

including those exposed below the action level, a copy of the standard and its appendices and must distribute to all employees any materials provided to the employer by the Occupational Safety and Health Administration (OSHA).

Your employer is required to complete this training program for all employees by August 28, 1979. After this date, all new employees must be trained prior to initial assignment to areas where there is a possibility of exposure over the action level.

This training program must also be provided at least annually thereafter.

1910.1026 Chromium (VI)

(1)(1)(iii); (1) **Communication of chromium (VI) hazards to employees**
(2)(i) and (ii);
Appendix A

(1) *Hazard communication — general.*

(iii) Employers shall include chromium (VI) in the hazard communication program established to comply with the HCS (1910.1200). Employers shall ensure that each employee has access to labels on containers of chromium (VI) and to safety data sheets, and is trained in accordance with the requirements of HCS and paragraph (1)(2) of this section.

(2) *Employee information and training.*

(i) The employer shall ensure that each employee can demonstrate knowledge of at least the following:

- (A) The contents of this section; and
- (B) The purpose and a description of the medical surveillance program required by paragraph (k) of this section.

(ii) The employer shall make a copy of this section readily available without cost to all affected employees.

Appendix A to 1910.1026 — Chromium (VI)

5. Employee information and training. Company employees will be trained pursuant to the provisions of 29 CFR 1910.1026(l)(2). In addition, the Companies agree to train employees in the provisions of this Agreement within sixty (60) days of the Opt-In Date (defined in paragraph 7 of this Agreement). The training regarding this Agreement shall be provided in language the employees can understand.

1910.1027 Cadmium

(m)(4) (m) Communication of cadmium hazards to employees

(4) *Employee information and training.*

- (i) The employer shall train each employee who is potentially exposed to cadmium in accordance with the requirements of this section. The employer shall institute a training program, ensure employee participation in the program, and maintain a record of the contents of such program.
- (ii) Training shall be provided prior to or at the time of initial assignment to a job involving potential exposure to cadmium and at least annually thereafter.
- (iii) The employer shall make the training program understandable to the employee and shall assure that each employee is informed of the following:
 - (A) The health hazards associated with cadmium exposure, with special attention to the information incorporated in Appendix A to this section;
 - (B) The quantity, location, manner of use, release, and storage of cadmium in the workplace and the specific nature of operations that could result in exposure to cadmium, especially exposures above the PEL;
 - (C) The engineering controls and work practices associated with the employee's job assignment;
 - (D) The measures employees can take to protect themselves from exposure to cadmium, including modification of such habits as smoking and personal hygiene, and specific procedures the employer has implemented to protect employees from exposure to cadmium such as appropriate work practices, emergency procedures, and the provision of personal protective equipment;
 - (E) The purpose, proper selection, fitting, proper use, and limitations of respirators and protective clothing;

- (F) The purpose and a description of the medical surveillance program required by paragraph (l) of this standard;
 - (G) The contents of this section and its appendices; and
 - (H) The employee's rights of access to records under 1910.1020(e) and (g).
- (iv) Additional access to information and training program and materials.
- (A) The employer shall make a copy of this section and its appendices readily available without cost to all affected employees and shall provide a copy if requested.
 - (B) The employer shall provide to the Assistant Secretary or the Director, upon request, all materials relating to the employee information and the training program.

1910.1028 Benzene

(j)(3) **(j) Communication of benzene hazards to employees**

(3) *Information and training.*

- (i) The employer shall provide employees with information and training at the time of their initial assignment to a work area where benzene is present. If exposures are above the action level, employees shall be provided with information and training at least annually thereafter.
- (ii) The training program shall be in accordance with the requirements of 29 CFR 1910.1200(h)(1) and (2), and shall include specific information on benzene for each category of information included in that section.
- (iii) In addition to the information required under 29 CFR 1910.1200, the employer shall:
 - (A) Provide employees with an explanation of the contents of this section, including Appendices A and B, and indicate to them where the standard is available; and,
 - (B) Describe the medical surveillance program required under paragraph (i) of this section, and explain the information contained in Appendix C.

1910.1029 Coke oven emissions

(k) (1) and (2); (k) **Employee information and training**
Appendix A

(1) *Training program.*

- (i) The employer shall train each employee who is employed in a regulated area in accordance with the requirements of this section. The employer shall institute a training program and ensure employee participation in the program.
- (ii) The training program shall be provided as of January 27, 1977 for employees who are employed in the regulated area at that time or at the time of initial assignment to a regulated area.
- (iii) The training program shall be provided at least annually for all employees who are employed in the regulated area, except that training regarding the occupational safety and health hazards associated with exposure to coke oven emissions and the purpose, proper use, and limitations of respiratory protective devices shall be provided at least quarterly until January 20, 1978.
- (iv) The training program shall include informing each employee of:
 - (a) The information contained in the substance information sheet for coke oven emissions (Appendix A);
 - (b) The purpose, proper use, and limitations of respiratory protective devices required in accordance with paragraph (g) of this section;
 - (c) The purpose for and a description of the medical surveillance program required by paragraph (j) of this section including information on the occupational safety and health hazards associated with exposure to coke oven emissions;
 - (d) A review of all written procedures and schedules required under paragraph (f) of this section; and
 - (e) A review of this standard.

- (2) Access to training materials
 - (i) The employer shall make a copy of this standard and its appendices readily available to all employees who are employed in the regulated area.
 - (ii) The employer shall provide upon request all materials relating to the employee information and training program to the Secretary and the Director.

Appendix A – Coke Oven Emissions Substance Information Sheet

IX. TRAINING AND EDUCATION

Additional information on all of these items plus training as to hazards of coke oven emissions and the engineering and work practice controls associated with your job will also be provided by your employer.

1910.1030 Bloodborne pathogens

(g)(2); (h)(2) **(g) Communication of hazards to employees**
and (3)

- (2) *Information and Training.*
 - (i) The employer shall train each employee with occupational exposure in accordance with the requirements of this section. Such training must be provided at no cost to the employee and during working hours. The employer shall institute a training program and ensure employee participation in the program.
 - (ii) Training shall be provided as follows:
 - (A) At the time of initial assignment to tasks where occupational exposure may take place;
 - (B) At least annually thereafter.
 - (iii) reserved
 - (iv) Annual training for all employees shall be provided within one year of their previous training.
 - (v) Employers shall provide additional training when changes such as modification of tasks or procedures or institution of new tasks or procedures affect the employee's occupational exposure. The additional training may be limited to addressing the new exposures created.

- (vi) Material appropriate in content and vocabulary to educational level, literacy, and language of employees shall be used.
- (vii) The training program shall contain at a minimum the following elements:
 - (A) An accessible copy of the regulatory text of this standard and an explanation of its contents;
 - (B) A general explanation of the epidemiology and symptoms of bloodborne diseases;
 - (C) An explanation of the modes of transmission of bloodborne pathogens;
 - (D) An explanation of the employer's exposure control plan and the means by which the employee can obtain a copy of the written plan;
 - (E) An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials;
 - (F) An explanation of the use and limitations of methods that will prevent or reduce exposure including appropriate engineering controls, work practices, and personal protective equipment;
 - (G) Information on the types, proper use, location, removal, handling, decontamination and disposal of personal protective equipment;
 - (H) An explanation of the basis for selection of personal protective equipment;
 - (I) Information on the hepatitis B vaccine, including information on its efficacy, safety, method of administration, the benefits of being vaccinated, and that the vaccine and vaccination will be offered free of charge;
 - (J) Information on the appropriate actions to take and persons to contact in an emergency involving blood or other potentially infectious materials;
 - (K) An explanation of the procedures to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available;

- (L) Information on the post exposure evaluation and follow-up that the employer is required to provide for the employee following an exposure incident;
 - (M) An explanation of the signs and labels and/or color coding required by paragraph (g)(1); and
 - (N) An opportunity for interactive questions and answers with the person conducting the training session.
- (viii) The person conducting the training shall be knowledgeable in the subject matter covered by the elements contained in the training program as it relates to the workplace that the training will address.
- (ix) Additional initial training for employees in HIV and HBV laboratories and production facilities. Employees in HIV or HBV research laboratories and HIV or HBV production facilities shall receive the following initial training in addition to the above training requirements:
- (A) The employer shall assure that employees demonstrate proficiency in standard microbiological practices and techniques and in the practices and operations specific to the facility before being allowed to work with HIV or HBV.
 - (B) The employer shall assure that employees have prior experience in the handling of human pathogens or tissue cultures before working with HIV or HBV.
 - (C) The employer shall provide a training program to employees who have no prior experience in handling human pathogens. Initial work activities shall not include the handling of infectious agents. A progression of work activities shall be assigned as techniques are learned and proficiency is developed. The employer shall assure that employees participate in work activities involving infectious agents only after proficiency has been demonstrated.

(h) Recordkeeping

(2) *Training records.*

- (i) Training records shall include the following information:
 - (A) The dates of the training sessions;
 - (B) The contents or a summary of the training sessions;

- (C) The names and qualifications of persons conducting the training; and
- (D) The names and job titles of all persons attending the training sessions.
- (ii) Training records shall be maintained for 3 years from the date on which the training occurred.
- (3) *Availability.*
 - (i) The employer shall ensure that all records required to be maintained by this section shall be made available upon request to the Assistant Secretary and the Director for examination and copying.
 - (ii) Employee training records required by this paragraph shall be provided upon request for examination and copying to employees, to employee representatives, to the Director, and to the Assistant Secretary.

