIOSH, stated that he shared:

> * * * The concern of Lt. Commander Joe Ocken * * * that some [of the provisions of the permit required confined space standard] * * * are less protective than the existing language of 1915.14 and [that he] would propose we go with the existing 1915.14. (SESAC Tr. September 3, 1992, 467–468)

Mr. Charles Klein, representing Newport News Shipbuilding, stated:

> * * * What the shipbuilding industry and shiprepairing industry is doing right now with respect to confined spaces is working fine. The number of explosions that you see, the number of fatalities that you see, are virtually nil, and that would suggest that the existing language that's found in 1915 is more than adequate, and, in fact, probably would be better taken over to the general industry than what is proposed for general industry. (SESAC Tr. September 3, 1992, 465–466)

Mr. Lou D'Ambrosio, representing the Washington and Northern Idaho District Council of Laborers' International Union of North America, agreed that the permit system would be less protective (SESAC Tr. September 3, 1992, 469).

OSHA has considered the evidence and agrees with the SESAC consensus that workers in shipyard employment are adequately protected by the current hot work standards, without the need for a permit system. Shipyards are unique in that they rely on Marine Chemist and competent persons to oversee confined and enclosed spaces and other dangerous atmospheres. In many locations, a Marine Chemist is required to issue a certificate before any hot work can be done. The Marine Chemist Certificate can only be issued when conditions within and adjacent to spaces which have contained a flammable or combustible gas or material have been cleaned and inspected and found to be safe (gas free). Moreover, the certificate specifies other requirements for entry and work such as ventilation, fire watch placement, and personal protective equipment, and requires a competent person to reinspect and test the space as directed in order to maintain the conditions of the Marine Chemist certificate. Similarly, the competent person cannot grant permission for hot work in those locations that he or she is allowed to test and certify until the conditions are safe for hot work. In addition, both the Marine Chemist and the competent person are required to produce written certifications that must be posted, as required in §§ 1915.14(a)(2) and 1915.7(d) (1) and (2) respectively. As added protection, the Marine Chemist requires a competent person to recheck the space to ensure that conditions do not change. If there is a change in the space, the competent person must stop work and recall the Marine Chemist to recertify that the space is safe for hot work before work can restart. These certifications and recordings are comparable to permits, in that an employee may not perform hot work in a confined or enclosed space or other dangerous atmosphere until a certificate is issued. OSHA is persuaded that the current requirements, modified for clarity, provide protection comparable to § 1910.146 to employees in the shipyard. Therefore, OSHA is not requiring hot work permits in subpart B.

OSHA also requested comment on whether hot work should be prohibited on insulated bulkheads and if so, whether all the insulation needed to be removed. The Agency asked whether there have been situations where toxic vapors have evolved from heated insulation, and whether fires have broken out during and after hot work operations. (53 FR 48102) A number of parties filed comments on this issue (e.g., 6–8, 6–12, 6–15, 6–18, 6–21, 6–22, 6–23, 6–24, 6–26, 6–31, 6–33, 6–34, 6–36, 6–37). These comments provided a wide range of views and some anecdotal information, but contained insufficient evidence to indicate that hot work on insulated bulkheads should be prohibited. Therefore, OSHA is not addressing this issue in subpart B.

Paragraph (a)(1) requires a Marine Chemist or a U.S. Coast Guard authorized person to certify certain spaces as "Safe for Hot Work" before hot-work may be done on or in them. Other than the expansion of coverage to land-side, the requirements for hot work are the same as in the previous standard. However, § 1915.14 has been

reorganized and editorial changes have been made to add clarity.

Paragraph (a)(1)(i), (a)(1)(ii) and (a)(1)(iii) list the confined and enclosed spaces and other dangerous atmospheres along with their adjacent spaces within shipyard employment that must be inspected and tested by a Marine Chemist or Coast Guard authorized person prior to hot work. OSHA has deleted all references to tank vessels and dry cargo, miscellaneous and passenger vessels because the scope now includes all vessels and vessel sections and land-side hot work activities. The requirements are unchanged from the previous requirements of 1915.14 (a)(1)(i), (a)(1)(ii), and (a)(1)(iii), but editorial changes have been made to add clarity.

Paragraph (a)(1)(iv) has been changed and relocated for clarity and consistency. In the previous rule, a Marine Chemist certificate was not necessary for hot work on dry cargo, miscellaneous, and passenger vessels when the work was performed on spaces adjacent to cargo tanks, as long as the gas or liquid in the tanks had a flash point below 150° Fahrenheit and the work was performed at least 25 feet (7.5 m) away from the tank. This exception has been expanded to any work in shipyards where the criteria are met, because the criteria are equally applicable to land-side operations.

Paragraph (a)(2) carries forth the requirement that the certificate issued by the Marine Chemist or the Coast Guard authorized person be posted in the immediate vicinity of the affected area and kept on file for a period of at least 3 months from the date of completion of the operation for which the certificate was generated.

Paragraph (b) covers those areas of the vessel and land-side spaces within the shipyard where a competent person can give permission for hot work to proceed after he or she has inspected and tested the space or area for flammability. The substantive requirements of this paragraph remain unchanged from the previous requirements except that land-side confined and enclosed spaces and other dangerous atmospheres are now included.

Paragraph (b)(1) states that hot work is not permitted in or on any of the listed spaces or adjacent spaces in § 1915.14(b)(1) (i) through (v) until the spaces have been tested for flammability and found to contain no concentrations of flammable vapors equal to or greater than 10 percent of the lower explosive limit. These spaces are: Dry cargo holds; the bilges; the engine or boiler room where a Marine Chemist's or a Coast Guard's authorized person's certificate is not required; vessels and vessel sections where a Marine Chemist or Coast Guard authorized person's certificate is not required under paragraph (a)(1)(i) of this section; and land-side enclosed or confined spaces or other dangerous atmospheres not covered in § 1915.14(a). The previous rule, in § 1915.14 (b) and (c), contains the same requirements found in § 1915.14(b)(1) (i) through (iv). Section 1915.15(b)(1)(v) extends the coverage to land-side operations within shipyard employment.

In paragraph (b)(2), requires a space or adjacent space that has been tested and found to contain a concentration of flammable vapors equal to or greater than 10 percent of the lower explosion limit to be labeled Not Safe for Hot Work. The space or adjacent space must than be ventilated at volumes and flow rates sufficient to ensure that the vapor concentration is below 10 percent of the lower explosive limit. This requirement is unchanged from the previous § 1915.14 (b) and (c).

Section 1915.14 (c) and (d) of the previous rule have been deleted because their contents have been moved to other places in subpart B. For example, hot work performed in engine and boiler rooms is now covered by paragraph (b)(1)(iii), and the hot work from open decks and tanks without overheads previously addressed by § 1915.14(d) is now covered in § 1915.14 (a) and (b).

The previous rule allowed the employer to inert spaces with non-flammable gas or water in shipbreaking operations. This provision was not included in the 1988 proposal and no commenters addressed this issue. OSHA is not carrying forth inerting as a specific provision because hot work on an inerted space must be approved by a Marine Chemist or Coast Guard authorized person. Work requiring a Marine Chemist's certificate is thoroughly covered in paragraph 1915.14(a) above. Finally § 1915.14 ends with a note referring users to Appendix A. Appendix A refers users to various other sections of part 1915 regulations that are directly relevant to hot work. Those sections, especially Subpart D, Welding, need to be reviewed carefully prior to starting hot work.

5. § 1915.15 Maintenance of Safe Conditions

The principal substantive change to this section continues to reflect OSHA's general decision to expand the scope of Subpart B to cover all phases of shipyard employment as defined in the final rule. Operations covered by the previous requirements in § 1915.15 were limited to ship repairing and shipbreaking. Under the previous rule, only employers engaged in ship repairing operations needed to comply with paragraph (a) of § 1915.15 and only employers engaged in shipbreaking operations needed to comply with paragraph (b) of § 1915.15. Because of the expansion of the scope of Subpart B to include all phases of shipyard employment, the final rule consolidates the requirements of § 1915.15 paragraphs (a) and (b) into one section of requirements that apply to all phases of shipyard employment.

OSHA raised two issues in the proposal that are related to the maintenance of safe conditions as regulated in this section. These issues concern the frequency of retesting and the need for testing to be accompanied by visual inspections.

Proposed §§ 1915.13(b)(4) and 1915.15 addressed the requirement to conduct atmospheric tests frequently. Proposed § 1915.13(b)(4) would have required that factors which influence the frequency of rechecking, such as air temperature and residue volatility, be considered when determining how often to retest, while proposed paragraphs (d) and (f) addressed the need for frequent atmospheric tests in order to maintain the initial working conditions in a tank.

Neither OSHA's previous standard nor the proposal specified how frequently a tank should be rechecked. Public comment was solicited as to whether OSHA should specify the frequency of testing in the standard, and if so, what that frequency should be and why. OSHA also asked if the factors which influence the need to check tanks frequently should be addressed directly in the standard. Finally, the Agency sought comment on whether OSHA should change the term "frequently" to "as often as necessary" and if so, why.

Many commenters addressed this issue and most favored requiring testing "as often as necessary" and setting forth the conditions that determine the actual frequency. For example, the U.S. Navy's Environmental Health Center (Ex. 6–31) commented,

> The term frequently is too vague and should be redefined to specify that re-testing should be dependent on alteration of specific atmospheric conditions, manipulation of valves, or opening of manholes at the work site.

Shipbuilders Council of America, (Ex. 6–3) indicated that OSHA should not attempt to define "frequently." SCA stated that,

> If an attempt is made to define the term "frequently," it may create more problems than it would solve. Illustrative is defining "frequently" as every two hours. There may

be some tanks that only need monitoring three times a shift instead of four. There are also some tanks that may require continuous monitoring. Using the terminology "as often as necessary" solves these problems, and allows the individuals monitoring the areas a little more discretion at utilizing their precious time wisely.

NFPA (Ex. 6–10) agreed that requiring testing "as often as necessary" would be appropriate,

The standard is intended to provide minimum requirements. Establishing a predetermined specified frequency for testing spaces through regulations may not allow for the various factors which may alter conditions * * * Once the initial entry has been authorized, retesting is necessary at some frequency to ensure that conditions are not changing thus endangering the safety of the workers in the space. The frequency of retesting must be determined by the individual conditions and circumstances of the work activity. Various factors as described in Appendix A to Subpart B may affect the initial conditions. Confined spaces need to be prepared on the basis of initial entry, subsequent work, and safe exit. Most often where accidents have resulted, there was either no testing for initial entry or no consideration of the change in conditions which might occur due to the work process or other factors. NFPA supports the concept * * * that frequency of follow-up testing be expressed in terms of "as often as necessary".

On the other hand the Commandant of the U.S. Coast Guard recommended OSHA specify a 4 hour retesting minimum, although he also acknowledged that Marine Chemists and competent persons must exercise their judgment on frequency of testing.

* * * A minimum frequency should be specified * * * In general spaces should be tested "as often as necessary". This phrasing implies that relevant factors have been considered and a judgment made about the need for retesting. Testing "frequently" does not imply any judgment. * * *

This period should not exceed 4 hours for an occupied space or 24 hours for an unoccupied space. No person should be allowed to enter an unoccupied space unless it has been tested/retested within 4 hours. The 24 hour requirement is an extension of NFPA 306–1988 2–6.1 which states that "Work authorized by the Certificate must commence within 24 hours unless otherwise noted on the Certificate." This should be extended to competent person testing as well as Marine Chemist testing, especially since the role of the competent person is one of monitoring conditions of spaces. Even if a space is unoccupied it represents a hazard from explosion or unauthorized entry.

The 4 hour requirement for occupied spaces is needed to ensure that spaces are not entered unless the on-duty competent person has first hand knowledge that the conditions of a tank have remained unchanged from those of initial testing and entry authorization.

NIOSH recommended OSHA set the frequency of testing, but rather than specifying as a minimum time interval, they listed the factors that should be considered in determining how often an atmosphere must be tested (Ex. 6–14),

NIOSH suggests that OSHA specify the frequency of atmospheric testing. The frequency of atmospheric testing depends upon a number of factors. These factors should be listed in the standard (such as nature of hazard, temperature within tank, type of work in tank, elapsed time, unattended tanks, work breaks, residue volatility, etc.). Testing intervals should be established according to these factors as determined by the following NIOSH-recommended hierarchy: (1) Marine Chemist, (2) Certified Industrial Hygienist (CIH) or Certified Safety Professional (CSP), or (3) Coast Guard Authorized Person [§ 1915.11]. Furthermore, NIOSH suggests that 'competent person' [§ 1915.7], as defined by OSHA, is not trained sufficiently to determine testing frequency. At a minimum, NIOSH suggests that testing be done at 'time of entry' and continuously or periodically during occupancy, particularly if conditions are changing.

Bay Shipbuilding (Ex. 6–15) commented,

Frequency of testing must be based on the area conditions and complexity of the hazard. Ventilation capability is also a major factor in hazard control. Once an area has been made safe, and air quality can be maintained with natural or mechanical ventilation, there are no further steps needed unless the condition is modified by some events such as a spill, leak, or injection of an environmentally altering element. Otherwise, the only thing to do is to continue monitoring (which is cost prohibitive); or base the checks on the HMIS scale for health, flammability, and reactivity of the product. The higher the HMIS rating, the more frequent the checks.

The American Waterways Shipyard Conference (AWSC) (Ex. 6–23) commented,

The requirement to frequently test the confined spaces is already defined by the nature of the work, i.e., the changing of work shifts, etc. There is no need to further define the term in the regulation.