1910.1043 Cotton dust

(i)(1) and (2) **(i) Employee education and training**

- (1) *Training program.*
 - (i) The employer shall train each employee exposed to cotton dust in accordance with the requirements of this section. The employer shall institute a training program and ensure employee participation in the program.
 - (A) The acute and long term health hazards associated with exposure to cotton dust;
 - (B) The names and descriptions of jobs and processes which could result in exposure to cotton dust at or above the permissible exposure levels;
 - (C) The measures, including work practices required by paragraph (g) of this section, necessary to protect the employee from exposures in excess of the permissible exposure limit;
 - (D) The purpose, proper use and limitations of respirators required by paragraph (f) of this section;

- (E) The purpose for and a description of the medical surveillance program required by paragraph (h) of this section and other information which will aid exposed employees in understanding the hazards of cotton dust exposure; and
- (F) The contents of the standard and its appendices.
- (ii) The training program shall be provided prior to initial assignment and shall be repeated annually for each employee exposed to cotton dust, when job assignments or work processes change, and when employee performance indicates a need for retraining.
- (2) *Access to training materials.*
 - (i) Each employer shall post a copy of this section with its appendices in a public location at the workplace, and shall, upon request, make copies available to employees.
 - (ii) The employer shall provide all materials relating to the employee training and information program to the Assistant Secretary and the Director upon request.

1910.1044 1,2-Dibromo-3-Chloropropane

(n)(1) and (2) (n) Employee information and training

- (1) *Training program.*
 - (i) The employer shall train each employee who may be exposed to DBCP in accordance with the requirements of this section. The employer shall institute a training program and ensure employee participation in the program.
 - (ii) The employer shall assure that each employee is informed of the following:
 - (a) The information contained in Appendix A;
 - (b) The quantity, location, manner of use, release or storage of DBCP and the specific nature of operations which could result in exposure to DBCP as well as any necessary protective steps;
 - (c) The purpose, proper use, and limitations of respirators;
 - (d) The purpose and description of the medical surveillance program required by paragraph (m) of this section; and
 - (e) A review of this standard, including appendices.

- (2) *Access to training materials.*
 - (i) The employer shall make a copy of this standard and its appendices readily available to all affected employees.
 - (ii) The employer shall provide, upon request, all materials relating to the employee information and training program to the Assistant Secretary and the Director.

1910.1045 Acrylonitrile (vinyl cyanide)

(o)(1) and (2) (o) Employee Information and Training

- (1) *Training program.*
 - (i) The employer shall train each employee exposed to AN above the action level, each employee whose exposures are maintained below the action level by engineering and work practice controls, and each employee subject to potential skin or eye contact with liquid AN in accordance with the requirements of this section. The employer shall institute a training program and ensure employee participation in the program.
 - (ii) Training shall be provided at the time of initial assignment, or upon institution of the training program, and at least annually thereafter, and the employer shall assure that each employee is informed of the following:
 - (A) The information contained in Appendices A and B;
 - (B) The quantity, location, manner of use, release, or storage of AN, and the specific nature of operations which could result in exposure to AN, as well as any necessary protective steps;
 - (C) The purpose, proper use, and limitations of respirators and protective clothing;
 - (D) The purpose and a description of the medical surveillance program required by paragraph (n) of this section;
 - (E) The emergency procedures developed, as required by paragraph (i) of this section;
 - (F) Engineering and work practice controls, their function, and the employee's relationship to these controls; and
 - (G) A review of this standard.

- (2) *Access to training materials.*
 - (i) The employer shall make a copy of this standard and its appendices readily available to all affected employees.
 - (ii) The employer shall provide, upon request, all materials relating to the employee information and training program to the Assistant Secretary and the Director.

1910.1047 Ethylene oxide

(j)(3) (j) Communication of hazards

- (3) *Information and training.*
 - (i) The employer shall provide employees who are potentially exposed to EtO at or above the action level or above the excursion limit with information and training on EtO at the time of initial assignment and at least annually thereafter.
 - (ii) Employees shall be informed of the following:
 - (A) The requirements of this section with an explanation of its contents, including Appendices A and B;
 - (B) Any operations in their work area where EtO is present;
 - (C) The location and availability of the written EtO final rule; and
 - (D) The medical surveillance program required by paragraph (i) of this section with an explanation of the information in Appendix C.
 - (iii) Employer training shall include at least:
 - (A) Methods and observations that may be used to detect the presence or release of EtO in the work area (such as monitoring conducted by the employer, continuous monitoring devices, etc.);
 - (B) The physical and health hazards of EtO;
 - (C) The measures employees can take to protect themselves from hazards associated with EtO exposure, including specific procedures the employer has implemented to protect employees from exposure to EtO, such as work practices, emergency procedures, and personal protective equipment to be used; and
 - (D) The details of the hazard communication program developed by the employer, including an explanation of the labeling system and how employees can obtain and use the appropriate hazard information.

1910.1048 Formaldehyde

(n)(1) through (4) (n) Employee Information and Training

- (1) *Participation.* The employer shall assure that all employees who are assigned to workplaces where there is exposure to formaldehyde participate in a training program, except where the employer can show, using objective data, that employees are not exposed to formaldehyde at or above 0.1 ppm, the employer is not required to provide training.
- (2) *Frequency.* Employers shall provide such information and training to employees at the time of initial assignment, and whenever a new exposure to formaldehyde is introduced into the work. The training shall be repeated at least annually.
- (3) *Training program.* The training program shall be conducted in a manner which the employee is able to understand and shall include:
 - (i) A discussion of the contents of this regulation and the contents of the Material Safety Data Sheet.
 - (ii) The purpose for and a description of the medical surveillance program required by this standard, including:
 - (A) A description of the potential health hazards associated with exposure to formaldehyde and a description of the signs and symptoms of exposure to formaldehyde.
 - (B) instructions to immediately report to the employer the development of any adverse signs or symptoms that the employee suspects is attributable to formaldehyde exposure.
 - (iii) Description of operations in the work area where formaldehyde is present and an explanation of the safe work practices appropriate for limiting exposure to formaldehyde in each job;
 - (iv) The purpose for, proper use of, and limitations of personal protective clothing and equipment;
 - (v) Instructions for the handling of spills, emergencies, and clean-up procedures;
 - (vi) An explanation of the importance of engineering and work practice controls for employee protection and any necessary instruction in the use of these controls; and

- (vii) A review of emergency procedures including the specific duties or assignments of each employee in the event of an emergency.
- (4) *Access to training materials.*
 - (i) The employer shall inform all affected employees of the location of written training materials and shall make these materials readily available, without cost, to the affected employees.
 - (ii) The employer shall provide, upon request, all training materials relating to the employee training program to the Assistant Secretary and the Director.

1910.1050 Methylenedianiline

(k)(3) and (4) (k) Communication of hazards

- (3) *Information and training.*
 - (i) The employer shall provide employees with information and training on MDA in accordance with 29 CFR 1910.1200(h) at the time of initial assignment and at least annually thereafter.
 - (ii) In addition to the information required under 29 CFR 1910.1200 the employer shall:
 - (A) Provide an explanation of the contents of this section, including Appendices A and B, and indicate to employees where a copy of the standard is available;
 - (B) Describe the medical surveillance program required under paragraph (m) of this section, and explain the information contained in Appendix C; and
 - (C) Describe the medical removal provision required under paragraph (m) of this section.
- (4) *Access to training materials.*
 - (i) The employer shall make readily available to all affected employees, without cost, all written materials relating to the employee training program, including a copy of this regulation.
 - (ii) The employer shall provide to the Assistant Secretary of Labor and the Director, upon request, all information and training materials relating to the employee information and training program.

1910.1051 1,3-Butadiene

(1)(2) and (3) **(1) Communication of BD hazards to employees**

(2) *Employee information and training.*

- (i) The employer shall provide all employees exposed to BD with information and training in accordance with the requirements of the Hazard Communication Standard, 29 CFR 1910.1200, 29 CFR 1915.1200, and 29 CFR 1926.59.
- (ii) The employer shall train each employee who is potentially exposed to BD at or above the action level or the STEL in accordance with the requirements of this section. The employer shall institute a training program, ensure employee participation in the program, and maintain a record of the contents of such program.
- (iii) Training shall be provided prior to or at the time of initial assignment to a job potentially involving exposure to BD at or above the action level or STEL and at least annually thereafter.
- (iv) The training program shall be conducted in a manner that the employee is able to understand. The employer shall ensure that each employee exposed to BD over the action level or STEL is informed of the following:
 - (A) The health hazards associated with BD exposure, and the purpose and a description of the medical screening and surveillance program required by this section;
 - (B) The quantity, location, manner of use, release, and storage of BD and the specific operations that could result in exposure to BD, especially exposures above the PEL or STEL;
 - (C) The engineering controls and work practices associated with the employee's job assignment, and emergency procedures and personal protective equipment;
 - (D) The measures employees can take to protect themselves from exposure to BD;
 - (E) The contents of this standard and its appendices; and
 - (F) The right of each employee exposed to BD at or above the action level or STEL to obtain:

- (1) medical examinations as required by paragraph (j) of this section at no cost to the employee;
 - (2) the employee's medical records required to be maintained by paragraph (m)(4) of this section; and
 - (3) all air monitoring results representing the employee's exposure to BD and required to be kept by paragraph (m)(2) of this section.
- (3) *Access to information and training materials.*
- (i) The employer shall make a copy of this standard and its appendices readily available without cost to all affected employees and their designated representatives and shall provide a copy if requested.
 - (ii) The employer shall provide to the Assistant Secretary or the Director, or the designated employee representatives, upon request, all materials relating to the employee information and the training program.

1910.1052 Methylene chloride

- (1)(1) through (8) **(I) Employee information and training**
- (1) The employer shall provide information and training for each affected employee prior to or at the time of initial assignment to a job involving potential exposure to MC.
 - (2) The employer shall ensure that information and training is presented in a manner that is understandable to the employees.
 - (3) In addition to the information required under the Hazard Communication Standard at 29 CFR 1910.1200, 29 CFR 1915.1200, or 29 CFR 1926.59, as appropriate:
 - (i) The employer shall inform each affected employee of the requirements of this section and information available in its appendices, as well as how to access or obtain a copy of it in the workplace;
 - (ii) Wherever an employee's exposure to airborne concentrations of MC exceeds or can reasonably be expected to exceed the action level, the employer shall inform each affected employee of the quantity, location, manner of use, release, and storage of MC and the specific operations in the workplace that could result in exposure to MC, particularly noting where exposures may be above the 8-hour TWA PEL or STEL.

- (4) The employer shall train each affected employee as required under the Hazard Communication standard at 29 CFR 1910.1200, 29 CFR 1915.1200, or 29 CFR 1926.59, as appropriate.
- (5) The employer shall re-train each affected employee as necessary to ensure that each employee exposed above the action level or the STEL maintains the requisite understanding of the principles of safe use and handling of MC in the workplace.
- (6) Whenever there are workplace changes, such as modifications of tasks or procedures or the institution of new tasks or procedures, which increase employee exposure, and where those exposures exceed or can reasonably be expected to exceed the action level, the employer shall update the training as necessary to ensure that each affected employee has the requisite proficiency.
- (7) An employer whose employees are exposed to MC at a multi-employer worksite shall notify the other employers with work operations at that site in accordance with the requirements of the Hazard Communication Standard, 29 CFR 1910.1200, 29 CFR 1915.1200, or 29 CFR 1926.59, as appropriate.
- (8) The employer shall provide to the Assistant Secretary or the Director, upon request, all available materials relating to employee information and training.

1910.1096 Ionizing radiation

(f)(3)(viii); (f) **Immediate evacuation warning signal**
and (i)(2)

(3) *Testing.*

(viii) All employees whose work may necessitate their presence in an area covered by the signal shall be made familiar with the actual sound of the signal — preferably as it sounds at their work location. Before placing the system into operation, all employees normally working in the area shall be made acquainted with the signal by actual demonstration at their work locations.

(i) **Instruction of personnel, posting**

- (2) All individuals working in or frequenting any portion of a radiation area shall be informed of the occurrence of radioactive materials or of radiation in such portions of the radiation area; shall be instructed in the safety problems associated with exposure to such materials or radiation and in precautions or devices to minimize exposure; shall be instructed in the applicable provisions

of this section for the protection of employees from exposure to radiation or radioactive materials; and shall be advised of reports of radiation exposure which employees must request pursuant to the regulations in this section.

1910.1200 Hazard Communication

(h)(1) through (3) **(h) Employee information and training**

- (1) Employers shall provide employees with effective information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new chemical hazard the employees have not previously been trained about is introduced into their work area. Information and training may be designed to cover categories of hazards (e.g., flammability, carcinogenicity) or specific chemicals. Chemical-specific information must always be available through labels and material safety data sheets.
- (2) *Information.* Employees shall be informed of:
 - (i) The requirements of this section;
 - (ii) Any operations in their work area where hazardous chemicals are present; and,
 - (iii) The location and availability of the written hazard communication program, including the required list(s) of hazardous chemicals, and material safety data sheets required by this section.
- (3) *Training.* Employee training shall include at least:
 - (i) Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);
 - (ii) The physical, health, simple asphyxiation, combustible dust, and pyrophoric gas hazards, as well as hazards not otherwise classified, of the chemicals in the work area;
 - (iii) The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and,

- (iv) The details of the hazard communication program developed by the employer, including an explanation of the labels received on shipped containers and the workplace labeling system used by their employer and the material safety data sheet, including the order of information and how employees can obtain and use the appropriate hazard information.

1910.1450 Occupational exposure to hazardous chemicals in laboratories

(f)(1) through (4) **(f) Employee information and training**

- (1) The employer shall provide employees with information and training to ensure that they are apprised of the hazards of chemicals present in their work area.
- (2) Such information shall be provided at the time of an employee's initial assignment to a work area where hazardous chemicals are present and prior to assignments involving new exposure situations. The frequency of refresher information and training shall be determined by the employer.
- (3) *Information.* Employees shall be informed of:
 - (i) The contents of this standard and its appendices which shall be made available to employees;
 - (ii) The location and availability of the employer's Chemical Hygiene Plan;
 - (iii) The permissible exposure limits for OSHA regulated substances or recommended exposure limits for other hazardous chemicals where there is no applicable OSHA standard;
 - (iv) Signs and symptoms associated with exposures to hazardous chemicals used in the laboratory; and
 - (v) The location and availability of known reference material on the hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory including, but not limited to, safety data sheets received from the chemical supplier.
- (4) *Training.*
 - (i) Employee training shall include:
 - (A) Methods and observations that may be used to detect the presence or release of a hazardous chemical (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);

- (B) The physical and health hazards of chemicals in the work area; and
 - (C) The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.
- (ii) The employee shall be trained on the applicable details of the employer's written Chemical Hygiene Plan.

Appendix A to 1910.1450 — National Research Council Recommendations Concerning Chemical Hygiene in Laboratories (Non-Mandatory)

Forward

As guidance for each employer's development of an appropriate laboratory Chemical Hygiene Plan, the following non-mandatory recommendations are provided. They were extracted from "Prudent Practices for Handling Hazardous Chemicals in Laboratories" (referred to below as "Prudent Practices"), which was published in 1981 by the National Research Council and is available from the National Academy Press, 2101 Constitution Ave., NW, Washington DC 20418.

(References to page numbers in "Prudent Practices" are given in parentheses).

Components of the Chemical Hygiene Plan — Information and Training Program (D)(10)

- (a) Aim: To assure that all individuals at risk are adequately informed about the work in the laboratory, its risks, and what to do if an accident occurs (5, 15).
- (b) Emergency and Personal Protection Training: Every laboratory worker should know the location and proper use of available protective apparel and equipment (154, 169).

Some of the full-time personnel of the laboratory should be trained in the proper use of emergency equipment and procedures (6). Such training as well as first aid instruction should be available to (154) and encouraged for (176) everyone who might need it.

- (c) Receiving and stockroom/storeroom personnel should know about hazards, handling equipment, protective apparel, and relevant regulations (217).
- (d) Frequency of Training: The training and education program should be a regular, continuing activity — not simply an annual presentation (15).
- (e) Literature/Consultation: Literature and consulting advice concerning chemical hygiene should be readily available to laboratory personnel, who should be encouraged to use these information resources (14).



Maritime

The following training requirements have been excerpted from ***Title 29 Code of Federal Regulations Parts 1915*** (Shipyard Employment), ***1917*** (Marine Terminals), and ***1918*** (Longshoring).*

29 CFR PART 1915 – SHIPYARD EMPLOYMENT

Subpart A – General Provisions

1915.6 Commercial diving operations

Commercial diving operations shall be subject to Subpart T of Part 1910, 1910.401-1910.441 of this chapter.

1915.7 Competent person

(b) and (c)

(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

* Note that in addition to these requirements, Part 1910, relating to general industry, also contains applicable training standards.

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 boatyards 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 Section 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, at a minimum, the following:
- (A) The employer's 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 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.

1915.9 Compliance duties owed to each employee

- (b) Training.** Standards in this part requiring training on hazards and related matters, such as standards requiring that employees receive training or that the employer train employees, provide training to employees, or institute or implement a training program, impose a separate compliance duty with respect to each employee covered by the requirement. The employer must train each affected employee in the manner required by the standard, and each failure to train an employee may be considered a separate violation.

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

1915.12 Precautions and the order of testing before entering confined and enclosed spaces and other dangerous atmospheres

(a)(1); (b)(1); (d)
(1) through (5);
(e)(1)(i)(ii) and
(iv) and (e)(2)

(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.

(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 a 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.

(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 a representative orders evacuation;
 - (ii) An evacuation signal such as an 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 present 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

- (1) 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.
 - (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.
 - (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.

1915.13 Cleaning and other cold work

(b)(2) and (4)

(b) Requirements for performing cleaning or cold work

- (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.

- (4) Testing shall be conducted by a 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.

1915.14 Hot work

(b)(1) (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,
 - (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.

1915.15 Maintenance of safe conditions

- (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.

Subpart C – Surface Preparation and Preservation

1915.35 Painting

- (b)(1) and (8) (b) **Paints and tank coatings dissolved in highly volatile, toxic and flammable solvents.** Several organic coatings, adhesives and resins are dissolved in highly toxic, flammable and explosive solvents with flash points below 80 degrees Fahrenheit. Work involving such materials shall be done only when all of the following special precautions have been taken:
- (1) Sufficient exhaust ventilation shall be provided to keep the concentration of solvent vapors below 10 percent of the lower explosive limit. Frequent tests shall be made by a competent person to ascertain the concentration.
 - (8) A competent person shall inspect all power lighting cables to ensure that the insulation is in excellent condition, free of all cracks and worn spots, that there are no connections within 50 feet (15.2 meters) of the operation, that lines are not overloaded, and that they are suspended with sufficient slack to prevent undue stress or chafing.

1915.36 Flammable liquids

- (a)(2) and (5) (a) In all cases when liquid solvents, paint and preservative removers, paints or vehicles, other than those covered by 1915.35(b), are capable of producing a flammable atmosphere under the conditions of use, the following precautions shall be taken:
- (2) Ventilation shall be provided in sufficient quantities to keep the concentration of vapors below 10 percent of their lower explosive limit. Frequent tests shall be made by a competent person to ascertain the concentration.
 - (5) A competent person shall inspect all power and lighting cables to ensure that the insulation is in excellent condition, free of all cracks and worn spots, that there are no connections within 50 feet (15.2 meters) of the operation, that lines are not overloaded, and that they are suspended with sufficient slack to prevent undue stress or chafing.