Independent Testing and Consultation (Ex. 6–24) commented,

There is no way to define all of the parameters which will decide how often a tank or compartment should be tested. The Marine Chemist or Coast Guard authorized person can indicate on the certificate, how often the space is to be tested. The wording in 1915.15 (d) and (f) should therefore be changed to 'as frequently as necessary to ensure. * * *

Bath Iron Works Corporation (Ex. 6–28) commented,

No easy definition exists for all circumstances requiring additional 'frequent' testing. This is a situation which requires the judgment of the Marine Chemist, based on his knowledge of the last three cargoes, their properties and the effectiveness of the cleaning procedures used. Some cargoes, such as alcohols, light fuel oils, etc., leave no harmful residues after adequate tank cleaning and ventilation. Under such situations, testing every 24 hours is adequate. Other cargoes leave residues, or, particular tank coatings partially absorb cargo residues, only to release vapors slowly over time, regardless of how the cleaning operations were conducted. These conditions require atmospheric testing more frequently. Long term experience at Bath Iron Works dealing with Diesel Fuel Marine (DFM), JP–5, and several preservative coatings have shown no changes in atmospheric conditions from one 24 hour period to another. In these cases, the Coast Guard guidelines of testing once each 24 hours is adequate.

OSHA has taken reasonable measures of increasing the awareness of the dangers of sealed or confined spaces by providing guidelines and situations which could create hazardous atmospheres in the discussion presented in Appendix A of the Proposed Rule. This information, together with the knowledge that the Marine Chemist has of the previous cargoes and his judgment, when passed on to the Competent Person via instructions on his Marine Chemist Certificate, should be adequate to define testing frequency under specific conditions.

Pacific Marine Testing (Ex. 6–33) stated,

Frequency of testing atmosphere is determined by the specific situation encountered. There are many variables which must be taken into account before frequency of testing may be prescribed.

Finally, the Marine Chemist Association, whose members set the frequency of retesting, (Ex. 6–34) commented,

The frequency of testing cannot be specified. There are too many variables that may govern the frequency of testing. Please note Appendix A Subpart B to the standard. The term 'frequency' should not be used and 'as often as necessary' should be substituted.

OSHA agrees with those commenters who suggested that OSHA use the performance language "as often as necessary" rather than cite a specific frequency for retesting. As the majority of commenters suggest, spaces vary and conditions within a space are subject to change at different time intervals. Therefore, a specific schedule for retesting all spaces could lead to unnecessary testing in some instances and inadequate testing that may not identify hazardous conditions as they arise in others. OSHA has concluded that those individuals who test an atmosphere must have the flexibility to determine the precise frequency of testing. However, OSHA is specifying that the testing be done "as often as necessary," in order to ensure that changes in conditions are detected for

each atmosphere. It is imperative that the atmosphere be checked often enough to ensure that it is safe for workers. To that end, Appendix A provides supplementary information to assist employers and employees in determining the frequency with which a tank must be monitored in order to ensure atmospheric conditions are being maintained. OSHA's decision to use performance language such as "as often as necessary" is also consistent with the Agency's continuing position to use performance-based standards where practicable.

Therefore, OSHA has amended the language of those requirements in this section that previously required "frequent" testing to require the testing of atmospheres "as often as necessary" in order to provide flexibility to Marine Chemists and competent persons who test spaces to determine the time and need for testing of atmospheres based on the conditions in each dangerous atmospheres.

OSHA sought public comment on whether the shipyard competent person should be required to conduct a physical examination of the tank and pipelines when making a follow-up inspection.

The majority of comments on this issue discussed it in terms of retesting to maintain safe conditions within all types of work spaces. However, because OSHA believes that a visual inspection is an integral part of any testing the reasoning in this discussion also pertains to initial testing required in § 1915.12, *Precautions before entering.*

Most commenters (e.g., Exs. 6–3, 6–4, 6–10, 6–14, 6–18, 6–31) indicated it would be appropriate for competent persons to conduct physical inspections of spaces they are checking during periodic retesting of atmospheres. Some of them and others (Exs. 6–10, 6–18, 6–31, 6–33, and 6–34) also indicated that it is currently industry practice for well trained individuals who conduct follow-up testing to physically inspect spaces during these follow-up inspections.

NIOSH (Ex. 6–14) commented,

The shipyard 'competent person' should be required to conduct a physical examination of the tank and pipelines during follow-up inspections. Original conditions and intended purposes of tanks and pipelines change continually in ship construction and repair. These new uses can only be detected by physically examining them during follow-up inspections.

The U.S. Coast Guard MIONY (Ex. 6–4) states,

Shipyard competent persons should be required to make physical examination of each space retested. During ship repair, vessels are often listed or trimmed for various reasons. This can cause flammable, toxic, and corrosive residues to leak out of pipelines. In practice these are rarely blanked and the isolation valves may have been opened or leak. These residues may ignite during hot work, harm workers on contact, or produce a hazardous atmosphere if there is a temperature increase.

NFPA (Ex. 6–10) agreed, and noted that,

NFPA strongly supports the inclusion of a requirement that in addition to atmospheric tests the shipyard competent person should also be required to conduct a physical examination of the spaces and associated pipelines. NFPA 306, 2–1 requires the Marine Chemist to conduct a physical inspection and to conduct tests within the spaces. For high flash point, low vapor pressure products such as diesel, a test for flammable or combustible vapors is not sufficient, since at atmospheric temperatures there are not enough vapors being evolved for the combustible gas indicator to detect. It is essential that physical inspections be conducted.

The Navy's Sea Systems Command (Ex. 6–12) commented,

The purpose of the follow-up check is to ensure conditions have not deteriorated. The requirement [for a physical inspection] is endorsed for hot work rechecks.

Similarly, the Commandant of the U.S. Coast Guard commented,

Because it is important for a Marine Chemist to make such examinations, it is even more important that the competent person also conducts such examinations.

By making a physical examination of the confined space the competent person understands the tank conditions better, and it helps to stress the importance of looking for other potential problems in a confined space. For example, paraffinic residues on bulkheads are sometimes partially cleaned in areas where minor welding jobs will be done on the opposite side of the bulkhead (in the adjacent space). Welders are unable to determine if they are welding outside the cleaned area, but the competent person would have the opportunity to detect a problem.

The Marine Chemist Association (Ex. 6–34) commented,

The shipyard competent person should definitely conduct physical examinations of the interior of tanks and pipelines. Instrumentation used to test the atmosphere of these structures do not always reveal the presence of flammable or combustible materials. If these persons are required to maintain safe conditions in enclosed and confined spaced they must evaluate conditions other than atmosphere.

Northwest Marine Chemist (Ex. 6–18) asserted that,

There is no way to properly determine the condition of a space without physically entering.

Independent Testing and Consulting, Inc. (Ex. 6–24) commented,

The shipyard competent person should be required to conduct a physical examination of the tank (provided it is safe to enter) and make any necessary tests of piping provided that the piping has been approved for hot work on the Marine Chemists certificate.

Chemical Engineering Service, Inc. (Ex. 6–25A) commented,

The original intent for the position of shipyard competent person was to detect conditions where, for some reason, there was a decrease in oxygen or an accumulation of combustible gas. Left undetected, these situations could develop into acute hazards for shipyard personnel. While these conditions are relatively rare, their occurrence could easily lead to catastrophic loss of life and property.

A much more chronic problem is fire hazards in the shipyard resulting from the introduction of flammable or combustible material subsequent to the initial internal inspection for hot work. This could be the result of leaking piping, accidental or intentional contamination, or gradual buildup of trash and other combustible materials. With the exception of liquids with a reasonably high vapor pressure, these fairly common conditions can only be detected with an internal inspection.

If it is the intent of OSHA to utilize the shipyard competent person to control fire hazards in addition to atmospheric hazards, internal inspection of all spaces must be required.

Atlantic Environmental & Marine Services (Ex. 6–27) commented,

* * * Shipyard Competent Persons should be required to conduct an on-site survey of tanks and pipelines when making follow up inspections.

The U.S. Navy's Environmental Health Center (Ex. 6–31) commented,

Yes, the shipyard competent person should be required to conduct a physical examination of the tank and pipelines when making a follow-up inspection. The current foundation of the NAVSEA Technical Manual lists a requirement in Section 23.4 of reference (c) for conducting a physical examination of the tank and pipelines upon reinspection. The condition for entry must be defined, such as, use of ventilation, PPE, non-sparking tools, and whether there is to be continuous or periodic testing.

Pacific Marine Testing (Ex. 6–33) commented,

The shipyard competent person, when trained properly by a sanctioned training such as the one developed and presented by NFPA and its supporters, is taught to conduct a physical examination of the tank and pipelines when making a follow-up inspection. A determination of a safe condition can be made only when the shipyard competent person has conducted a physical examination.

Only the Shipbuilders Council of America (Ex. 6–3, pg. 3) and the Newport News Shipbuilding (Ex. 6–6, pg. 4) urged OSHA to allow a qualified

person to decide whether a physical examination is necessary.

> The qualified person should not be required to conduct a full physical examination of the tank and pipelines when making a follow-up inspection. . . . the qualified person should be given appropriate flexibility when making this determination based on all available data, *including* a physical inspection, where necessary.

OSHA agrees with the majority of commenters on this issue and has concluded that, because of changing conditions, appropriate retesting must include a physical inspection of a tank or pipelines for leaks or other build-ups of hazardous substance within a certified space. Physical inspection of a space is an integral part of an effective follow-up inspection or monitoring program. For example, an actual physical examination is crucial in eliminating housekeeping debris that could be fire hazards such as rags, insulation, or heavy oil residues in the tank deep spot. Therefore, OSHA is requiring physical inspections be conducted during follow-up inspections of tested spaces.

In paragraph (a) of the final rule OSHA continues the requirement that was found in the first sentence of paragraph (a)(1) in the previous text. The employer is required to disconnect, blank off, or otherwise block by a positive method all pipelines that could carry hazardous materials into spaces that have been tested and found safe for work. There were no substantive comments addressing this provision. Although OSHA has clarified the language with this rule, the substance remains the same.

The second sentence of paragraph (a)(1) in the previous text required that manholes and other closures of a space that were secured during the testing of the space remain secured afterwards to prevent alteration of the tested space atmosphere. OSHA has eliminated this requirement from the final rule. OSHA has decided that it would be more appropriate to recognize that closures of tested spaces may be opened safely for various reasons during work operations and that a requirement for them to remain secured was unnecessary. What is critical for safety is that the atmospheric conditions within the space remain within permissible levels. Therefore, OSHA will continue to recognize the need to test and monitor spaces as necessary. This will assure that safe work atmospheres are maintained and if they are not, work must be stopped regardless of how the atmosphere becomes contaminated.

Paragraph (b) of the final rule (as was the third sentence of paragraph (a)(1) of the previous rule) is intended to ensure that a safe working environment is maintained within a previously tested space, even if outside contaminants may have been introduced into the space after initial testing. The final rule says that when any changes occur that could alter conditions within the space or other dangerous atmospheres, work shall be stopped until the space is visually inspected, retested and found to comply with §§ 1915.12, 1915.13 and 1915.14 of this part, as applicable. To provide guidance to employers on what changes would require work be stopped, OSHA has included a note with examples.

Paragraph (c) of the final rule requires a competent person to test atmospheric conditions within a previously tested space as often as necessary to maintain conditions as specified on certificates issued by a Marine Chemist or Coast Guard authorized person. The Agency has changed the format of the final rule and this new paragraph (c) addresses only the language that was found in paragraph (a)(4) of the previous rule. The requirements that were found in paragraphs (a)(2) and (a)(3) of the previous text are not addressed in this section because they are covered elsewhere in OSHA's requirements or they have been moved to a more appropriate section of the final rule. For example, previous paragraph (a)(3) required employers to ensure that employees understand and obey all warning signs, tags, and the language of Marine Chemists' certificates. The requirement addressing employee understanding of the warning labels is found in § 1915.16 of this Subpart. OSHA considers paragraph (c) of the final rule to be an editorial change to the language that was found in the first sentence of paragraph (a)(4) in the previous rule and therefore, non-substantive.

In paragraph (d) of the final rule, OSHA requires that if a competent person finds that atmospheric conditions within a space fail to meet the applicable requirements of §§ 1915.12, 1915.13 and 1915.14 of Subpart B, work in the space must be stopped, the space retested by a Marine Chemist or Coast Guard authorized person and a new certificate issued in accordance with § 1915.14(a) before work may resume. The language found in paragraph (d) is similar to that found in the second sentence of paragraph (a)(4) of the previous standard and the basic requirement remains the same. Modifications to the previous language have changed references to the maintenance of gas-free conditions to the maintenance of conditions meeting §§ 1915.12, 1915.13, and 1915.14. These sections address not only gas-free conditions but also other hazardous atmospheric conditions to which an employee may be exposed, which are also within the scope of the certificate. OSHA believes that separating the two requirements found in paragraph (a)(4) of the previous rule into separate paragraphs (c) and (d) of the final rule will improve compliance by making the rule easier to understand.

Paragraph (e) of the final rule requires a competent person to continue to test as necessary those spaces he or she has tested previously to ensure that the atmospheric conditions within the tested space are maintained. This is consistent with both NFPA 306 and industry practice. The substance of the final rule is similar to the language proposed in 1988 and the first sentence of paragraph (b)(2) of the previous rule except that, like paragraph (c) above, tests are to be conducted for all relevant atmospheric conditions.

In paragraph (f) of the final rule, OSHA requires that all work be stopped in those spaces tested previously by a competent person when a competent person finds that the conditions within the space no longer meet the requirements set forth elsewhere in this subpart. The language in paragraph (f) of the final rule is similar to the language proposed in paragraph (g) of the 1988 proposal and is parallel to the language contained in paragraph (d) above.