Subpart D – Welding, Cutting and Heating

1915.53 Welding, cutting and heating in way of preservative coatings

- (b), (e)(1), (f)
- (b) Before welding, cutting or heating is commenced on any surface covered by a preservative coating whose flammability is not known, a test shall be made by a competent person to determine its flammability. Preservative coatings shall be considered to be highly flammable when scrapings burn with extreme rapidity.
 - (e) Before welding, cutting or heating is commenced in enclosed spaces on metals covered by soft and greasy preservatives, the following precautions shall be taken:
 - (1) A competent person shall test the atmosphere in the space to ensure that it does not contain explosive vapors, since there is a possibility that some soft and greasy preservatives may have flash points below temperatures which may be expected to occur naturally. If such vapors are determined to be present, no hot work shall be commenced until such precautions have been taken as will ensure that the welding, cutting or heating can be performed in safety.
 - (f) Immediately after welding, cutting or heating is commenced in enclosed spaces on metal covered by soft and greasy preservatives, and at frequent intervals thereafter, a competent person shall make tests to ensure that no flammable vapors are being produced by the coatings. If such vapors are determined to be present, the operation shall be stopped immediately and shall not be resumed until such additional precautions have been taken as are necessary to ensure that the operation can be resumed safely.

1915.54 Welding, cutting and heating of hollow metal containers and structures not covered by 1915.12

- (c) Before welding, cutting, heating or brazing is begun on structural voids such as skegs, bilge keels, fair waters, masts, booms, support stanchions, pipe stanchions or railings, a competent person shall inspect the object and, if necessary, test it for the presence of flammable liquids or vapors. If flammable liquids or vapors are present, the objects shall be made safe.

1915.55 Gas welding and cutting

(d)(1)
through (6)

- (d) Use of fuel gas.** The employer shall thoroughly instruct employees in the safe use of fuel gas, as follows:
- (1) Before connecting a regulator to a cylinder valve, the valve shall be opened slightly and closed immediately. (This action is generally termed “cracking” and is intended to clear the valve of dust or dirt that might otherwise enter the regulator.) The person cracking the valve shall stand to one side of the outlet, not in front of it. The valve of a fuel gas cylinder shall not be cracked where the gas would reach welding work, sparks, flame or other possible sources of ignition.
 - (2) The cylinder valve shall always be opened slowly to prevent damage to the regulator. To permit quick closing, valves on fuel gas cylinders shall not be opened more than 1-1/2 turns. When a special wrench is required, it shall be left in position on the stem of the valve while the cylinder is in use so that the fuel gas flow can be shut off quickly in case of an emergency. In the case of manifolded or coupled cylinders, at least one such wrench shall always be available for immediate use. Nothing shall be placed on top of a fuel gas cylinder, when in use, which may damage the safety device or interfere with the quick closing of the valve.
 - (3) Fuel gas shall not be used from cylinders through torches or other devices which are equipped with shutoff valves without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold.
 - (4) Before a regulator is removed from a cylinder valve, the cylinder valve shall always be closed and the gas released from the regulator.
 - (5) If, when the valve on a fuel gas cylinder is opened, there is found to be a leak around the valve stem, the valve shall be closed and the gland nut tightened. If this action does not stop the leak, the use of the cylinder shall be discontinued, and it shall be properly tagged and removed from the vessel. In the event that fuel gas should leak from the cylinder valve rather than from the valve stem and the gas cannot be shut off, the cylinder shall be properly tagged and removed from the vessel. If a regulator attached to a cylinder valve will effectively stop a leak through the valve seal, the cylinder need not be removed from the vessel.
 - (6) If a leak should develop at a fuse plug or other safety device, the cylinder shall be removed from the vessel.

1915.56 Arc welding and cutting

(d)(1)
through (4)

- (d) Operating instructions.** Employers shall instruct employees in the safe means of arc welding and cutting as follows:
- (1) When electrode holders are to be left unattended, the electrodes shall be removed and the holders shall be so placed or protected so that they cannot make electrical contact with employees or conducting objects.
 - (2) Hot electrode holders shall not be dipped in water, since to do so may expose the arc welder or cutter to electric shock.
 - (3) When the arc welder or cutter has occasion to leave his work or to stop work for any appreciable length of time, or when the arc welding or cutting machine is to be moved, the power supply switch to the equipment shall be opened.
 - (4) Any faulty or defective equipment shall be reported to the supervisor.

1915.57 Uses of fissionable material

- (b) Any activity which involves the use of radioactive material, whether or not under license from the Nuclear Regulatory Commission, shall be performed by competent persons specially trained in the proper and safe operation of such equipment. In the case of materials used under Commission license, only persons actually licensed, or competent persons under direction and supervision of the licensee, shall perform such work.

Subpart E – Scaffolds, Ladders and Other Working Surfaces

1915.71 Scaffolds or staging

(b) General requirements

- (7) No scaffold shall be erected, moved, dismantled or altered except under the supervision of competent persons.

Subpart F – General Working Conditions

1915.89 Control of hazardous energy (lockout/tags-plus)

(o)(1) through
(7); (r)(1)

(o) Information and training

- (1) *Initial training.* The employer shall train each employee in the applicable requirements of this section no later than October 31, 2011.
- (2) *General training content.* The employer shall train each employee who is, or may be, in an area where lockout/tags-plus systems are being used so they know:
 - (i) The purpose and function of the employer's lockout/tags-plus program and procedures;
 - (ii) The unique identity of the locks and tags to be used in the lockout/tags-plus system, as well as the standardized color, shape or size of these devices;
 - (iii) The basic components of the tags-plus system: an energy-isolating device with a tag affixed to it and an additional safety measure;
 - (iv) The prohibition against tampering with or removing any lockout/tags-plus system; and
 - (v) The prohibition against restarting or reenergizing any machinery, equipment, or system being serviced under a lockout/tags-plus system.
- (3) *Additional training requirements for affected employees.* In addition to training affected employees in the requirements in paragraph (o)(2) of this section, the employer also shall train each affected employee so he/she knows:
 - (i) The use of the employer's lockout/tags-plus program and procedures;
 - (ii) That affected employees are not to apply or remove any lockout/tags-plus system; and
 - (iii) That affected employees are not to bypass, ignore, or otherwise defeat any lockout/tags-plus system.

- (4) *Additional training requirements for authorized employees.* In addition to training authorized employees in the requirements in paragraphs (o)(2) and (o)(3) of this section, the employer also shall train each authorized employee so he/she knows:
- (i) The steps necessary for the safe application, use, and removal of lockout/tags-plus systems to prevent energization or startup or the release of hazardous energy during servicing of machinery, equipment, or systems;
 - (ii) The type of energy sources and the magnitude of the energy available at the worksite;
 - (iii) The means and methods necessary for effective isolation and control of hazardous energy;
 - (iv) The means for determining the safe exposure status of other employees in a group when the authorized employee is working as a group's primary authorized employee;
 - (v) The requirement for tags to be written so they are legible and understandable to all employees;
 - (vi) The requirement that tags and their means of attachment be made of materials that will withstand the environmental conditions encountered in the workplace;
 - (vii) The requirement that tags be securely attached to energy-isolating devices so they cannot be accidentally removed while servicing machinery, equipment, or systems;
 - (viii) That tags are warning devices, and alone do not provide physical barriers against energization or startup, or the release of hazardous energy, provided by locks, and energy-isolating devices; and
 - (ix) That tags must be used in conjunction with an energy-isolating device to prevent energization or startup or the release of hazardous energy.
- (5) *Additional training for lockout/tags-plus coordinator.* In addition to training lockout/tags-plus coordinators in the requirements in paragraphs (o)(2), (o)(3), and (o)(4) of this section, the employer shall train each lockout/tags-plus coordinator so he/she knows:
- (i) How to identify and isolate any machinery, equipment, or system that is being serviced; and
 - (ii) How to accurately document lockout/tags-plus systems and maintain the lockout/tags-plus log.

- (6) *Employee retraining.*
 - (i) The employer shall retrain each employee, as applicable, whenever
 - (A) There is a change in his/her job assignment that presents new hazards or requires a greater degree of knowledge about the employer's lockout/tags-plus program or procedures;
 - (B) There is a change in machinery, equipment, or systems to be serviced that presents a new energy-control hazard;
 - (C) There is a change in the employer's lockout/tags-plus program or procedures; or
 - (D) It is necessary to maintain the employee's proficiency
 - (ii) The employer also shall retrain each employee, as applicable, whenever an incident investigation or program audit indicates that there are:
 - (A) Deviations from, or deficiencies in, the employer's lockout/tags-plus program or procedures; or
 - (B) Inadequacies in an employee's knowledge or use of the lockout/tags-plus program or procedures.
 - (iii) The employer shall ensure that retraining establishes the required employee knowledge and proficiency in the employer's lockout/tags-plus program and procedures and in any new or revised energy-control procedures
- (7) Upon completion of employee training, the employer shall keep a record that the employee accomplished the training, and that this training is current. The training record shall contain at least the employee's name, date of training, and the subject of the training.

(r) Recordkeeping

- (1) Table to paragraph (r)(1) of this section specifies what records the employer must retain and how long the employer must retain them:

***Table to Paragraph (r)(1) of This Section—
Retention of Records Required by 1915.89***

The employer must keep the following records . . .	For at least . . .
(i) Current lockout/tags-plus program and procedures	Until replaced by updated program and procedures.
(ii) Training records	Until replaced by updated records for each type of training.
(iii) Incident investigation reports	Until the next program audit is completed.
(iv) Program audit report	12 months after being replaced by the next audit report.

- (2) The employer shall make all records required by this section available to employees, their representatives, and the Assistant Secretary in accordance with the procedures and time periods specified in 29 CFR 1910.1020(e)(1) and (e)(3).

Subpart G – Gear and Equipment for Rigging and Materials Handling

1915.112 Ropes, chains and slings

(c) Chain and chain slings

- (5) All repairs to chains shall be made under qualified supervision. Links or portions of the chain found to be defective as described in paragraph (c)(4) of this section shall be replaced by links having proper dimensions and made of material similar to that of the chain. Before repaired chains are returned to service, they shall be proof tested to the proof test load recommended by the manufacturer.

1915.116 Use of gear

- (l) An individual who is familiar with the signal code in use shall be assigned to act as a signalman when the hoist operator cannot see the load being handled. Communications shall be made by means of clear and distinct visual or auditory signals except that verbal signals shall not be permitted.

1915.117 Qualifications of operators

Paragraphs (a) and (d) of this section shall apply to ship repairing and shipbuilding only. Paragraphs (b) and (c) of this section shall apply to ship repairing, shipbuilding and shipbreaking.

- (a) When ship's gear is used to hoist materials aboard, a competent person shall determine that the gear is properly rigged, that it is in safe condition, and that it will not be overloaded by the size and weight of the lift.
- (b) Only those employees who understand the signs, notices, and operating instructions, and are familiar with the signal code in use, shall be permitted to operate a crane, winch, or other power operated hoisting apparatus.

Subpart H – Tools and Related Equipment

1915.135 Powder actuated fastening tools

- (a) and (c)(1) through (6) (a) This section shall apply to ship repairing and shipbuilding only.
- (c) *Instruction of operators.* Before employees are permitted to use powder actuated tools, they shall have been thoroughly instructed by a competent person with respect to the requirements of paragraph (b) of this section and the safe use of such tools as follows:
 - (1) Before using a tool, the operator shall inspect it to determine that it is clean, that all moving parts operate freely and that the barrel is free from obstructions.
 - (2) When a tool develops a defect during use, the operator shall immediately cease to use it and shall notify his supervisor.
 - (3) Tools shall not be loaded until just prior to the intended firing time and the tool shall not be left unattended while loaded.
 - (4) The tool, whether loaded or empty, shall not be pointed at any person, and hands shall be kept clear of the open barrel end.
 - (5) In case of a misfire, the operator shall hold the tool in the operating position for at least 15 seconds and shall continue to hold the muzzle against the work surface during disassembly or opening of the tool and removal of the powder load.
 - (6) Neither tools nor powder charges shall be left unattended in places where they would be available to unauthorized persons.

1915.136 Internal combustion engines, other than ships' equipment

- (c) When internal combustion engines on vehicles, such as forklifts and mobile cranes, or on portable equipment such as fans, generators, and pumps, exhaust into the atmosphere below decks, the competent person shall make tests of the carbon monoxide content of the atmosphere as frequently as conditions require to ensure that dangerous concentrations do not develop. Employees shall be removed from the compartment involved when the carbon monoxide concentration exceeds 50 parts per million (0.005%). The employer shall use blowers sufficient in size and number and so arranged as to maintain the concentration below this allowable limit before work is resumed.

Subpart I – Personal Protective Equipment (PPE)

1915.152 General requirements

(e)(1) through (3) (e) Training

- (1) The employer shall provide training to each employee who is required by this section to use PPE (Exception: Training in the use of personal fall arrest systems and positioning device systems is covered in Sections 1915.159 and 1915.160). Each employee shall be trained to understand at least the following:
 - (i) When PPE is necessary;
 - (ii) What PPE is necessary;
 - (iii) How to properly don, doff, adjust, and wear PPE;
 - (iv) The limitations of the PPE; and
 - (v) The proper care, maintenance, useful life, and disposal of the PPE.
- (2) The employer shall ensure that each affected employee demonstrates the ability to use PPE properly before being allowed to perform work requiring the use of PPE.
- (3) The employer shall retrain any employee who does not understand or display the skills required by paragraph (e)(2) of this section. Circumstances where retraining is required include, but are not limited to, situations where:

- (i) Changes in occupation or work render previous training obsolete; or
- (ii) Changes in the types of PPE to be used render previous training obsolete; or
- (iii) Inadequacies in an affected employee's knowledge or use of assigned PPE indicate that the employee has not retained the requisite understanding or skill.

1915.154 Respiratory protection

Respiratory protection for shipyard employment is covered by 29 CFR 1910.134.

1915.159 Personal fall arrest systems (PFAS)

- (d) **Training.** Before using personal fall arrest equipment, each affected employee shall be trained to understand the application limits of the equipment and proper hook-up, anchoring, and tie-off techniques. Affected employees shall also be trained so that they can demonstrate the proper use, inspection, and storage of their equipment.

1915.160 Positioning device systems

- (d) **Training.** Before using a positioning device system, employees shall be trained in the application limits, proper hook-up, anchoring and tie-off techniques, methods of use, inspection, and storage of positioning device systems.

Subpart K – Portable, Unfired Pressure Vessels, Drums and Containers, Other Than Ship's Equipment

1915.172 Portable air receivers and other unfired pressure vessels

- (b) Portable, unfired pressure vessels, not built to the code requirements of paragraph (a) of this section, and built prior to the effective date of this regulation, shall be examined quarterly by a competent person. They shall be subjected yearly to a hydrostatic pressure test of one and one-half times the working pressure of the vessels.

Subpart P – Fire Protection in Shipyard Employment

1915.508 Training

- (a) **The employer must train employees in the applicable requirements of this section:**
 - (1) Within 90 days of December 14, 2004, for employees currently working;
 - (2) Upon initial assignment for new employees; and
 - (3) When necessary to maintain proficiency for employees previously trained.
- (b) **Employee training.** The employer must ensure that all employees are trained on:
 - (1) The emergency alarm signals, including system discharge alarms and employee evacuation alarms; and
 - (2) The primary and secondary evacuation routes that employees must use in the event of a fire in the workplace. While all vessels and vessel sections must have a primary evacuation route, a secondary evacuation route is not required when impracticable.
- (c) **Additional training requirements for employees expected to fight incipient stage fires.** The employer must ensure that employees expected to fight incipient stage fires are trained on the following:
 - (1) The general principles of using fire extinguishers or hose lines, the hazards involved with incipient firefighting, and the procedures used to reduce these hazards;
 - (2) The hazards associated with fixed and portable fire protection systems that employees may use or to which they may be exposed during discharge of those systems; and
 - (3) The activation and operation of fixed and portable fire protection systems that the employer expects employees to use in the workplace.
- (d) **Additional training requirements for shipyard employees designated for fire response.** The employer must:
 - (1) Have a written training policy stating that fire response employees must be trained and capable of carrying out their duties and responsibilities at all times;
 - (2) Keep written standard operating procedures that address anticipated emergency operations and update these procedures as necessary;

- (3) Review fire response employee training programs and hands-on sessions before they are used in fire response training to make sure that fire response employees are protected from hazards associated with fire response training;
 - (4) Provide training for fire response employees that ensures they are capable of carrying out their duties and responsibilities under the employer's standard operating procedures;
 - (5) Train new fire response employees before they engage in emergency operations;
 - (6) At least quarterly, provide training on the written operating procedures to fire response employees who are expected to fight fires;
 - (7) Use qualified instructors to conduct the training;
 - (8) Conduct any training that involves live fire response exercises in accordance with NFPA 1403-2002 Standard on Live Fire Training Evolutions (incorporated by reference, see 1915.5);
 - (9) Conduct semi-annual drills according to the employer's written procedures for fire response employees that cover site-specific operations, occupancies, buildings, vessels and vessel sections, and fire-related hazards; and
 - (10) Prohibit the use of smoke generating devices that create a dangerous atmosphere in training exercises.
- (e) Additional training requirements for fire watch duty.**
- (1) The employer must ensure that each fire watch is trained by an instructor with adequate fire watch knowledge and experience to cover the items as follows:
 - (i) Before being assigned to fire watch duty;
 - (ii) Whenever there is a change in operations that presents a new or different hazard;
 - (iii) Whenever the employer has reason to believe that the fire watch's knowledge, skills, or understanding of the training previously provided is inadequate; and
 - (iv) Annually.
 - (2) The employer must ensure that each employee who stands fire watch duty is trained in:

- (i) The basics of fire behavior, the different classes of fire and of extinguishing agents, the stages of fire, and methods for extinguishing fires;
 - (ii) Extinguishing live fire scenarios whenever allowed by local and federal law;
 - (iii) The recognition of the adverse health effects that may be caused by exposure to fire;
 - (iv) The physical characteristics of the hot work area;
 - (v) The hazards associated with fire watch duties;
 - (vi) The personal protective equipment (PPE) needed to perform fire watch duties safely;
 - (vii) The use of PPE;
 - (viii) The selection and use of any fire extinguishers and fire hoses likely to be used by a fire watch in the work area;
 - (ix) The location and use of barriers;
 - (x) The means of communication designated by the employer for fire watches;
 - (xi) When and how to start fire alarm procedures; and
 - (xii) The employer's evacuation plan.
- (3) The employer must ensure that each fire watch is trained to alert others to exit the space whenever:
- (i) The fire watch perceives an unsafe condition;
 - (ii) The fire watch perceives that a worker performing hot work is in danger;
 - (iii) The employer or a representative of the employer orders an evacuation; or
 - (iv) An evacuation signal, such as an alarm, is activated.
- (f) **Records.** The employer must keep records that demonstrate that employees have been trained as required by paragraphs (a) through (e) of this section.
- (1) The employer must ensure that the records include the employee's name; the trainer's name; the type of training; and the date(s) on which the training took place.
 - (2) The employer must keep each training record for one year from the time it was made or until it is replaced with a new training record, whichever is shorter, and make it available for inspection and copying by OSHA on request.