Like paragraph (d) above, paragraph (f) of the final rule drops the list of specific atmospheric conditions and instead references §§ 1915.12, 1915.13 and 1915.14. The substantive requirement for stopping work until a space found to be hazardous has been retested and found safe for workers has not changed from the previous language.

6. § 1915.16 Warning Signs and Labels

The substantive change OSHA has made to this section involves the expansion of the scope of the previous requirements to all phases of shipyard employment. The previous language limited the scope of § 1915.16 to ship repairing operations only. The reasons for the expansion in scope of this section are discussed above in § 1915.11, Scope and Application.

The provisions in final § 1915.16 require that signs and labels that are posted to meet the specific requirements contained in other sections of Subpart B be presented in a manner that can be understood by all employees. Like the previous standard, an individual tank or other space need not be labeled separately if the whole area has been

tested and all means of access to the area are labeled with a warning sign.

OSHA solicited public comment on whether § 1915.16 should require that all conditions be labeled on tanks. The majority of responders who considered this issue (Ex. 6–8, 6–15, 6–21, 6–22, 6–23, 6–24, 6–36, 6–37, 6–38) supported the continuation of the previous requirement that only tanks containing unsafe work conditions need to be labeled. Other commenters (Ex. 6–4, 6–12, 6–28, 6–31) supported labeling all locations that had been tested, whether safe or unsafe. Still other commenters (Ex. 6–3, 6–6) suggested that only tanks containing safe work environments be labeled.

Those commenters who supported continued use of the previous requirement of posting only unsafe tanks are best represented by the following comments. The American Waterways Shipyard Conference, (Ex. 6–23) commented,

> Current shipyard operations only provide warning signs for unsafe tanks. If both conditions are marked with warning signs, then it ceases to be an instant hazard recognition.

This was further emphasized by a comment from Sound Testing, Inc., (Ex. 6–8):

> I have always found the present standard's section on warning signs to be very workable. Not much is gained by labeling safe places as such, for three reasons: 1. This practice would be very costly; 2. The very idea of using a warning sign on a safe place is illogical; and 3. Signs would proliferate. The more signs there are, the less is the effect of any single sign. Signs should be used as sparingly as possible, so that when we really need them they will be effective.

On the other hand, the National Fire Protection Association (NFPA) (Ex. 6–10) supported the placing of warning signs on only those tanks that have been tested and found to be safe. NFPA states:

> NFPA would support a requirement for placing warning signs on tanks if the signs were specifically restricted to indicating spaces which have been tested and suitably designated as "SAFE." If signs are required for all tanks which are "SAFE" then any tank which does not have a sign is then interpreted by all employees to be "NOT SAFE."

OSHA has concluded that requiring only unsafe spaces to be labeled as specified in §§ 1915.12, 1915.13, or 1915.14 will provide the most effective notice of atmospheric conditions that could endanger employees. The Agency believes that the identification of hazardous conditions is the most efficient means of utilizing signs or labels. OSHA agrees with commenters who noted that warning signs should be used only when necessary so that when they are posted, employees will take notice of them. Shipyard employees are familiar with the labeling of tanks that have been tested and found to be unsafe. On the other hand, OSHA is not prohibiting the posting of other signs and labels an employer may find appropriate for that employer's workplace, but the Agency cautions employers about the overuse of signs and labels, which could lead to decreased effectiveness. Moreover, in response to the NFPA and other commenters who supported labeling "safe" spaces, OSHA notes that spaces that have been tested and found to be safe are required to be identified by the Marine Chemist's certificate or the competent person's record of testing and recommendations. These certificates and records provide the appropriate notice of safe working conditions. There is insufficient evidence in the record to show that changes to the labeling requirements would increase safety. For all these reasons, OSHA is requiring that all tanks and other spaces that fail to meet the requirements of §§ 1915.12, 1915.13, or 1915.14, as applicable, be posted with hazard warning signs or labeled with hazard warning messages as required in those sections.

OSHA deleted paragraph (a) of the old and proposed rules which required employers to notify employees of dangerous work areas. The reason for this is that the posting requirements for various atmospheric conditions are specifically addressed in their respective sections.

The final rule text and the proposed rule text differ in that OSHA proposed that employers be responsible for ensuring that all employees "obey" all warning signs. One commenter, Bay Shipbuilding Corp., (Ex. 6–15) addressed the issue of employee compliance with safety regulations.

> The employee must share the responsibility to obey and observe proper practices along with the employer. Every employee must be held accountable for their actions.

In this regard, OSHA notes that under the OSH Act, employers are responsible for compliance with standards issued under Section 6, and enforcement is directed at the employer and not the employee.

In this final rule, OSHA has revised the previous rule by providing two basic requirements addressing hazard warning messages to employees.

In paragraph (a), OSHA is requiring that all hazard warning messages that are posted to comply with respective paragraphs of §§ 1915.12, 1915.13, and 1915.14 be presented in a manner or format that can be perceived and understood by all employees.

OSHA proposed in paragraph (a) that the employer ensure that employees understand all warning signs and limitations provided by Marine Chemists and the OSHA Form 74. OSHA has dropped the reference to the OSHA Form 74 since it is no longer required, and has added new language to clarify that the employer must present warning materials in a manner that can be understood by all of his or her employees. There are many methods such as dual language signs or pictorial graphics that an employer may use to ensure that employees can and do understand all warning signs and instruction addressing dangerous working conditions. This is consistent with the position OSHA has taken on other rulemakings that address signs, tags, and labels. For example, in 29 CFR § 1910.145, OSHA permits the use of accident prevention tags using graphic or second language text where necessary. Moreover, the obligation to present signs and labels in a manner that can be perceived by all employees also means that the label or sign must be posted in a place where employees will see it in the course of their work. Other factors the employer must consider are size, material, and methods of attachment. In short, this new performance-oriented language requires that employers provide adequate notice to all employees of dangerous working conditions, but leaves the method of presentation up to the employer.

In paragraph (b) of the final rule, OSHA continues to allow employers to post the warning signs or labels at all means of access rather than requiring each tank or space to be labeled, as long as the entire space has been tested and certified. This is the same as paragraph (c) of the previous standard.

III. Statutory Considerations

A. Introduction

OSHA has described the hazards found in confined and enclosed spaces and other dangerous atmospheres in shipyard employment and the measures required to protect affected employees from those hazards in Section I, *Background*, and in Section II, *Summary and Explanation of the Final Rule*, earlier in this preamble. The Agency is providing the following discussion of the statutory mandate for OSHA rulemaking activity to explain the legal basis for its determination that the Confined and Enclosed Spaces and Other Dangerous Atmospheres standard,

as promulgated, is reasonably necessary to protect affected employees from significant risks of injury and death.

Section 2(b)(3) of the Occupational Safety and Health Act authorizes "the Secretary of Labor to set mandatory *occupational safety and health standards* applicable to businesses affecting interstate commerce", and section 5(a)(2) provides that "[e]ach employer shall comply with *occupational safety and health standards* promulgated under this Act" (emphasis added). Section 3(8) of the OSH Act (29 U.S.C. 652(8)) provides that "the term 'occupational safety and health standard' means 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."

In two recent cases, reviewing courts have expressed concern that OSHA's interpretation of these provisions of the OSH Act, particularly of section 3(8) as it pertains to safety rulemaking, could lead to overly costly or under-protective safety standards. In *International Union, UAW v. OSHA*, 938 F.2d 1310 (D.C. Cir. 1991), the District of Columbia Circuit rejected substantive challenges to OSHA's lockout/tagout standard and denied a request that enforcement of that standard be stayed, but it also expressed concern that OSHA's interpretation of the OSH Act could lead to safety standards that are very costly and only minimally protective. In *National Grain & Feed Ass'n v. OSHA*, 866 F.2d 717 (5th Cir. 1989), the Fifth Circuit concluded that Congress gave OSHA considerable discretion in structuring the costs and benefits of safety standards but, concerned that the grain dust standard might be under-protective, directed OSHA to consider adding a provision that might further reduce significant risk of fire and explosion.

OSHA rulemakings involve a significant degree of Agency expertise and policy-making discretion to which reviewing courts must defer. (See for example, *Building & Constr. Trades Dep't, AFL–CIO v. Brock*, 838 F.2d 1258, 1266 (D.C. Cir. 1988); *Industrial Union Dep't, AFL–CIO v. American Petroleum Inst.*, 448 U.S. 607, 655 n. 62 (1980).) At the same time, the Agency's technical expertise and policy-making authority must be exercised within discernable parameters. The lockout/tagout and grain handling standard decisions sought clarification of the Agency's view of the scope of its expertise and authority. In light of those decisions, the preamble to this safety standard states OSHA's views regarding the limits of its safety rulemaking authority and explains why the Agency is confident that its interpretive views have in the past avoided regulatory extremes and continue to do so in this rule.

Stated briefly, the OSH Act requires that before promulgating any occupational safety standard, OSHA demonstrate based on substantial evidence in the record as a whole that: (1) The proposed standard will substantially reduce a significant risk of material harm; (2) compliance is technologically feasible in the sense that the protective measures being required already exist, can be brought into existence with available technology, or can be created with technology that can reasonably be developed; (3) compliance is economically feasible in the sense that industry can absorb or pass on the costs without major dislocation or threat of instability; and (4) the standard is cost-effective in that it employs the least expensive protective measures capable of reducing or eliminating significant risk. Additionally, proposed safety standards must be compatible with prior Agency action, must be responsive to significant comment in the record, and, to the extent allowed by statute, must be consistent with applicable Executive Orders. These elements limit OSHA's regulatory discretion for safety rulemaking and provide a decision-making framework for developing a rule.

B. Congress Concluded That OSHA Regulations Are Necessary To Protect Workers From Occupational Hazards And That Employers Should Be Required To Reduce or Eliminate Significant Workplace Health and Safety Threats

At section 2(a) of the OSH Act (29 U.S.C. 651(a)), Congress announced its determination that occupational injury and illness should be eliminated as much as possible: "The Congress finds that occupational injury and illness arising out of work situations impose a substantial burden upon, and are a hindrance to, interstate commerce in terms of lost production, wage loss, medical expenses, and disability compensation payments." Congress therefore declared "it to be its purpose and policy * * * to assure so far as possible every working man and woman in the Nation safe * * * working conditions [29 U.S.C. 651(b)]."

To that end, Congress instructed the Secretary of Labor to adopt existing Federal and consensus standards during the first 2 years after the OSH Act became effective and, in the event of conflict among any such standards, to "promulgate the standard which assures the greatest protection of the safety or health of the affected employees [29 U.S.C. 655(a)]." Congress also directed the Secretary to set mandatory occupational safety standards (29 U.S.C. 651(b)(3)), based on a rulemaking record and substantial evidence (29 U.S.C. 655(b)(2)), that are "reasonably necessary or appropriate to provide safe * * * employment and places of employment." When promulgating permanent safety or health standards that differ from existing national consensus standards, the Secretary must explain "why the rule as adopted will better effectuate the purposes of this Act than the national consensus standard [29 U.S.C. 655(b)(8)]." Correspondingly, every employer must comply with OSHA standards and in addition, "furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees [29 U.S.C. 654(a)]."

"Congress understood that the Act would create substantial costs for employers, yet intended to impose such costs when necessary to create a safe and healthful working environment. Congress viewed the costs of health and safety as a cost of doing business. * * * Indeed, Congress thought that the *financial costs* of health and safety problems in the workplace were as large as or larger than the *financial costs* of eliminating these problems [*American Textile Mfrs. Inst. Inc. v. Donovan*, 452 U.S. 490, 519–522 (1981) (*ATMI*); emphasis was supplied in original]." "[T]he fundamental objective of the Act [is] to prevent occupational deaths and serious injuries [*Whirlpool Corp. v. Marshall*, 445 U.S. 1, 11 (1980)]." "We know the costs would be put into consumer goods but that is the price we should pay for the 80 million workers in America [S. Rep. No. 91–1282, 91st Cong., 2d Sess. (1970); H.R. Rep. No. 91–1291, 91st Cong., 2d Sess. (1970), *reprinted in* Senate Committee on Labor and Public Welfare, *Legislative History of the Occupational Safety and Health Act of 1970*, (Committee Print 1971) ("Leg. Hist.") at 444 (Senator Yarborough)]." "Of course, it will cost a little more per item to produce a washing machine. Those of us who use washing machines will pay for the increased cost, but it is worth it, to stop the terrible death and injury rate in this country [*Id.* at 324; see also 510–511, 517]."

[T]he vitality of the Nation's economy will be enhanced by the greater productivity realized through saved lives and useful years of labor.

When one man is injured or disabled by an industrial accident or disease, it is he and his family who suffer the most immediate and personal loss. However, that tragic loss also affects each of us. As a result of occupational accidents and disease, over $1.5 billion in wages is lost each year [1970 dollars], and the annual loss to the gross national product is estimated to be over $8 billion. Vast resources that could be available for productive use are siphoned off to pay workmen's compensation and medical expenses. * * *

Only through a comprehensive approach can we hope to effect a significant reduction in these job death and casualty figures. [*Id.* at 518–19 (Senator Cranston)]

Congress considered uniform enforcement crucial because it would reduce or eliminate the disadvantage that a conscientious employer might experience where inter-industry or intra-industry competition is present. Moreover, "many employers—particularly smaller ones—simply cannot make the necessary investment in health and safety, and survive competitively, unless all are compelled to do so [Leg. Hist. at 144, 854, 1188, 1201]."