Subpart Z – Toxic and Hazardous Substances

1915.1001 Asbestos

(k)(9) and (10); **(k) Communication of hazards**

(o)(1) and (4);
Appendix L

(9) *Employee information and training.*

- (i) The employer shall train each employee who is likely to be exposed in excess of a PEL and each employee who performs Class I through IV asbestos operations in accordance with the requirements of this section. Training shall be provided at no cost to the employee. The employer shall institute a training program and ensure employee participation in the program.
- (ii) Training shall be provided prior to or at the time of initial assignment and at least annually thereafter.
- (iii) Training for Class I operations and for Class II operations that require the use of critical barriers (or equivalent isolation methods) and/or negative pressure enclosures under this section shall be the equivalent in curriculum, training method and length to the EPA Model Accreditation Plan (MAP) asbestos abatement workers training (40 CFR part 763, subpart E, appendix C).
- (iv) *Training for other Class II work.*
 - (A) For work with asbestos containing roofing materials, flooring materials, siding materials, ceiling tiles, or transite panels, training shall include at a minimum all the elements included in paragraph (k)(9)(viii) of this section and in addition, the specific work practices and engineering controls set forth in paragraph (g) of this section which specifically relate to that category. Such course shall include “hands-on” training and shall take at least 8 hours.
 - (B) An employee who works with more than one of the categories of material specified in paragraph (k)(9)(iv) (A) of this section shall receive training in the work practices applicable to each category of material that the employee removes and each removal method that the employee uses.

- (C) For Class II operations not involving the categories of material specified in paragraph (k)(9)(iv)(A) of this section, training shall be provided which shall include at a minimum all the elements included in paragraph (k)(9)(viii) of this section and in addition, the specific work practices and engineering controls set forth in paragraph (g) of this section which specifically relate to the category of material being removed, and shall include “hands-on” training in the work practices applicable to each category of material that the employee removes and each removal method that the employee uses.
- (v) Training for Class III employees shall be consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92(a)(2). Such a course shall also include “hands-on” training and shall take at least 16 hours. Exception: For Class III operations for which the competent person determines that the EPA curriculum does not adequately cover the training needed to perform that activity, training shall include as a minimum all the elements included in paragraph (k)(9)(viii) of this section and in addition, the specific work practices and engineering controls set forth in paragraph (g) of this section which specifically relate to that activity, and shall include “hands-on” training in the work practices applicable to each category of material that the employee disturbs.
- (vi) Training for employees performing Class IV operations shall be consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92(a)(1). Such a course shall include available information concerning the locations of thermal system insulation and surfacing ACM/PACM, and asbestos-containing flooring material, or flooring material where the absence of asbestos has not yet been certified; and instruction in the recognition of damage, deterioration, and delamination of asbestos containing building materials. Such a course shall take at least 2 hours.
- (vii) Training for employees who are likely to be exposed in excess of the PEL and who are not otherwise required to be trained under paragraph (k)(9) (iii) through (vi) of this section, shall meet the requirements of paragraph (k)(9)(viii) of this section.

- (viii) The training program shall be conducted in a manner that the employee is able to understand. In addition to the content required by the provisions in paragraphs (k)(9)(iii) through (vi) of this section, the employer shall ensure that each such employee is informed of the following:
- (A) Methods of recognizing asbestos, including the requirement in paragraph (k)(1) of this section to presume that certain building materials contain asbestos;
 - (B) The health effects associated with asbestos exposure;
 - (C) The relationship between smoking and asbestos in producing lung cancer;
 - (D) The nature of operations that could result in exposure to asbestos, the importance of necessary protective controls to minimize exposure including, as applicable, engineering controls, work practices, respirators, housekeeping procedures, hygiene facilities, protective clothing, decontamination procedures, emergency procedures, and waste disposal procedures, and any necessary instruction in the use of these controls and procedures; where Class III and IV work will be or is performed, the contents of EPA 20T-2003, “Managing Asbestos In-Place” July 1990 or its equivalent in content;
 - (E) The purpose, proper use, fitting instructions, and limitations of respirators as required by 29 CFR 1910.134;
 - (F) The appropriate work practices for performing the asbestos job;
 - (G) Medical surveillance program requirements;
 - (H) The content of this standard including appendices;
 - (I) The names, addresses and phone numbers of public health organizations which provide information, materials and/or conduct programs concerning smoking cessation. The employer may distribute the list of such organizations contained in Appendix J to this section, to comply with this requirement; and
 - (J) The requirements for posting signs and affixing labels and the meaning of the required legends for such signs and labels.

(10) *Access to training materials.*

- (i) The employer shall make readily available to affected employees without cost, written materials relating to the employee training program, including a copy of this regulation.
- (ii) The employer shall provide to the Assistant Secretary and the Director, upon request, all information and training materials relating to the employee information and training program.
- (iii) The employer shall inform all employees concerning the availability of self-help smoking cessation program material. Upon employee request, the employer shall distribute such material, consisting of NIH Publication No. 89-1647, or equivalent self-help material, which is approved or published by a public health organization listed in Appendix J to this section.

(n) Recordkeeping

- (4) *Training records.* The employer shall maintain all employee training records for one (1) year beyond the last date of employment by that employer.

(o) Qualified person

- (1) *General.* On all shipyard worksites covered by this standard, the employer shall designate a qualified person having the qualifications and authority for ensuring worker safety and health required by Subpart C, General Safety and Health Provisions for Construction (29 CFR 1926.20 through 1926.31).
- (4) *Training for the competent person.*
 - (i) For Class I and II asbestos work the qualified person shall be trained in all aspects of asbestos removal and handling, including: Abatement, installation, removal and handling; the contents of this standard; the identification of asbestos; removal procedures, where appropriate; and other practices for reducing the hazard. Such training shall be obtained in a comprehensive course for supervisors, that meets the criteria of EPA's Model Accredited Plan (40 CFR part 763, subpart E, Appendix C), such as a course conducted by an EPA-approved or state-approved training provider, certified by EPA or a state, or a course equivalent in stringency, content, and length.
 - (ii) For Class III and IV asbestos work, the qualified person shall be trained in aspects of asbestos handling appropriate

for the nature of the work, to include procedures for setting up glove bags and mini-enclosures, practices for reducing asbestos exposures, use of wet methods, the contents of this standard, and the identification of asbestos. Such training shall include successful completion of a course that is consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92(a)(2), or its equivalent in stringency, content, and length. Qualified persons for Class III and Class IV work may also be trained pursuant to the requirements of paragraph (o)(4)(i) of this section.

Appendix L — Work Practices and Engineering Controls for Automotive Brake and Clutch Inspection, Disassembly, Repair and Assembly — Mandatory

This mandatory appendix specifies engineering controls and work practices that must be implemented by the employer during automotive brake and clutch inspection, disassembly, repair, and assembly operations. Proper use of these engineering controls and work practices by trained employees will reduce employees' asbestos exposure below the permissible exposure level during clutch and brake inspection, disassembly, repair, and assembly operations. The employer shall institute engineering controls and work practices using either the method set forth in paragraph [A] or paragraph [B] of this appendix, or any other method which the employer can demonstrate to be equivalent in terms of reducing employee exposure to asbestos as defined and which meets the requirements described in paragraph [C] of this appendix, for those facilities in which no more than 5 pairs of brakes or 5 clutches are inspected, disassembled, reassembled and/or repaired per week, the method set forth in paragraph [D] of this appendix may be used:

1915.1003 13 Carcinogens (4-Nitrobiphenyl, etc.)

Note: The requirements applicable to shipyard employment under this section are identical to those set forth in 29 CFR 1910.1003.

1915.1017 Vinyl chloride

Note: The requirements applicable to shipyard employment under this section are identical to those set forth in 29 CFR 1910.1017.

1915.1018 Inorganic arsenic

Note: The requirements applicable to shipyard employment under this section are identical to those set forth in 29 CFR 1910.1018.

1915.1025 Lead

Note: The requirements applicable to shipyard employment under this section are identical to those set forth in 29 CFR 1910.1025.

1915.1027 Cadmium

Note: The requirements applicable to shipyard employment under this section are identical to those set forth in 29 CFR 1910.1027.

1915.1028 Benzene

Note: The requirements applicable to shipyard employment under this section are identical to those set forth in 29 CFR 1910.1028.

1915.1030 Bloodborne pathogens

Note: The requirements applicable to shipyard employment under this section are identical to those set forth in 29 CFR 1910.1030.

1915.1044 1,2-Dibromo-3-Chloropropane

Note: The requirements applicable to shipyard employment under this section are identical to those set forth in 29 CFR 1910.1044.

1915.1045 Acrylonitrile

Note: The requirements applicable to shipyard employment under this section are identical to those set forth in 29 CFR 1910.1045.

1915.1047 Ethylene oxide

Note: The requirements applicable to shipyard employment under this section are identical to those set forth in 29 CFR 1910.1047.

1915.1048 Formaldehyde

Note: The requirements applicable to shipyard employment under this section are identical to those set forth in 29 CFR 1910.1048.

1915.1050 Methylenedianiline

Note: The requirements applicable to shipyard employment under this section are identical to those set forth in 29 CFR 1910.1050.

1915.1200 Hazard Communication

Note: The requirements applicable to shipyard employment under this section are identical to those set forth in 29 CFR 1910.1200.

1915.1450 Occupational exposure to hazardous chemicals in laboratories

Note: The requirements applicable to shipyard employment under this section are identical to those set forth in 29 CFR 1910.1450.

29 CFR PART 1917 – MARINE TERMINALS

Subpart A – General Provisions

1917.1 Scope and applicability

(a)(2)

(iii) Commercial diving operations

Note: The requirements applicable to Marine Terminals under this section are identical to those set forth in 29 CFR 1910.410(a)(1); (2)(i) through (iii); (3) and (4).

(iv) Electrical (safety-related work practices)

Note: The requirements applicable to Marine Terminals under this section are identical to those set forth in 29 CFR 1910.332(b)(1).

(v) Grain handling facilities

Note: The requirements applicable to Marine Terminals under this section are identical to those set forth in 29 CFR 1910.272(e)(1)(i) and (ii) and (2).