Thus, the statutory text and legislative history make clear that Congress conclusively determined that OSHA regulation is necessary to protect workers from occupational hazards and that employers should be required to reduce or eliminate significant workplace health and safety threats.

C. As Construed by the Courts and by OSHA, the OSH Act Sets Clear and Reasonable Limits for Agency Rulemaking Action

OSHA has long followed the teaching that section 3(8) of the OSH Act requires that, before it promulgates "*any* permanent health or safety standard, [it must] make a threshold finding that a place of employment is unsafe—in the sense that significant risks are present and can be eliminated or lessened by a change in practices [*Industrial Union Dep't, AFL–CIO v. American Petroleum Inst.*, 448 U.S. 607, 642 (1980) (plurality) (*Benzene*); emphasis was supplied in original]." Thus, the national consensus and existing federal standards that Congress instructed OSHA to adopt summarily within two years of the OSH Act's inception provide reference points concerning the least an OSHA standard should achieve (29 U.S.C. 655(a)). As a result, OSHA is precluded from regulating insignificant safety risks or from issuing safety standards that do not at least lessen risk in a significant way.

The OSH Act also limits OSHA's discretion to issue overly burdensome rules, as the agency also has long recognized that "any standard that was not economically or technologically feasible would *a fortiori* not be reasonably necessary or appropriate' under the Act. See *Industrial Union Dep't v. Hodgson*, [499 F.2d 467, 478 (D.C. Cir. 1974)] (Congress does not appear to have intended to protect employees by putting their employers out of business.') [*American Textile Mfrs. Inst. Inc.*, 452 U.S. at 513 n. 31 (a standard is economically feasible even if it portends disaster for some marginal firms,' but it is economically infeasible if it threaten[s] massive dislocation to, or imperil[s] the existence of,' the industry)]."

By stating the test in terms of "threat" and "peril," the Supreme Court made clear in *ATMI* that economic infeasibility begins short of industry-wide bankruptcy. OSHA itself has placed the line considerably below this level. (See for example, *ATMI*, 452 U.S. at 527 n. 50; 43 FR 27360 (June 23, 1978). Proposed 200 μg/m³ PEL for cotton dust did not raise serious possibility of industry-wide bankruptcy, but impact on weaving sector would be severe, possibly requiring reconstruction of 90 percent of all weave rooms. OSHA concluded that the 200 μg/m³ level was not feasible for weaving and that 750 μg/m³ was all that could reasonably be required. See also 54 FR 29245–29246 (July 11, 1989); *American Iron & Steel Institute*, 939 F.2d at 1003. OSHA raised engineering control level for lead in small nonferrous foundries to avoid the possibility of bankruptcy for about half of small foundries even though the industry as a whole could have survived the loss of small firms.)

All OSHA standards must also be cost-effective in the sense that the protective measures being required must be the least expensive measures capable of achieving the desired end (*ATMI*, at 514 n. 32; *Building and Constr. Trades Dep't AFL–CIO v. Brock*, 838 F.2d 1258, 1269 (D.C. Cir. 1988)). OSHA gives additional consideration to financial impact in setting the period of time that should be allowed for compliance, allowing as much as 10 years for compliance phase-in. (See *United Steelworkers of Am. v. Marshall*, 647 F.2d 1189, 1278 (D.C. Cir. 1980), *cert. denied*, 453 U.S. 913 (1981).) Additionally, OSHA's enforcement policy takes account of financial hardship on an individualized basis. OSHA's Field Operations Manual provides that, based on an employer's economic situation, OSHA may extend the period within which a violation must be corrected after issuance of a citation (CPL 2.45B, Chapter III, paragraph E6d(3)(a), Dec. 31, 1990).

To reach the necessary findings and conclusions, OSHA conducts rulemaking in accordance with the requirements of section 6 of the OSH Act. The rulemaking process enables the Agency to determine the qualitative and, if possible, the quantitative nature of the risk with (and without) regulation, the technological feasibility of compliance, the availability of capital to the industry and the extent to which that capital is required for other purposes, the industry's profit history, the industry's ability to absorb costs or pass them on to the consumer, the impact of higher costs on demand, and the impact on competition with substitutes and imports. (See *ATMI* at 2501–2503; *American Iron & Steel Institute* generally.) Section 6(f) of the OSH Act further provides that, if the validity of a standard is challenged, OSHA must support its conclusions with "substantial evidence in the record considered as a whole," a standard that courts have determined requires fairly close scrutiny of agency action and the explanation of that action. (See *Steelworkers*, 647 F.2d at 1206–1207.)

OSHA's powers are further circumscribed by the independent Occupational Safety and Health Review Commission, which provides a neutral forum for employer contests of citations issued by OSHA for noncompliance with health and safety standards (29 U.S.C. 659–661; noted as an additional constraint in *Benzene* at 652 n. 59). OSHA must also respond rationally to similarities and differences among industries or industry sectors. (See *Building and Constr. Trades Dep't, AFL–CIO v. Brock*, 838 F.2d 1258, 1272–73 (D.C. Cir. 1988).)

OSHA rulemaking is thus constrained first by the need to demonstrate that the standard will substantially reduce a significant risk of material harm, and then by the requirement that compliance is technologically capable of being done and not so expensive as to threaten economic instability or dislocation for the industry. Within these bounds, further constraints such as the need to find cost-effective measures and to respond rationally to all meaningful comment militate against regulatory extremes.

D. The Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment Standard Complies With the Statutory Criteria Described Above and Is Not Subject to the Additional Constraints Applicable to Section 6(b)(5) Standards

Standards which regulate hazards that are frequently undetectable because they are subtle or develop slowly or after long latency periods, are frequently referred to as "health" standards. Standards that regulate hazards, like explosions or electrocution, that cause immediately noticeable physical harm, are called "safety" standards. (See *National Grain & Feed Ass'n v. OSHA (NGFA II)*, 866 F.2d 717, 731, 733 (5th Cir. 1989). As noted above, section 3(8) provides that *all* OSHA standards must be "reasonably necessary or appropriate." In addition, section 6(b)(5) requires that OSHA set health standards which limit significant risk "to the extent feasible." OSHA has determined that the Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment standard is a safety standard, because the standard addresses hazards, such as asphyxiation, explosions, and fires, that are immediately dangerous to life or health, not the longer term, less obvious hazards subject to section 6(b)(5).

The OSH Act and its legislative history clearly indicate that Congress intended for OSHA to distinguish between safety standards and health standards. For example in section 2(b)(6) of the OSH Act, Congress declared that the goal of assuring safe and healthful working conditions and preserving human resources would be achieved, in part:

> * * * by exploring ways to discover latent diseases, establishing causal connections between diseases and work in environmental conditions, and conducting other research relating to health problems, in recognition of the fact that occupational health standards present problems often different from those involved in occupational safety.

The legislative history makes this distinction even clearer:

> [The Secretary] should take into account that anyone working in toxic agents and physical agents which might be harmful may be subjected to such conditions for the rest of his working life, so that we can get at something which might not be toxic now, if he works in it a short time, but if he works in it the rest of his life might be very dangerous; and we want to make sure that such things are taken into consideration in establishing standards. [*Leg. Hist.* at 502–503 (Sen. Dominick), quoted in *Benzene* at 648–49]

Additionally, Representative Daniels distinguished between "insidious silent killers' such as toxic fumes, bases, acids, and chemicals" and "violent physical injury causing immediate visible physical harm" (*Leg. Hist.* at 1003), and Representative Udall contrasted insidious hazards like carcinogens with "the more visible and well-known question of industrial accidents and on-the-job injury" (*Leg. Hist.* at 1004). (See also, for example, S. Rep. No. 1282, 91st Cong., 2d Sess. 2–3 (1970), U.S. Code Cong. & Admin. News 1970, pp. 5177, 5179, reprinted in Leg. Hist. at 142–143, discussing 1967 Surgeon General study that found that 65 percent of employees in industrial plants "were potentially exposed to harmful physical agents, *such as severe noise or vibration*, or to toxic materials"; Leg. Hist. at 412; *id.* at 446; *id.* at 516; *id.* at 845; *International Union, UAW* at 1315.)

In reviewing OSHA rulemaking activity, the Supreme Court has held that section 6(b)(5) requires OSHA to set "the most protective standard consistent with feasibility" (*Benzene* at 643 n. 48). As Justice Stevens observed:

> The reason that Congress drafted a special section for these substances * * * was because Congress recognized that there were special problems in regulating health risks as opposed to safety risks. In the latter case, the risks are generally immediate and obvious, while in the former, the risks may not be evident until a worker has been exposed for long periods of time to particular substances. [*Benzene*, at 649 n. 54.]

Challenges to the grain dust and lockout/tagout standards included assertions that grain dust in explosive quantities and uncontrolled energy releases that could expose employees to crushing, cutting, burning or explosion hazards were harmful physical agents so that OSHA was required to apply the criteria of section 6(b)(5) when determining how to protect employees from those hazards. Reviewing courts have uniformly rejected such assertions. For example, the Court in *International Union, UAW v. OSHA*, 938 F.2d 1310 (D.C. Cir. 1991) rejected the view that section 6(b)(5) provided the statutory criteria for regulation of uncontrolled energy, holding that such a "reading would obliterate a distinction that Congress drew between health and safety risks." The Court also noted that the language of the OSH Act and the legislative history supported the OSHA position (*International Union, UAW* at 1314). Additionally, the Court stated: "We accord considerable weight to an agency's construction of a statutory scheme it is entrusted to administer, rejecting it only if unreasonable" (*International Union, UAW* at 1313, citing *Chevron U.S.A., Inc. v. NRDC*, 467 U.S. 837, 843 (1984)).

The Court reviewing the grain dust standard also deferred to OSHA's reasonable view that the Agency was not subject to the feasibility mandate of section 6(b)(5) in regulating explosive quantities of grain dust (*National Grain & Feed Association v. OSHA (NGFA II)*, 866 F.2d 717, 733 (5th Cir. 1989)). It therefore applied the criteria of section 3(8), requiring the Agency to establish that the standard is "reasonably necessary or appropriate" to protect employees.

As explained in Section I, *Background*, and Section II, *Summary and Explanation of the Final Rule*, earlier in this preamble, and Section IV, *Summary of Final Regulatory Analysis*, below, OSHA has determined that confined and enclosed spaces and other dangerous atmospheres in shipyard employment pose significant risks to employees and that the provisions of the final rule are reasonably necessary to protect affected employees from those risks. OSHA believes that compliance is economically feasible, because, as documented in the Regulatory Impact Analysis, all regulated sectors can readily absorb or pass on compliance costs.

As presented in Section IV, *Summary of Final Regulatory Analysis*, later in this preamble, and in Table 1, the standard's costs, benefits, and compliance requirements are consistent with those of other OSHA safety standards, such as the Hazardous Waste Operations and Emergency Response (HAZWOPER) standard.

OSHA assessed employee risk by evaluating exposure to the hazards associated with confined and enclosed spaces and other dangerous atmospheres in shipyard employment. Section IV, *Summary of Final Regulatory Analysis*, later in this preamble, presents OSHA's estimate of the costs and benefits of the Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment standard. OSHA has set the scope of the Confined and Enclosed Spaces and Other Dangerous Atmospheres standard to address situations in which employees are exposed to these hazards, regardless of the location, shipboard vs. land-side. The Agency believes, based on analysis of the elements of the hazards identified, that there is sufficient information for OSHA to determine that employees in the covered sectors face significant risks related to confined and enclosed spaces and other dangerous atmospheres in shipyard employment. Therefore, the Agency has determined that all employees within the scope of the Confined and Enclosed Spaces and

Other Dangerous Atmospheres in Shipyard Employment standard face a significant risk of material harm and that compliance with these standards is reasonably necessary to protect affected employees from that risk.

OSHA has considered and responded to all substantive comments regarding the proposed Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment on their merits in Section II, *Summary and Explanation of the Final Rule*, earlier in this preamble. In particular, OSHA evaluated all suggested changes to the proposed rule in terms of their impact on worker safety, their feasibility, their cost effectiveness, and their consonance with the OSH Act.

IV. Final Regulatory Impact Analysis, Regulatory Flexibility Certification, and Environmental Impact Assessment

A. Summary

The Agency has concluded that the final Subpart B standard for confined spaces in shipyards is technologically and economically feasible. Subpart B incorporates the approach of the previous standard and subpart A (as it applies to subpart B) while mandating new, comprehensive program elements such as training, duty to other employers, and rescue.

The Agency estimates that the final rule will result in no new significant costs for the industry. In addition, the Agency finds that the final Subpart B is the most cost-effective approach. The Agency agrees with its Shipyard Employment Standards Advisory Committee (SESAC) that the current approach of making confined and enclosed spaces and other dangerous atmospheres safe before entry and using Marine Chemists and competent persons to test and certify spaces has succeeded well and will continue to provide a safe working environment for employees.

TABLE I.—SUMMARY OF BENEFITS AND COSTS OF RECENT OSHA SAFETY STANDARDS

Standard (CFR cite)	Final rule date (FR cite)	Number of deaths prevented annually	Number of injuries prevented annually	Annual costs first 5 yrs (mill)	Annual cost next 5 yrs (mill)
Grain handling (§ 1910.272)	12–31–87 (52 FR 49622)	18	394	5.9–33.4	5.9–33.4
HAZWOPER (§ 1910.120)	3–6–89 (54 FR 9311)	32	18,700	153	153
Excavations (Subpart P)	10–31–89 (54 FR 45,954)	74	800	306	306
Process safety Mgmt (§ 1910.119)	2–24–92 (57 FR 6356)	330	1,917	880.7	470.8
Permit-required confined spaces (§ 1910.146).	1–14–93 (58 FR 4462)	54	5,041	202.4	202.4

In addition, extending the scope of Subpart B to land-side activities will benefit the industry and its workers by ensuring that land-side work activities are covered by a protective standard. Most of the industry has been following Subpart B for confined space work on land-side for some time. Because workers and the tasks and hazards are essentially the same whether on vessels or land-side, employing separate standards for each would have the potential to create confusion and actually increase the risk of an incident occurring. The full regulatory impact analysis is in docket S–050.