(vi) Hazard communication

Note: The requirements applicable to Marine Terminals under this section are identical to those set forth in 29 CFR 1910.1200(h)(1) and (3)(i) through (iv).

(vii) Ionizing radiation

Note: The requirements applicable to Marine Terminals under this section are identical to those set forth in 29 CFR 1910.1096(i)(2).

(viii) Noise (hearing protection)

Note: The requirement applicable to Marine Terminals under this section are identical to those set forth in 29 CFR 1910.95(i)(4).

(x) Respiratory protection

Note: The requirements applicable to Marine Terminals under this section are identical to those set forth in 29 CFR 1910.134(k)(3)

(xii) Servicing multi-piece and single-piece rim wheels

Note: The requirement applicable to Marine Terminals under this section are identical to those set forth in 29 CFR 1910.177(c)(1)(i) through (iii); (2)(i) through (viii) and (3) including single piece wheels per Federal Register of February 3, 1984 (pp. 4338-4352) but not automobile or truck tires marked “LT.”

(xiii) Toxic and hazardous substances

Note: The requirements applicable to Marine Terminals under this section are identical to those set forth in 29 CFR 1910 Subpart Z.

Subpart B – Marine Terminal Operations

1917.23 Hazardous atmospheres and substances

(b)(1) and (d)(3) **Note:** The requirements applicable to Marine Terminals under this section are identical to those set forth in 29 CFR 1910 Subpart Z.

(b) Determination of hazard

(1) When the employer is aware that a room, building, vehicle, railcar, or other space contains or has contained a hazardous atmosphere, a designated and appropriately equipped person shall test the atmosphere before employee entry to determine whether a hazardous atmosphere exists.

(d) Entry into hazardous atmospheres. Only designated persons shall enter hazardous atmospheres, in which case the following provisions shall apply:

(3) Except for emergency or rescue operations, employees shall not enter into any atmosphere which has been identified as flammable or oxygen deficient (less than 19.5 percent oxygen). Persons who may be required to enter flammable or oxygen deficient atmospheres in emergency operations shall be instructed in the dangers attendant to those atmospheres and instructed in the use of self-contained breathing apparatus, which shall be utilized.

1917.25 Fumigants, pesticides, insecticides, and hazardous preservatives

(e) Only designated persons shall enter hazardous atmospheres, in which place the following provisions apply.

(2) Persons entering a space containing a hazardous atmosphere shall be instructed in the nature of the hazard, precautions to be taken, and the use of protective and emergency equipment. Standby observers, similarly equipped and instructed, shall continuously monitor the activity of employees within such a space.

1917.27 Personnel

(a)(1) and
(b)(1) and (2)

(a) Qualifications of machinery operators.

- (1) Only those employees determined by the employer to be competent by reason of training or experience, and who understand the signs, notices and operating instructions and are familiar with the signal code in use shall be permitted to operate a crane, winch or other power operated cargo handling apparatus, or any power operated vehicle, or give signals to the operator of any hoisting apparatus. Exception: Employees being trained and supervised by a designated person may operate such machinery and give signals to operators during training.

(b) Supervisory accident prevention proficiency

- (1) After October 3, 1985 immediate supervisors of cargo-handling operations of more than five (5) persons shall satisfactorily complete a course in accident prevention. Employees newly assigned to supervisory duties after that date shall be required to meet the provisions of this paragraph within 90 days of such assignment.
- (2) The course shall consist of instruction suited to the particular operations involved.*

*The following are recommended topics: (i) Safety responsibility and authority; (ii) elements of accident prevention; (iii) attitudes, leadership and motivation; (iv) hazards of longshoring, including peculiar local circumstances; (v) hazard identification and elimination; (vi) applicable regulations; and (vii) accident investigations.

1917.28 Hazard communication

Note: The requirements applicable to Marine Terminals under this section are identical to those set forth in 29 CFR 1910.1200(h)(1) and (3)(i) through (iv).

1917.30 Emergency action plans

(a)(5)(i)
through (iii)

(a) Emergency action plans

- (5) *Training.*
 - (i) Before implementing the emergency action plan, the employer shall designate and train a sufficient number of persons to assist in the safe and orderly emergency evacuation of employees.
 - (ii) The employer shall review the plan with each employee covered by the plan at the following times:
 - (A) Initially when the plan is developed;

- (B) Whenever the employee's responsibilities or designated actions under the plan change; and,
- (C) Whenever the plan is changed.
- (iii) The employer shall review with each employee upon initial assignment those parts of the plan that the employee must know to protect the employee in the event of an emergency. The written plan shall be kept at the workplace and be made available for employee review.

Subpart C – Cargo Handling Gear and Equipment

1917.44 General rules applicable to vehicles

- (a), (i), and (o)(3)
- (a) The requirements of this section apply to general vehicle use within marine terminals. Exception: The provisions of paragraphs (c) and (1) of this section do not apply when preempted by applicable regulation of the Department of Transportation.
 - (i) A distance of not less than 20 feet (6.1 meters) shall be maintained between the first two vehicles in a check-in, check-out, roadability, or vessel loading/discharging line. The distance shall be maintained between any subsequent vehicles behind which employees are required to work.
 - (o) *Servicing multi-piece and single piece rim wheels.* Servicing of multi-piece and single piece rim wheels is covered by 1910.177.
 - (3) *Employee training.*
 - (i) Only employees trained in the procedures required in paragraph (o)(4) of this section and who have demonstrated their ability to service multi-piece rim wheels shall be assigned to such duties.
 - (ii) Employees assigned such duties shall have demonstrated their ability by the safe performance of the following tasks:
 - (A) Tire demounting (including deflation);
 - (B) Inspection of wheel components;
 - (C) Mounting of tires;

- (D) Inflation of tires, including use of a restraining device;
- (E) Handling of wheels;
- (F) Inflation of tires when a wheel is mounted on the vehicle; and
- (G) Installation and removal of wheels.

Subpart D – Specialized Terminals

1917.73 Terminal facilities handling menhaden and similar species of fish

- (d) The plant superintendent and foremen shall be trained and be knowledgeable about the hazards of hydrogen sulfide and oxygen deficiency. They shall be trained in the use of appropriate respiratory and other protective equipment, and in rescue procedures. Other supervisory plant personnel shall be informed of these hazards and instructed in the necessary safety measures, including use of respiratory and rescue equipment.

Subpart G – Related Terminal Operations and Equipment

1917.152 Welding, cutting and heating (hot work)

- (c) **Fire protection**
 - (4) When the hot work operation is such that normal fire prevention precautions are not sufficient, additional personnel shall be assigned to guard against fire during hot work and for a sufficient time after completion of the work to ensure that no fire hazard remains. The employer shall instruct all employees involved in hot work operations as to potential fire hazards and the use of firefighting equipment.

29 CFR PART 1918 – SAFETY AND HEALTH REGULATIONS FOR LONGSHORING

Subpart A – Scope and Definitions

1918.1 Scope and application

(b) Part 1910 of this chapter does not apply to longshoring except for the following provisions:

(2) *Commercial diving operations.*

Note: The requirements applicable to Longshoring under this section are identical to those set forth in 29 CFR 1910.410(a)(1); (2)(i) through (iii); (3) and (4).

(3) *Electrical safety-related work practices.*

Note: The requirements applicable to Longshoring under this section are identical to those set forth in 29 CFR 1910.332(b)(1).

(4) *Hazard communication.*

Note: The requirements applicable to Longshoring under this section are identical to those set forth in 29 CFR 1910.1200(h)(1) and (3)(i) and (iv).

(5) *Ionizing radiation.*

Note: The requirements applicable to Longshoring under this section are identical to those set forth in 29 CFR 1910.1096(i)(2).

(6) *Noise (hearing protection).*

Note: The requirements applicable to Longshoring under this section are identical to those set forth in 29 CFR 1910.95(i)(4).

(8) *Respiratory protection.*

Note: The requirements applicable to Longshoring under this section are identical to those set forth in 29 CFR 1910.134(k)(3).

(9) *Toxic and Hazardous Substances.*

Note: The requirements applicable to Longshoring under this section are identical to those set forth in 29 CFR 1910, Subpart Z.

Subpart H – Handling Cargo

1918.85 Containerized cargo operations

(k) Fall Protection Systems

- (12) Before using any fall protection system, the employee shall be trained in the use and application limits of the equipment, proper hook-up, anchoring and tie-off techniques, methods of use, and proper methods of equipment inspection and storage.

Subpart I – General Working Conditions

1918.93 Hazardous atmospheres and substances

(d) Entry into hazardous atmospheres

- (3) Except in emergency or rescue operations, employees shall not enter any atmosphere identified as flammable or oxygen-deficient (less than 19.5 percent oxygen). Persons who may be required to enter flammable or oxygen-deficient atmospheres in emergency operations shall be instructed in the dangers attendant to those atmospheres and be instructed in the use of self-contained breathing apparatus which shall be used for entry.

1918.94 Ventilation and atmospheric conditions

(b) Fumigated grains

- (3) A test of the fumigant concentration in the atmosphere of the compartment shall be made after loading begins and before employees enter the compartment. Additional tests shall be made as often as necessary to ensure that hazardous concentrations do not develop.
- (v) One or more employees on duty shall be equipped and trained to provide any specific emergency medical treatment stipulated for the particular fumigant.

1918.97 First aid and lifesaving facilities

(b) **First Aid.** A first-aid kit shall be available at or near each vessel being worked. At least one person holding a valid first-aid certificate, such as is issued by the Red Cross or other equivalent organization, shall be available to render first aid when work is in progress.

1918.98 Qualifications of machinery operators and supervisory training

(a) **Qualification of machinery operators**

(1) Only an employee determined by the employer to be competent by reason of training or experience, and who understands the signs, notices, and operating instructions and is familiar with the signal code in use, shall be permitted to operate a crane, winch, or other power-operated cargo handling apparatus, or any power-operated vehicle, or give signals to the operator of any hoisting apparatus. However, an employee being trained and supervised by a designated person may operate such machinery and give signals to operators during training.