B. Introduction

Executive Order 12866 requires the Agency to perform an analysis of the costs, benefits, and regulatory alternatives of its "significant regulatory actions." A significant regulatory action is one that is likely to result in a rule that may: (1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order. This final rule directly affects one well-defined industry, the shipbuilding and ship repair industry, but there are no new costs of compliance. Accordingly, the promulgation of the confined and enclosed spaces and other dangerous atmospheres standard for shipyard employment is not a "significant regulatory action" for the purposes' of E.O. 12866.

As required by the OSH Act and its judicial interpretations, the Agency must demonstrate that this regulation is both technologically and economically feasible for the shipyard industry. The Agency has concluded that this standard meets both tests of feasibility.

In addition, the Regulatory Flexibility Act of 1980 (5 U.S.C. 601 *et seq.*) requires Federal agencies to determine whether a regulation will have a significant economic impact on a substantial number of small entities. The Assistant Secretary certifies that this rule will not have such an impact, as the rule imposes no new cost on firms.

The Agency must also review this standard in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 *et seq.*), the Guidelines of the Council of Environmental Quality (CEQ)(40 CFR part 1500), and OSHA's DOL NEPA Procedures (29 CFR part 11).

This summary of the Agency's analysis includes an overview of affected industries and employees, estimated benefits, the technological feasibility of the standard, estimated compliance costs, regulatory flexibility analysis, economic and environmental impacts, a discussion of the regulatory and non-regulatory alternatives to this final standard, and the existence of significant risk. The full text of the regulatory analysis has been placed in the shipyard confined space's Docket S–050.

OSHA created the Shipyard Employment Standards Advisory Committee (SESAC) in 1988 to advise the Agency in consolidating the shipyard standards. The committee was made up of representatives from industry, labor, government, and professional organizations. Besides making recommendations to the Agency about its regulations, the committee also provided information about current industry practices and the costs and benefits of various rules and alternatives. This information has been reviewed carefully by the Agency in developing the Regulatory Analysis of the final rule.

C. Industry Profile

The American shipyard industry has been in a long-term decline since 1981 when the Federal government ended subsidy programs for commercial ship construction. In the period 1976–1980, the industry built an average of 64 merchant vessels per year. Only five commercial ships have been built since 1988. The decline in merchant vessel construction in the 1980s was partially offset by a large increase in military ship construction. However, the end of the military competition with the former U.S.S.R. has resulted in a sharp drop in military ships on order. The recently completed "bottom-up" review of the armed forces has called for a major reduction in the number of active combat ships, and consequently a drop in the number of future orders. U.S. Navy orders, which averaged 19 per year in the 1980s, is estimated to fall to 8 per year during the period 1994–1999. Ship repair and construction of inland vessels and barges has remained constant during the past 5 years.

Employment in the shipbuilding industry had fallen from 177,000 in 1984 to about 125,000 by 1987 and remained near that level until 1992. The Bureau of Labor Statistics estimates that employment in the industry had fallen to 106,000 by late 1993. It is likely that employment will continue to fall to below 100,000 in the next few years. In 1992 the value of output from American shipyards was approximately $9.9 billion. Based on Dun & Bradstreet's estimated mean return for the shipyard industry of 2.9 percent, the industry earned approximately $287 million.

The Agency estimates that there are approximately 500 firms in SIC 3731, and a majority of these have fewer than 50 employees. Employment in the shipyard industry is highly concentrated. The ten largest shipyards employ approximately 70 percent of all shipyard workers, and only the 100 largest firms have as many as 100 employees. The Agency estimates that approximately 200 firms engaged in ship repair employ fewer than 11 employees.

D. Population at Risk

Based on data in the 1987 Census of Manufacturers, 75 percent of shipyard employees are production employees. Data from CONSAD Research Corporation's 1986 report to OSHA estimated that 76.6 percent of shipyard workers were production workers. Relying on the 1987 Census of Manufacturers, the Agency concludes that there are approximately 79,500 production workers (75 percent of 106,000 total employees) who are potentially involved in confined space entry in shipyard employment and are therefore exposed to confined space hazards.

E. Technological Feasibility

The shipyard industry has been applying the previous Subpart B on vessels for approximately 30 years—and to some extent on land-side activities. While the revised final standard mandates new elements such as training, rescue, and duty to other employers, it makes no fundamental change in the way shipyards perform confined spaces' work. Technologies such as atmospheric testing instruments, ventilation equipment, and respirators have been in use for many years throughout the industry. As the new standard does not require any new technology or engineering or other controls, the Agency concludes that this new confined space standard is technologically feasible. The performance-oriented criteria of the standard should also allow technological innovation to achieve compliance.

F. Costs and Benefits

Several elements in the final rule could impose costs on the shipyard industry: requirements for training of production workers; duty to other employers (contractors and subcontractors); extending the scope to land-side operations; and specifications for self-rescue and rescue teams. The Shipyard Employment Safety Advisory Committee (SESAC) recommended that all of these provisions be included in the final confined spaces standard to make the rule comprehensive. Submissions to the docket by the shipyard industry, unions, and professionals in the maritime industry indicate that these elements would not impose new costs on shipyards but would in essence codify current industry practice. Testimony at SESAC's meetings also consistently indicated that the elements of the new standard would impose no new costs on the industry (SESAC transcript Sept. 3, 1992, pp. 471–503). The Agency therefore concludes that the new Subpart B is economically feasible, and will have no effect on profits or the cost of output of the shipyard industry.

A benefit of the final rule is to eliminate a paperwork requirement of reporting the identity of shipyard competent persons to the Agency on two forms and to clarify the duties of the competent person, Certified Industrial Hygienist, and Marine Chemist. The Agency believes that full compliance with existing Subpart B would eliminate the average of one to two annual fatalities. However, the Agency also concludes that mandating the new comprehensive elements of the final standard (for training, duty to other employers, and rescue) will contribute to compliance and discipline in applying Subpart B and will reduce the number of fatalities. The Agency also concludes that increasing the oxygen content to 19.5 percent by volume, specifying the order of atmospheric testing, and limiting oxygen to no more than 22 percent by volume reduces significant risk relative to the requirements of existing Subpart B. The shipyard industry largely conforms to these practices at the present time.

G. Regulatory Alternatives

The Agency also believes that the proposed rule is the most cost-effective regulatory alternative for this industry. If the general industry "permit-entry confined spaces" standard (29 CFR 1910.146) were applied to land-side activities—or all shipyard work—costs would be incurred to re-train shipyard production workers in a second procedure for entering and working in confined spaces, for attendants, and for establishing a written program. The Agency estimates that this would cost the industry approximately $104 million annually. These costs are not as high as estimates found in the comments to the docket because the final general industry permit spaces rule differed significantly from the proposed rule, especially on the number of attendants that would be required. Adopting the general industry confined spaces for only land-side shipyard operations could also result in increased risk of accidents if shipyard workers had to apply two distinct standards to their work. Confined space work is routine in shipyards and employees frequently shift back and forth between land-side and vessels.

A second regulatory alternative would be to apply the general industry standard to all shipyard work. Here the program costs would be as great as the first alternative but the Agency has concluded that there would not be additional benefits. The shipyard confined space standard is in many ways a more restrictive subset of the general industry standard. The additional program-based elements of § 1910.146 would not improve the safety of confined space entry in shipyards because the shipyard standard is even more comprehensive in its coverage of hazardous atmospheres. Further, its approach to inspection, testing, and ventilating spaces has become an

integral part of the routine work activity in shipyard employment.

Confined and enclosed space and other dangerous atmosphere work in shipyards is unique: it is routine; hazardous atmospheres are common; and the work activity itself frequently introduces or creates hazards. The confined spaces of each ship are different. A ship's interior structure may consist of a series of nested confined spaces, one within the other, each of which may be irregular and accessible through small hatches. Safety procedures based on attendants or quick rescue are not a safe or a practical solution.

Evidence in the record from the industry attests to the success of the shipyard industry in protecting employees during work in confined spaces (Docket S–050: 11–3, 11–6, 11–12, 11–13, 11–17, 11–30). However, fatalities and injuries do occur: OSHA recorded 20 deaths between 1983–1992 in its Fatality Investigation Reports for the shipyard and boat-building industries combined. In every case, OSHA's evaluation indicated that the fatality was caused by a failure to follow the requirements of the previous Subpart B. Although accidents are relatively few given the large number of confined space entries and the hazards involved, the continuing number of fatalities and injuries indicates that a regulation is necessary to maintain safe work practices.

H. International Trade

In accordance with Executive Order 12866, OSHA assessed the effects of the final standard on international trade. The shipyard industry actively competes with foreign shipyards for ship repair and shipbuilding orders. If this OSHA regulation significantly increased the price of products and services of domestic shipyards, foreign shipyards could benefit. OSHA believes, however, that there will be no significant effect on products or services as a result of this regulation.

I. Environmental Impact

The confined spaces standard has been reviewed in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 *et seq.*), the regulations of the Council on Environmental Quality (40 CFR Part 1500), and DOL NEPA Procedures (29 CFR Part 11). This rule will not result in a significant incremental increase release of hazardous substances into the ambient air. Releases of substances regulated under EPA's SARA Title III or EPA NESHAP standards are subject to reporting and control requirements in those rules.

J. References

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5. CONSAD Research Corp. Data to Support a Regulatory Analysis of the Proposed Standard for Shipbuilding and Repairing. Final Report. Prepared for the U.S. Department of Labor, Occupational Safety and Health Administration, under Contract No. J–9–F–4–0024. Pittsburgh: CONSAD, November 1985.

6. CONSAD Research Corp. Data to Support a Regulatory Analysis of the Proposed Standard for Shipbuilding and Repairing: Subpart B. Prepared for the U.S. Department of Labor, Occupational Safety and Health Administration, under Contract No. J–9–F–4–0024. Pittsburgh: CONSAD, June 1986.

7. Commission on Merchant Marine and Defense. First Report of the Commission of Merchant Marine and Defense, Appendices. Washington, D.C., September 30, 1987.

8. Dun and Bradstreet Financial Data. 1989, 1991.

9. Bureau of Labor Statistics, Employment and Earnings, Nov., 1993.

10. Executive Office of the President. OMB. *Standard Industrial Classification Manual.* 1987.

11. Main Hurdman/KGM. Profile of the Shipbuilding and Repairing Industry. Prepared for the U.S. Department of Labor, Occupational Safety and Health Administration. Washington, D.C., October 1984. 62 Pp.

12. Shipyard Council of America. "Merchant Shipbuilding" September, 1987; "Naval Shipbuilding" January, 1992; "Ship Construction Report" July, 1991.

13. American Waterways Shipyard Conference. 1989 and 1992 Annual Shipyard Survey. Arlington, Va.

14. Bureau of Labor Statistics, Occupational Injuries and Illnesses in the U.S. by Industry 1992.

15. *Selected Occupational Fatalities Related to Ship Building and Repairing as Found in Reports of OSHA Fatality/Catastrophe Investigations*, U.S. Dept. of Labor, OSHA, 1990.

V. Effective Date

In developing the final rule, OSHA has considered whether a delayed effective date is necessary for any of the provisions of the standard. Employers will need time to integrate their procedures for complying with the provisions in this standard as applied to land-side confined and enclosed spaces and other dangerous atmospheres. Although the record indicates that the new provisions (training, rescue, and duties to other employers) being used on board vessels and vessel sections are current industry practice, under this standard they also have been expanded to include land-side operations. OSHA believes that a period of 90 days will be adequate for this purpose, since most of the requirements in the final rule do not require extensive training or major modifications of existing work practices. This amount of time will be adequate for employers to ensure that their work practices conform to the requirements of the revised standard.

VI. Information Collection Requirements

5 CFR part 1320 sets forth procedures for agencies to follow in obtaining OMB clearance for information collection requirements under the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 et seq. The final Confined and Enclosed Spaces and Other Dangerous Atmospheres standard requires the employer to allow OSHA access to the competent person roster, testing and inspection results, and training records. In accordance with the provisions of the Paperwork Reduction Act and the regulations issued pursuant thereto, OSHA certifies that it has submitted the information collection to OMB for review under section 3504(b) of that Act.

Public reporting burden for this collection of information is estimated to average five minutes per response to allow OSHA compliance officers access to the employer's records. Send comments regarding this burden estimate, or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Information Management, Department of Labor, room N–1301, 200 Constitution Avenue, NW., Washington, DC 20210; and to the Office of Management and Budget, Paperwork Reduction Project (Confined and Enclosed Spaces and Other Dangerous Atmospheres). Washington, DC 20503.

VII. Federalism

This final rule has been reviewed in accordance with Executive Order 12612 (52 FR 41685, October 30, 1987), regarding Federalism. This Order requires that agencies, to the extent possible, refrain from limiting state

policy options, consult with states before taking any actions which would restrict state policy options, and take such actions only if there is clear constitutional authority and the presence of a problem of national scope. The Order provides for preemption of state law only if there is a clear Congressional intent for the Agency to do so. Any such preemption is to be limited to the extent possible.

Section 18 of the Occupational Safety and Health Act (OSH Act) expresses Congress' clear intent to preempt state laws relating to issues on which Federal OSHA has promulgated occupational safety and health standards. Under the OSH Act, a state can avoid preemption only if it submits, and obtains Federal approval of, a plan for the development of such standards and their enforcement. Occupational safety and health standards developed by such Plan-States must, among other things, be at least as effective in providing safe and healthful employment and places of employment as the Federal standards. Where such standards are applicable to products distributed or used in interstate commerce, they may not unduly burden commerce and must be justified by compelling local conditions. (See section 18(c)(2) of the OSH Act.)

The Federal standards on confined and enclosed spaces and other dangerous atmospheres address hazards which are not unique to any one state or region of the country. Nonetheless, states with occupational safety and health plans approved under section 18 of the OSH Act will be able to develop their own state standards to deal with any special problems which might be encountered in a particular state. Moreover, because these standards are written in general, performance-oriented terms, there is considerable flexibility for state plans to require, and for affected employers to use, methods of compliance which are appropriate to the working conditions covered by the standard.

In brief, this final rule addresses a clear national problem related to occupational safety and health in shipyard employment. States which have elected to participate under section 18 of the OSH Act are not preempted by this standard and will be able to address any special conditions within the framework of the Federal Act, while ensuring that the state standards are at least as effective as this standard.

VIII. State Plan Standards

The 23 states and 2 territories with their own OSHA-approved occupational safety and health plans must adopt a comparable standard within 6 months of the publication date of the final standard. These states and territories are: Alaska, Arizona, California, Connecticut,[4] Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nevada, New Mexico, New York,[5] North Carolina, Oregon, Puerto Rico, South Carolina, Tennessee, Utah, Vermont, Virginia, Virgin Islands, Washington, and Wyoming. Until such time as a state standard is promulgated, Federal OSHA will provide interim enforcement assistance, as appropriate, in these states.

IX. Authority

This document was prepared under the direction of Joseph A. Dear, Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, DC 20210.

List of Subjects in 29 CFR Part 1915

Confined spaces, Emergency medical services, Hazardous substances, Marine safety, Occupational Safety and Health, Signs and Symbols, Vessels, Welding.

Accordingly, pursuant to section 41 of LHWCA (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. 1–90 (55 FR 9033), and 29 CFR part 1911, 29 CFR part 1915 is amended as set forth below.

Signed at Washington, DC, this 8th day of July 8, 1994.

Joseph A. Dear,

Assistant Secretary of Labor.

Part 1915 of Title 29 of the Code of Federal Regulations is amended as follows:

PART 1915—[AMENDED]

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

Authority: Sec. 41, Longshore and Harbor Workers' Compensation Act (33 U.S.C. 941); secs. 4, 6, 8, Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Sec. 4 of the Administrative Procedure Act (5 U.S.C. 553); Secretary of Labor's Order No. 12–71 (36 FR 8754), 8–76 (41 FR 25059), 9–83 (48 FR 35736), or 1–90 (55 FR 9033) as applicable; 29 CFR Part 1911.

Subpart A—General Provisions

2. Section 1915.7 is revised to read as follows:

§ 1915.7 Competent person.

(a) *Application.* This section applies to shipyard employment.

(b) *Designation.* (1) One or more competent persons shall be designated by the employer in accordance with the applicable requirements of this section, unless the requirements of Subparts B, C, D and H of this part are always carried out by a Marine Chemist.

Exception: The employer may designate any person who meets the applicable portions of the criteria set forth in paragraph (c) of this section as a competent person who is limited to performing testing to the following situations:

(i) Repair work on small craft in boat yards where only combustible gas indicator tests are required for fuel tank leaks or when using flammable paints below decks;

(ii) Building of wooden vessels where only knowledge of the precautions to be taken when using flammable paints is required;

(iii) The breaking of vessels where there is no fuel oil or other flammable hazard; and

(iv) Tests and inspections performed to comply with §§ 1915.35(b)(8) and 1915.36(a)(5).

(2)(i) The employer shall maintain either a roster of designated competent persons or a statement that a Marine Chemist will perform the tests or inspections which require a competent person.

(ii) The employer shall make the roster of designated persons or the statement available to employees, the employee's representative, the Director or the Assistant Secretary upon request.

(iii) The roster shall contain, as a minimum, the following:

(A) The employers' name,

(B) The designated competent person's name(s), and

(C) The date the employee was trained as a competent person.

(c) *Criteria.* The employer shall ensure that each designated competent person has the following skills and knowledge:

(1) Ability to understand and carry out written or oral information or instructions left by Marine Chemist, Coast Guard authorized persons and Certified Industrial Hygienists;

(2) Knowledge of Subparts B, C, D and H of this part;

(3) Knowledge of the structure, location, and designation of spaces where work is done;

(4) Ability to calibrate and use testing equipment including but not limited to, oxygen indicators, combustible gas indicators, carbon monoxide indicators, and carbon dioxide indicators, and to interpret accurately the test results of that equipment;

(5) Ability to perform all required tests and inspections which are or may

[4] Plan covers only State and local government employees.

[5] Plan covers only State and local government employees.

be performed by a competent person as set forth in Subparts B, C, D and H of this part.

(6) Ability to inspect, test, and evaluate spaces to determine the need for further testing by a Marine Chemist or a Certified Industrial Hygienist; and

(7) Ability to maintain records required by this section.

(d) *Recordkeeping.* (1) When tests and inspections are performed by a competent person, Marine Chemist, or Certified Industrial Hygienist as required by any provisions of subparts B, C, D, or H of this part, the employer shall ensure that the person performing the test and inspection records the location, time, date, location of inspected spaces, and the operations performed, as well as the test results and any instructions.

(2) The employer shall ensure that the records are posted in the immediate vicinity of the affected operations while work in the spaces is in progress. The records shall be kept on file for a period of at least three months from the completion date of the specific job for which they were generated.

(3) The employer shall ensure that the records are available for inspection by the Assistant Secretary, Director, and employees and their representatives.

3. Subpart B of part 1915 is revised to read as follows:

Subpart B—Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment

Sec.

1915.11 Scope, application, and definitions applicable to this subpart.
1915.12 Precautions before entering confined and enclosed spaces and other dangerous atmospheres.
1915.13 Cleaning and other cold work.
1915.14 Hot work.
1915.15 Maintenance of safe conditions.
1915.16 Warning signs and labels.

Appendix A to Subpart B—Compliance Assistance Guidelines for Confined and Enclosed Spaces and Other Dangerous Atmospheres

Appendix B to Subpart B—Reprint of U.S. Coast Guard Regulations Referenced in Subpart B, for Determination of Coast Guard Authorized Persons

§ 1915.11 Scope, application and definitions applicable to this Subpart.

(a) *Scope and application.* This Subpart applies to work in confined and enclosed spaces and other dangerous atmospheres in shipyard employment, including vessels, vessel sections, and on land-side operations regardless of geographic location.

(b) *Definitions applicable to this Subpart.*

Adjacent spaces means those spaces bordering a subject space in all directions, including all points of contact, corners, diagonals, decks, tank tops, and bulkheads.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, or designated representative.

Certified Industrial Hygienist (CIH) means an industrial hygienist who is certified by the American Board of Industrial Hygiene.

Coast Guard authorized person means an individual who meets the requirement of Appendix B to subpart B of this part 1915 for tank vessels, for passenger vessels, and for cargo and miscellaneous vessels.

Dangerous atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (i.e., escape unaided from a confined or enclosed space), injury, or acute illness.

Director means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designated representative.

Enter with Restrictions denotes a space where entry for work is permitted only if engineering controls, personal protective equipment, clothing, and time limitations are as specified by the Marine Chemist, Certified Industrial Hygienist, or the shipyard competent person.

Entry means the action by which a person passes through an opening into a space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

Hot work means any activity involving riveting, welding, burning, the use of powder-actuated tools or similar fire-producing operations. Grinding, drilling, abrasive blasting, or similar spark-producing operations are also considered hot work except when such operations are isolated physically from any atmosphere containing more than 10 percent of the lower explosive limit of a flammable or combustible substance.

Immediately dangerous to life or health (IDLH) means an atmosphere that poses an immediate threat to life or that is likely to result in acute or immediate severe health effects.

Inert or inerted atmosphere means an atmospheric condition where:

(1) The oxygen content of the atmosphere in the space is maintained at a level equal to or less than 8.0 percent by volume or at a level at or below 50 percent of the amount required to support combustion, whichever is less; or

(2) The space is flooded with water and the vapor concentration of flammable or combustible materials in the free space atmosphere above the water line is less than 10 percent of the lower explosive limit for the flammable or combustible material.

Labeled means identified with a sign, placard, or other form of written communication, including pictograms, that provides information on the status or condition of the work space to which it is attached.

Lower explosive limit (LEL) means the minimum concentration of vapor in air below which propagation of a flame does not occur in the presence of an ignition source.

Marine Chemist means an individual who possesses a current Marine Chemist Certificate issued by the National Fire Protection Association.

Not Safe for Hot Work denotes a space where hot work may not be performed because the conditions do not meet the criteria for Safe for Hot Work.

Nationally Recognized Testing Laboratory (NRTL) means an organization recognized by OSHA, in accordance with Appendix A of 29 CFR 1910.7, which tests for safety and lists or labels or accepts equipment and materials that meet all the criteria found in § 1910.7(b)(1) through (b)(4)(ii).

Not Safe for Workers denotes a space where an employee may not enter because the conditions do not meet the criteria for Safe for Workers.

Oxygen-deficient atmosphere means an atmosphere having an oxygen concentration of less than 19.5 percent by volume.

Oxygen-enriched atmosphere means an atmosphere that contains 22.0 percent or more oxygen by volume.

Safe for Hot Work denotes a space that meets all of the following criteria:

(1) The oxygen content of the atmosphere does not exceed 22.0 percent by volume;

(2) The concentration of flammable vapors in the atmosphere is less than 10 percent of the lower explosive limit;

(3) The residues or materials in the space are not capable of producing a higher concentration than permitted in paragraph (1) or (2) of the above, under existing atmospheric conditions in the presence of hot work and while maintained as directed by the Marine Chemist or competent person, and

(4) All adjacent spaces have been cleaned, or inerted, or treated sufficiently to prevent the spread of fire.

Safe for Workers denotes a space that meets the following criteria:

(1) The oxygen content of the atmosphere is at least 19.5 percent and below 22 percent by volume;

(2) The concentration of flammable vapors is below 10 percent of the lower explosive limit (LEL);

(3) Any toxic materials in the atmosphere associated with cargo, fuel, tank coatings, or inerting media are within permissible concentrations at the time of the inspection; and

(4) Any residues or materials associated with the work authorized by the Marine Chemist, Certified Industrial Hygienist, or competent person will not produce uncontrolled release of toxic materials under existing atmospheric conditions while maintained as directed.

Space means an area on a vessel or vessel section or within a shipyard such as, but not limited to: cargo tanks or holds; pump or engine rooms; storage lockers; tanks containing flammable or combustible liquids, gases, or solids; rooms within buildings; crawl spaces; tunnels; or accessways. The atmosphere within a space is the entire area within its bounds.

Upper explosive limit (UEL) means the maximum concentration of flammable vapor in air above which propagation of flame does not occur on contact with a source of ignition.

Vessel section means a sub-assembly, module, or other component of a vessel being built, repaired, or broken.

Visual inspection means the physical survey of the space, its surroundings and contents to identify hazards such as, but not limited to, restricted accessibility, residues, unguarded machinery, and piping or electrical systems.

§ 1915.12 Precautions before entering confined and enclosed spaces and other dangerous atmospheres.

(a) *Oxygen content.* (1) The employer shall ensure that the following spaces are visually inspected and tested by a competent person to determine the atmosphere's oxygen content prior to initial entry into the space by an employee:

(i) Spaces that have been sealed, such as, but not limited to, spaces that have been coated and closed up, and non-ventilated spaces that have been freshly painted;

(ii) Spaces and adjacent spaces that contain or have contained combustible or flammable liquids or gases;

(iii) Spaces and adjacent spaces that contain or have contained liquids, gases, or solids that are toxic, corrosive, or irritant;

(iv) Spaces and adjacent spaces that have been fumigated; and

(v) Spaces containing materials or residues of materials that create an oxygen-deficient atmosphere.

(2) If the space to be entered contains an oxygen deficient atmosphere, the space shall be labeled "Not Safe for Workers" or, if oxygen-enriched, "Not Safe for Workers—Not Safe for Hot Work." If an oxygen-deficient or oxygen-enriched atmosphere is found, ventilation shall be provided at volumes and flow rates sufficient to ensure that the oxygen content is maintained at or above 19.5 percent and below 22.0 percent by volume. The warning label may be removed when the oxygen content is equal to or greater than 19.5 and less than 22.0 percent by volume.

(3) An employee may not enter a space where the oxygen content, by volume, is below 19.5 percent or above 22.0 percent. Exception: An employee may enter for emergency rescue or for a short duration for installation of ventilation equipment necessary to start work in the space provided:

(i) The atmosphere in the space is monitored for oxygen content, by volume, continuously; and

(ii) Respiratory protection and other appropriate personal protective equipment and clothing are provided in accordance with Subpart I of this part.

Note to paragraph (a): Other provisions for work in IDLH atmospheres are located in Subpart I of this part.

(b) *Flammable atmospheres.* (1) The employer shall ensure that spaces and adjacent spaces that contain or have contained combustible or flammable liquids or gases are:

(i) Inspected visually by the competent person to determine the presence of combustible or flammable liquids; and

(ii) Tested by a competent person prior to entry by an employee to determine the concentration of flammable vapors and gases within the space.

(2) If the concentration of flammable vapors or gases in the space to be entered is equal to or greater than 10 percent of the lower explosive limit, the space shall be labeled "Not Safe for Workers" and "Not Safe for Hot-Work." Ventilation shall be provided at volumes and flow rates sufficient to ensure that the concentration of flammable vapors is maintained below 10 percent of the lower explosive limit. The warning labels may be removed when the concentration of flammable vapors is below 10 percent of the lower explosive limit.

(3) An employee may not enter a space where the concentration of flammable vapors or gases is equal to or greater than 10 percent of the lower explosive limit. Exception: An employee may enter for emergency rescue or for a short duration for installation of ventilation equipment necessary to start work in the space, provided:

(i) No ignition sources are present;

(ii) The atmosphere in the space is monitored continuously;

(iii) The atmosphere in the space is maintained above the upper explosive limit; and

(iv) Respiratory protection and other appropriate personal protective equipment and clothing are provided in accordance with Subpart I of this part.

Note 1 to paragraph (b): Additional provisions for work in IDLH atmospheres are located in Subpart I of this part.

Note 2 to paragraph (b): Additional provisions for work in spaces containing a flammable substance which also has a permissible exposure limit, are located in Subpart Z of 29 CFR part 1915, and § 1915.12(c).

(c) *Toxic, corrosive, irritant or fumigated atmospheres and residues.* (1) The employer shall ensure that spaces or adjacent spaces that contain or have contained liquids, gases, or solids that are toxic, corrosive or irritant are:

(i) Inspected visually by the competent person to determine the presence of toxic, corrosive, or irritant residue contaminants; and

(ii) Tested by a competent person prior to initial entry by an employee to determine the air concentration of toxics, corrosives, or irritants within the space.

(2) If a space contains an air concentration of a material which exceeds a part 1915 subpart Z permissible exposure limit (PEL) or is IDLH, the space shall be labeled "Not Safe for Workers." Ventilation shall be provided at volumes and flow rates which will ensure that air concentrations are maintained within the PEL or, in the case of contaminants for which there is no established PEL, below the IDLH. The warning label may be removed when the concentration of contaminants is maintained within the PEL or below IDLH level.

(3) If a space cannot be ventilated to within the PELs or is IDLH, a Marine Chemist or CIH must re-test until the space can be certified "Enter with Restrictions" or "Safe for Workers."

(4) An employee may not enter a space whose atmosphere exceeds a PEL or is IDLH. Exception: An employee may enter for emergency rescue, or for a short duration for installation of ventilation equipment provided:

(i) The atmosphere in the space is monitored continuously;

(ii) Respiratory protection and other necessary and appropriate personal protective equipment and clothing are

provided in accordance with Subpart I of this part.

Note to paragraph (c): Other provisions for work in IDLH atmospheres are located in Subpart I of this part.

(d) *Training of employees entering confined and enclosed spaces or other dangerous atmospheres.* (1) The employer shall ensure that each employee that enters a confined or enclosed space and other areas with dangerous atmospheres is trained to perform all required duties safely.

(2) The employer shall ensure that each employee who enters a confined space, enclosed space, or other areas with dangerous atmospheres is trained to:

(i) Recognize the characteristics of the confined space;

(ii) Anticipate and be aware of the hazards that may be faced during entry;

(iii) Recognize the adverse health effects that may be caused by the exposure to a hazard;

(iv) Understand the physical signs and reactions related to exposures to such hazards;

(v) Know what personal protective equipment is needed for safe entry into and exit from the space;

(vi) Use personal protective equipment; and

(vii) Where necessary, be aware of the presence and proper use of barriers that may be needed to protect an entrant from hazards.

(3) The employer shall ensure that each entrant into confined or enclosed spaces or other dangerous atmospheres is trained to exit the space or dangerous atmosphere whenever:

(i) The employer or his or her representative orders evacuation;

(ii) An evacuation signal such as a alarm is activated ; or

(iii) The entrant perceives that he or she is in danger.

(4) The employer shall provide each employee with training:

(i) Before the entrant begins work addressed by this section; and

(ii) Whenever there is a change in operations or in an employee's duties that presents a hazard about which the employee has not previously been trained.

(5) The employer shall certify that the training required by paragraphs (d)(1) through (d)(4) of this section has been accomplished.

(i) The certification shall contain the employee's name, the name of the certifier, and the date(s) of the certification.

(ii) The certification shall be available for inspection by the Assistant Secretary, the Director, employees, and their representatives.

(e) *Rescue teams.* The employer shall either establish a shipyard rescue team or arrange for an outside rescue team which will respond promptly to a request for rescue service.

(1) Shipyard rescue teams shall meet the following criteria:

(i) Each employee assigned to the shipyard team shall be provided with and trained to use the personal protective equipment he or she will need, including respirators and any rescue equipment necessary for making rescues from confined and enclosed spaces and other dangerous atmospheres.

(ii) Each employee assigned to the shipyard rescue team shall be trained to perform his or her rescue functions including confined and enclosed and other dangerous atmosphere entry.

(iii) Shipyard rescue teams shall practice their skills at least once every 12 months. Practice drills shall include the use of mannequins and rescue equipment during simulated rescue operations involving physical facilities that approximate closely those facilities from which rescue may be needed.

Note to paragraph (e)(1)(iii): If the team preforms an actual rescue during the 12 month period, an additional practice drill for that type of rescue is not required.

(iv) At least one person on each rescue team shall maintain current certification in basic first aid which includes maintenance of an airway, control of bleeding, maintenance of circulation and cardiopulmonary resuscitation (CPR) skills.

(2) The employer shall inform outside rescue teams of the hazards that the team may encounter when called to perform confined and enclosed space or other dangerous atmosphere rescue at the employer's facility so that the rescue team can be trained and equipped.

Note to paragraph (e): The criteria for in-house rescue, listed in paragraph (e)(1) can be used by the employer in evaluating outside rescue services.

(f) *Exchanging hazard information between employers.* Each employer whose employees work in confined and enclosed spaces or other dangerous atmospheres shall ensure that all available information on the hazards, safety rules, and emergency procedures concerning those spaces and atmospheres is exchanged with any other employer whose employees may enter the same spaces.

§ 1915.13 Cleaning and other cold work.

(a) *Locations covered by this section.* The employer shall ensure that manual cleaning and other cold work are not performed in the following spaces unless the conditions of paragraph (b) of this section have been met:

(1) Spaces containing or having last contained bulk quantities of combustible or flammable liquids or gases; and

(2) Spaces containing or having last contained bulk quantities of liquids, gases or solids that are toxic, corrosive or irritating.

(b) *Requirements for performing cleaning or cold work.* (1) Liquid residues of hazardous materials shall be removed from work spaces as thoroughly as practicable before employees start cleaning operations or cold work in a space. Special care shall be taken to prevent the spilling or the draining of these materials into the water surrounding the vessel, or for shore-side operations, onto the surrounding work area.

(2) Testing shall be conducted by a competent person to determine the concentration of flammable, combustible, toxic, corrosive, or irritant vapors within the space prior to the beginning of cleaning or cold work.

(3) Continuous ventilation shall be provided at volumes and flow rates sufficient to ensure that the concentration(s) of:

(i) Flammable vapor is maintained below 10 percent of the lower explosive limit; and

Note to paragraph (b)(3)(i): Spaces containing highly volatile residues may require additional ventilation to keep the concentration of flammable vapors below 10 percent of the lower explosive limit and within the permissible exposure limit.

(ii) Toxic, corrosive, or irritant vapors are maintained within the permissible exposure limits and below IDLH levels.

(4) Testing shall be conducted by the competent person as often as necessary during cleaning or cold work to assure that air concentrations are below 10 percent of the lower explosive limit and within the PELs and below IDLH levels. Factors such as, but not limited to, temperature, volatility of the residues and other existing conditions in and about the spaces are to be considered in determining the frequency of testing necessary to assure a safe atmosphere.

Note to paragraph (b)(4): See Appendix A for additional information on frequency of testing.

(5) Spills or other releases of flammable, combustible, toxic, corrosive, and irritant materials shall be cleaned up as work progresses.

(6) An employee may not enter a confined or enclosed space or other dangerous atmosphere if the concentration of flammable or combustible vapors in work spaces

exceeds 10 percent of the lower explosive limit. Exception: An employee may enter for emergency rescue or for a short duration for installation of ventilation equipment provided:

(i) No ignition sources are present;

(ii) The atmosphere in the space is monitored continuously;

(iii) The atmosphere in the space is maintained above the upper explosive limit; and

(iv) Respiratory protection, personal protective equipment, and clothing are provided in accordance with subpart I of this part.

Note to paragraph (b)(6): Other provisions for work in IDLH and other dangerous atmospheres are located in Subpart I of this part.

(7) A competent person shall test ventilation discharge areas and other areas where discharged vapors may collect to determine if vapors discharged from the spaces being ventilated are accumulating in concentrations hazardous to employees.

(8) If the tests required in paragraph (b)(7) of this section indicate that concentrations of exhaust vapors that are hazardous to employees are accumulating, all work in the contaminated area shall be stopped until the vapors have dissipated or been removed.

(9) Only explosion-proof, self-contained portable lamps, or other electric equipment approved by a National Recognized Testing Laboratory (NRTL) for the hazardous location shall be used in spaces described in paragraph (a) of this section until such spaces have been certified as "Safe for Workers."

Note to paragraph (b)(9): Battery-fed, portable lamps or other electric equipment bearing the approval of a NRTL for the class, and division of the location in which they are used are deemed to meet the requirements of this paragraph.

(10) The employer shall prominently post signs that prohibit sources of ignition within or near a space that has contained flammable or combustible liquids or gases in bulk quantities:

(i) At the entrance to those spaces;

(ii) In adjacent spaces; and

(iii) In the open area adjacent to those spaces.

(11) All air moving equipment and its component parts, including duct work, capable of generating a static electric discharge of sufficient energy to create a source of ignition, shall be bonded electrically to the structure of a vessel or vessel section or, in the case of land-side spaces, grounded to prevent an electric discharge in the space.

(12) Fans shall have non-sparking blades, and portable air ducts shall be of non-sparking materials.

Note to paragraph (b): See § 1915.12(c) of this part and applicable requirements of 29 CFR part 1915, subpart Z for other provisions affecting cleaning and cold work.

§ 1915.14 Hot work.

(a) *Hot work requiring testing by a Marine Chemist or Coast Guard authorized person.* (1) The employer shall ensure that hot work is not performed in or on any of the following confined and enclosed spaces and other dangerous atmospheres, boundaries of spaces or pipelines until the work area has been tested and certified by a Marine Chemist or a U.S. Coast Guard authorized person as "Safe for Hot Work":

(i) Within, on, or immediately adjacent to spaces that contain or have contained combustible or flammable liquids or gases.

(ii) Within, on, or immediately adjacent to fuel tanks that contain or have last contained fuel; and

(iii) On pipelines, heating coils, pump fittings or other accessories connected to spaces that contain or have last contained fuel.

(iv) Exception: Within spaces adjacent to spaces in which the flammable gases or liquids have a flash point below 150° F (65.6° C) and the distance between such spaces and the work is greater than 25 feet (7.5 m).

Note to paragraph (a)(1): The criteria for safe for hot work is located in the definition section of subpart B.

(2) The certificate issued by the Marine Chemist or Coast Guard authorized person shall be posted in the immediate vicinity of the affected operations while they are in progress and kept on file for a period of at least three months from the date of the completion of the operation for which the certificate was generated.

(b) *Hot work requiring testing by a competent person.* (1) Hot work is not permitted in or on the following spaces or adjacent spaces or other dangerous atmospheres until they have been tested by a competent person and determined to contain no concentrations of flammable vapors equal to or greater than 10 percent of the lower explosive limit:

(i) Dry cargo holds,

(ii) The bilges,

(iii) The engine room and boiler spaces for which a Marine Chemist or a Coast Guard authorized person certificate is not required under paragraph (a)(1)(i) of this section, and

(iv) Vessels and vessel sections for which a Marine Chemist or Coast Guard authorized person certificate is not required under paragraph (a)(1)(i) of this section, and

(v) Land-side confined and enclosed spaces or other dangerous atmospheres not covered by paragraph (a)(1) of this section.

(2) If the concentration of flammable vapors or gases is equal to or greater than 10 percent of the lower explosive limit in the space or an adjacent space where the hot work is to be done, then the space shall be labeled "Not Safe for Hot Work" and ventilation shall be provided at volumes and flow rates sufficient to ensure that the concentration of flammable vapors or gases is below 10 percent by volume of the lower explosive limit. The warning label may be removed when the concentration of flammable vapors and gases are below 10 percent lower explosive limit.

Note to § 1915.14: See appendix A for additional information relevant to performing hot work safely.

§ 1915.15 Maintenance of safe conditions.

(a) *Preventing hazardous materials from entering.* Pipelines that could carry hazardous materials into spaces that have been certified "Safe for Workers" or "Safe for Hot Work" shall be disconnected, blanked off, or otherwise blocked by a positive method to prevent hazardous materials from being discharged into the space.

(b) *Alteration of existing conditions.* When a change that could alter conditions within a tested confined or enclosed space or other dangerous atmosphere occurs, work in the affected space or area shall be stopped. Work may not be resumed until the affected space or area is visually inspected and retested and found to comply with §§ 1915.12, 1915.13, and 1915.14 of this part, as applicable.

Note to paragraph (b): Examples of changes that would warrant the stoppage of work include: The opening of manholes or other closures or the adjusting of a valve regulating the flow of hazardous materials.

(c) *Tests to maintain the conditions of a Marine Chemist's or Coast Guard authorized person's certificates.* A competent person shall visually inspect and test each space certified as "Safe for Workers" or "Safe for Hot Work," as often as necessary to ensure that atmospheric conditions within that space is maintained within the conditions established by the certificate after the certificate has been issued.

(d) *Change in the conditions of a Marine Chemist's or Coast Guard authorized person's certificate.* If a competent person finds that the

atmospheric conditions within a certified space fail to meet the applicable requirements of §§ 1915.12, 1915.13, and 1915.14 of this part, work in the certified space shall be stopped and may not be resumed until the space has been retested by a Marine Chemist or Coast Guard authorized person and a new certificate issued in accordance with § 1915.14(a).

(e) *Tests to maintain a competent person's findings.* After a competent person has conducted a visual inspection and tests required in §§ 1915.12, 1915.13, and 1915.14 of this part and determined a space to be safe for an employee to enter, he or she shall continue to test spaces as often as necessary to ensure that the required atmospheric conditions within the tested space are maintained.

(f) *Changes in conditions determined by competent person's findings.* After the competent person has determined initially that a space is safe for an employee to enter and he or she finds subsequently that the conditions within the tested space fail to meet the requirements of §§ 1915.12, 1915.13, and 1915.14, of this part, as applicable, work shall be stopped until the conditions in the tested space are corrected to comply with §§ 1915.12, 1915.13, and 1915.14, as applicable.

§ 1915.16 Warning signs and labels.

(a) *Employee comprehension of signs and labels.* The Employer shall ensure that each sign or label posted to comply with the requirements of this subpart is presented in a manner that can be perceived and understood by all employees.

(b) *Posting of large work areas.* A warning sign or label required by paragraph (a) of this section need not be posted at an individual tank, compartment or work space within a work area if the entire work area has been tested and certified: not safe for workers, not safe for hot work, and if the sign or label to this effect is posted conspicuously at each means of access to the work area.

Appendix A to Subpart B—Compliance Assistance Guidelines for Confined and Enclosed Spaces and Other Dangerous Atmospheres

This Appendix is a non-mandatory set of guidelines provided to assist employers in complying with the requirements of this subpart. This Appendix neither creates additional obligations nor detracts from obligations otherwise contained in the standard. It is intended to provide explanatory information and educational material to employers and employees to foster understanding of, and compliance with, the standard.

Sections 1915.11 through 1915.16. These standards are minimum safety standards for entering and working safely in vessel tanks and compartments.

Section 1915.11(b) Definition of "Hot work." There are several instances in which circumstances do not necessitate that grinding, drilling, abrasive blasting be regarded as hot work. Some examples are:

1. Abrasive blasting of the hull for paint preparation does not necessitate pumping and cleaning the tanks of a vessel.

2. Prior to hot work on any hollow structure, the void space should be tested and appropriate precautions taken.

Section 1915.11(b) Definition of "Lower explosive limit." The terms lower flammable limit (LFL) and lower explosive limit (LEL) are used interchangeably in fire science literature.

Section 1915.11(b) Definition of "Upper explosive limit." The terms upper flammable limit (UFL) and upper explosive limit (UEL) are used interchangeably in fire science literature.

Section 1915.12(a)(4). After a tank has been properly washed and ventilated, the tank should contain 20.8 percent oxygen by volume. This is the same amount found in our normal atmosphere at sea level. However, it is possible that the oxygen content will be lower. When this is the case, the reasons for this deficiency should be determined and corrective action taken.

An oxygen content of 19.5 percent can support life and is adequate for entry. However, any oxygen level less than 20.8 percent and greater than 19.5 percent level should also alert the competent person to look for the causes of the oxygen deficiency and to correct them prior to entry.

Section 1915.12(b)(4) Flammable atmospheres. Atmospheres with a concentration of flammable vapors at or above 10 percent of the lower explosive limit (LEL) are considered hazardous when located in confined spaces. However, atmospheres with flammable vapors below 10 percent of the LEL are not necessarily safe.

Such atmospheres are too lean to burn. Nevertheless, when a space contains or produces measurable flammable vapors below the 10 percent LEL, it might indicate that flammable vapors are being released or introduced into the space and could present a hazard in time. Therefore, the cause of the vapors should be investigated and, if possible, eliminated prior to entry.

Some situations that have produced measurable concentrations of flammable vapors that could exceed 10 percent of the LEL in time are:

1. Pipelines that should have been blanked or disconnected have opened, allowing product into the space.

2. The vessel may have shifted, allowing product not previously cleaned and removed during washing to move into other areas of the vessel.

3. Residues may be producing the atmosphere by releasing flammable vapor.

Section 1915.12(b)(6) Flammable atmospheres that are toxic. An atmosphere with a measurable concentration of a flammable substance below 10 percent of the LEL may be above the OSHA permissible exposure limit for that substance. In that case, refer to § 1915.12(c) (2), (3), and (4).

Section 1915.13(b)(4), § 1915.15(c), and § 1915.15(e). The frequency with which a tank is monitored to determine if atmospheric conditions are being maintained is a function of several factors that are discussed below:

1. *Temperature.* Higher temperatures will cause a combustible or flammable liquid to vaporize at a faster rate than lower temperatures. This is important since hotter days may cause tank residues to produce more vapors and that may result in the vapors exceeding 10 percent of the LEL or an overexposure to toxic contaminants.

2. *Work in the tank.* Any activity in the tank could change the atmospheric conditions in that tank. Oxygen from a leaking oxyfuel hose or torch could result in an oxygen-enriched atmosphere that would more easily propagate a flame. Some welding operations use inert gas, and leaks can result in an oxygen-deficient atmosphere. Manual tank cleaning with high pressure spray devices can stir up residues and result in exposures to toxic contaminants. Simple cleaning or mucking out, where employees walk through and shovel residues and sludge, can create a change in atmospheric conditions.

3. *Period of time elapsed.* If a period of time has elapsed since a Marine Chemist or Coast Guard authorized person has certified a tank as safe, the atmospheric condition should be rechecked by the competent person prior to entry and starting work.

4. *Unattended tanks or spaces.* When a tank or space has been tested and declared safe, then subsequently left unattended for a period of time, it should be retested prior to entry and starting work. For example, when barges

are left unattended at night, unidentified products from another barge are sometimes dumped into their empty tanks. Since this would result in a changed atmosphere, the tanks should be retested prior to entry and starting work.

5. *Work break.* When workers take a break or leave at the end of the shift, equipment sometimes is inadvertently left in the tanks. At lunch or work breaks and at the end of the shift are the times when it is most likely someone will leave a burning or cutting torch in the tank, perhaps turned on and leaking oxygen or an inert gas. Since the former can produce an oxygen-enriched atmosphere, and the latter an oxygen-deficient atmosphere, tanks should be checked for equipment left behind, and atmosphere, monitored if necessary prior to re-entering and resuming work. In an oxygen-enriched atmosphere, the flammable range is severely broadened. This means that an oxygen-enriched atmosphere can promote very rapid burning.

6. *Ballasting or trimming.* Changing the position of the ballast, or trimming or in any way moving the vessel so as to expose cargo that had been previously trapped, can produce a change in the atmosphere of the tank. The atmosphere should be retested after any such move and prior to entry or work.

Section 1915.14 (a) and (b) Hot work. This is a reminder that other sections of the OSHA shipyard safety and health standards in part 1915 should be reviewed prior to starting any hot work. Most notably, Subpart D, Welding, Cutting and Heating, places additional restrictions on hot work: The requirements of §§ 1915.51 and 1915.53 must be met before hot work is begun on any metal that is toxic or is covered by a preservative coating respectively; the requirements of § 1915.54 must be met before welding, cutting, or heating is begun on any structural voids.

Section 1915.12(a)(2). During hot work, more than 20.8 percent oxygen by volume can be unsafe since it extends the normal flammable range. The standard permits the oxygen level to reach 22 percent by volume in order to account for instrument error. However, the cause of excess oxygen should be investigated and the source removed.

Section 1915.16(b). If the entire vessel has been found to be in the same condition, then employers shall be considered to be in compliance with this requirement when signs using appropriate warning language in accordance with § 1915.16(a) are posted at the gangway and at all other means of access to the vessel.

Appendix B to Subpart B—Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment

This Appendix provides a complete reprint of U.S. Coast Guard regulations as of October 1, 1993 referenced in Subpart B for purposes of determining who is a Coast Guard authorized person.

1. Title 46 CFR 35.01–1 (a) through (c) covering hot work on tank vessels reads as follows:

(a) The provisions of "Standard for the Control of Gas Hazards on Vessels to be Repaired," NFPA No. 306, published by National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269, shall be used as a guide in conducting the inspections and issuance of certificates required by this section.

(b) Until an inspection has been made to determine that such operation can be undertaken with safety, no alterations, repairs, or other such operations involving riveting, welding, burning, or like fire-producing actions shall be made:

(1) Within or on the boundaries of cargo tanks that have been used to carry flammable or combustible liquid or chemicals in bulk, or within spaces adjacent to such cargo tanks; or

(2) Within or on the boundaries of fuel tanks; or

(3) To pipe lines, heating coils, pumps, fittings, or other appurtenances connected to such cargo or fuel tanks.

(c) Such inspections shall be made and evidenced as follows:

(1) In ports or places in the United States or its territories and possessions, the inspection shall be made by a Marine Chemist certificated by the National Fire Protection Association; however, if the services of such certified Marine Chemists are not reasonably available, the Officer in Charge, Marine Inspection, upon the recommendation of the vessel owner and his contractor or their representative, shall select a person who, in the case of an individual vessel, shall be authorized to make such inspection. If the inspection indicates that such operations can be undertaken with safety, a certificate setting forth the fact in writing and qualified as may be required, shall be issued by the certified Marine Chemist or the authorized person before the work is started. Such qualifications shall include any requirements as may be deemed necessary to maintain, insofar as can reasonably be done, the safe conditions in the spaces certified, throughout the operation and shall include such additional tests and certifications as considered required. Such qualifications and requirements shall include precautions necessary to eliminate or minimize hazards that may be present from protective coatings or residues from cargoes.

2. Title 46 CFR 71.60(c)(1) covering hot work on passenger vessels reads as follows:

(a) The provisions of "Standard for the Control of Gas Hazards on Vessels to be Repaired," NFPA No. 306, published by National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269, shall be used as a guide in conducting the inspections and issuance of certificates required by this section.

(b) Until an inspection has been made to determine that such operation can be undertaken with safety, no alterations, repairs, or other such operations involving riveting, welding, burning, or like fire-producing actions shall be made:

(1) Within or on the boundaries of cargo tanks which have been used to carry flammable or combustible liquid or chemicals in bulk, or within spaces adjacent to such cargo tanks; or

(2) Within or on the boundaries of fuel tanks; or

(3) To pipe lines, heating coils, pumps, fittings, or other appurtenances connected to such cargo or fuel tanks.

(c) Such inspections shall be made and evidenced as follows:

(1) In ports or places in the United States or its territories and possessions the inspection shall be made by a Marine Chemist certificated by the National Fire Protection Association; however, if the services of such certified Marine Chemist are not reasonably available, the Officer in Charge, Marine Inspection, upon the recommendation of the vessel owner and his contractor or their representative, shall select a person who, in the case of an individual vessel, shall be authorized to make such inspection. If the inspection indicated that such operations can be undertaken with safety, a certificate setting forth the fact in writing and qualified as may be required, shall be issued by the certified Marine Chemist or the authorized person before the work is started. Such qualifications shall include any requirements as may be deemed necessary to maintain, insofar as can reasonably be done, the safe conditions in the spaces certified throughout the operation and shall include such additional tests and certifications as considered required. Such qualifications and requirements shall include precautions necessary to eliminate or minimize hazards that may be present from protective coatings or residues from cargoes.

3. Title 46 CFR 91.50–1(c)(1) covering hot work on cargo and miscellaneous vessels as follows:

(a) The provisions of "Standard for the Control of Gas Hazards on Vessels to be Repaired," NFPA No. 306, published by National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269, shall be used as a guide in conducting the inspections and issuance of certificates required by this section.

(b) Until an inspection has been made to determine that such operation can be undertaken with safety, no alterations, repairs, or other such operations involving riveting, welding, burning, or like fire-producing actions shall be made:

(1) Within or on the boundaries of cargo tanks which have been used to carry flammable or combustible liquid or chemicals in bulk, or within spaces adjacent to such cargo tanks; or,

(2) Within or on the boundaries of fuel tanks; or,

(3) To pipe lines, heating coils, pumps, fittings, or other appurtenances connected to such cargo or fuel tanks.

(c) Such inspections shall be made and evidenced as follows:

(1) In ports or places in the United States or its territories and possessions the inspection shall be made by a Marine Chemist certificated by the National Fire Protection Association; however, if the services of such certified Marine Chemist are not reasonably available, the Officer in Charge, Marine Inspection, upon the recommendation of the vessel owner and his contractor or their representative, shall select a person who, in the case of an individual vessel, shall be authorized to make such inspection. If the inspection indicated that such operations can be undertaken with safety, a certificate setting forth the fact in writing and qualified as may be required, shall be issued by the certified Marine Chemist or the authorized person before the work is started. Such qualifications shall include any requirements as may be deemed necessary to maintain, insofar as can reasonably be done, the safe conditions in the spaces certified throughout the operation and shall include such additional tests and certifications as considered required. Such qualifications and requirements shall include precautions necessary to eliminate or minimize hazards that may be present from protective coatings or residues from cargoes.

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