Photo: Dona File, Philadelphia, PA

Construction

The following standards have been excerpted from ***Title 29, Code of Federal Regulations Part 1926***. They contain training requirements with which employers must comply. Note that in addition to these ***Part 1926*** standards, ***Part 1910, Occupational Safety and Health Standards***, also contain training standards applicable to construction work.

29 CFR 1910

Subpart B – Adoption and Extension of Established Federal Standards

1910.12 Construction work

- (a) **Standards.** The standards prescribed in part 1926 of this chapter are adopted as occupational safety and health standards under section 6 of the Act [OSH Act] and shall apply, according to the provisions thereof, to every employment and place of employment of every employee engaged in construction work. Each employer shall protect the employment and places of employment of each of his employees engaged in construction work by complying with the appropriate standards prescribed in this paragraph.

- (b) **Definition.** For the purposes of this section, Construction work means work for construction, alteration, and/or repair, including painting and decorating. See discussion of these terms in 1926.13 of this title.
- (c) **Construction Safety Act Distinguished.** This section adopts as occupational safety and health standards under section 6 of the Act the standards which are prescribed in part 1926 of this chapter. Thus, the standards (substantive rules) published in subpart C and following subparts of part 1926 of this chapter are applied. This section does not incorporate subparts A and B of part 1926 of this chapter. Subparts A and B have pertinence only to the application of section 107 of the Contract Work Hours and Safety Standards Act (Construction Safety Act).

29 CFR 1926

Subpart C – General Safety and Health Provisions

1926.20 General safety and health provisions

(b)(1), (2)
and (4); (f)(2)

(b) Accident prevention responsibilities

- (1) It shall be the responsibility of the employer to initiate and maintain such programs as may be necessary to comply with this part.
- (2) Such programs [as may be necessary to comply with this part] shall provide for frequent and regular inspections of the job sites, materials, and equipment to be made by competent persons [capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who have authorization to take prompt corrective measures to eliminate them] designated by the employers.
- (4) The employer shall permit only those employees qualified [one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project] by training or experience to operate equipment and machinery.

(f) **Compliance duties owed to each employee**

- (2) *Training.* Standards in this part requiring training on hazards and related matters, such as standards requiring that employees receive training or that the employer train employees, provide training to employees, or institute or implement a training program, impose a separate compliance duty with respect to each employee covered by the requirement. The employer must train each affected employee in the manner required by the standard, and each failure to train an employee may be considered a separate violation.

1926.21 Safety training and education

(a) and (b)

(a) **General requirements.** The Secretary shall, pursuant to section 107(f) of the Act, establish and supervise programs for the education and training of employers and employees in the recognition, avoidance and prevention of unsafe conditions in employments covered by the act.

(b) **Employer responsibility.**

- (1) The employer should avail himself of the safety and health training programs the Secretary provides.
- (2) The employer shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury.
- (3) Employees required to handle or use poisons, caustics, and other harmful substances shall be instructed regarding the safe handling and use, and be made aware of the potential hazards, personal hygiene, and personal protective measures required.
- (4) In job site areas where harmful plants or animals are present, employees who may be exposed shall be instructed regarding the potential hazards, and how to avoid injury, and the first aid procedures to be used in the event of injury.
- (5) Employees required to handle or use flammable liquids, gases, or toxic materials shall be instructed in the safe handling and use of these materials and made aware of the specific requirements contained in subparts D, F, and other applicable subparts of this part.
- (6) (i) All employees required to enter into confined or enclosed spaces shall be instructed as to the nature of the hazards involved, the necessary precautions to be taken, and in the use of protective and emergency equipment required. The employer shall comply with any specific regulations that apply to work in dangerous or potentially dangerous areas.

- (ii) For purposes of paragraph (b)(6)(i) of this section, *confined or enclosed space* means any space having a limited means of egress, which is subject to the accumulation of toxic or flammable contaminants or has an oxygen deficient atmosphere. Confined or enclosed spaces include, but are not limited to, storage tanks, process vessels, bins, boilers, ventilation or exhaust ducts, sewers, underground utility vaults, tunnels, pipelines, and open top spaces more than 4 feet in depth such as pits, tubs, vaults, and vessels.

1926.32 Definitions

- (f) “Competent person” means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
- (m) “Qualified” means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

1926.35 Employee emergency action plans

(e)(1)
through (3)

(e) Training.

- (1) Before implementing the emergency action plan, the employer shall designate and train a sufficient number of persons to assist in the safe and orderly emergency evacuation of employees.
- (2) The employer shall review the plan with each employee covered by the plan at the following times:
 - (i) Initially when the plan is developed,
 - (ii) Whenever the employee’s responsibilities or designated actions under the plan change, and
 - (iii) Whenever the plan is changed.
- (3) The employer shall review with each employee upon initial assignment those parts of the plan which the employee must know to protect the employee in the event of an emergency. The written plan shall be kept at the workplace and made available for employee review. For those employers with 10 or fewer employees the plan may be communicated orally to employees and the employer need not maintain a written plan.

Subpart D – Occupational Health and Environmental Controls

1926.50 Medical services and first aid

- (c) In the absence of an infirmary, clinic, hospital, or physician, that is reasonably accessible in terms of time and distance to the worksite, which is available for the treatment of injured employees, a person who has a valid certificate in first-aid training from the U.S. Bureau of Mines, the American Red Cross, or equivalent training that can be verified by documentary evidence, shall be available at the worksite to render first aid.

1926.52 Occupational noise exposure

- (d) (1) In all cases where the sound levels exceed the values shown herein, a continuing, effective hearing conservation program shall be administered.

1926.53 Ionizing radiation

- (b) Any activity which involves the use of radioactive materials or X-rays, whether or not under license from the Nuclear Regulatory Commission, shall be performed by competent persons specially trained in the proper and safe operation of such equipment. In the case of materials used under Commission license, only persons actually licensed, or competent persons under direction and supervision of the licensee, shall perform such work.

1926.54 Nonionizing radiation

- (a) Only qualified and trained employees shall be assigned to install, adjust, and operate laser equipment.
- (b) Proof of qualification of the laser equipment operator shall be available and in possession of the operator at all times.

1926.55 Gases, vapors, fumes, dusts, and mists

- (a) Exposure of employees to inhalation, ingestion, skin absorption, or contact with any material or substance at a concentration above those specified in the “Threshold Limit Values of Airborne Contaminants for 1970” of the American Conference of Governmental Industrial Hygienists, shall be avoided. See Appendix A to this section.

- (b) To achieve compliance with paragraph (a) of this section, administrative or engineering controls must first be implemented whenever feasible. When such controls are not feasible to achieve full compliance, protective equipment or other protective measures shall be used to keep the exposure of employees to air contaminants within the limits prescribed in this section. Any equipment and technical measures used for this purpose must first be approved for each particular use by a competent industrial hygienist or other technically qualified person. Whenever respirators are used, their use shall comply with 1926.103.
- (c) Paragraphs (a) and (b) of this section do not apply to the exposure of employees to airborne asbestos, tremolite, anthophyllite, or actinolite dust. Whenever any employee is exposed to airborne asbestos, tremolite, anthophyllite, or actinolite dust, the requirements of 1910.1101 or 1926.58 of this title shall apply.
- (d) Paragraphs (a) and (b) of this section do not apply to the exposure of employees to formaldehyde. Whenever any employee is exposed to formaldehyde, the requirements of 1910.1048 of this title shall apply.

1926.57 Ventilation

(i)(9)(i) and
(i)(11)(v)

(i) Open surface tanks

(9) Personal protection.

- (i) All employees working in and around open-surface tank operations must be instructed as to the hazards of their respective jobs, and in the personal protection and first aid procedures applicable to these hazards.

(11) Inspection, maintenance and installation.

- (v) If, in emergencies, such as rescue work, it is necessary to enter a tank which may contain a hazardous atmosphere, suitable respirators, such as self-contained breathing apparatus; hose mask with blower, if there is a possibility of oxygen deficiency; or a gas mask, selected and operated in accordance with paragraph (i)(9)(vi) of this section, shall be used. If a contaminant in the tank can cause dermatitis, or be absorbed through the skin, the employee entering the tank shall also wear protective clothing. At least one trained standby employee, with suitable respirator, shall be present in the nearest uncontaminated area. The standby employee must be able to communicate with the employee in the tank and be able to haul him out of the tank with a lifeline if necessary.

1926.59 Hazard communication

[**Note:** The requirements applicable to construction work under this section are identical to those set forth at 1910.1200 Hazard Communication of this chapter.]

1910.1200 Hazard communication

(a) Purpose.

- (1) The purpose of this section is to ensure that the hazards of all chemicals produced or imported are classified, and that information concerning the classified hazards is transmitted to employers and employees. The requirements of this section are intended to be consistent with the provisions of the United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Revision 3. The transmittal of information is to be accomplished by means of comprehensive hazard communication programs, which are to include container labeling and other forms of warning, safety data sheets and employee training. [See standard for specific requirements.]

1926.60 Methylenedianiline

(l)(3) and (4),
and (o)(6)

(l) Communication of hazards to employees

(3) *Information and training.*

- (i) The employer shall provide employees with information and training on MDA, in accordance with 29 CFR 1910.1200(h), at the time of initial assignment and at least annually thereafter.
- (ii) In addition to the information required under 29 CFR 1910.1200, the employer shall:
 - (A) Provide an explanation of the contents of this section, including appendices A and B of this section, and indicate to employees where a copy of the standard is available;
 - (B) Describe the medical surveillance program required under paragraph (n) of this section, and explain the information contained in Appendix C of this section; and
 - (C) Describe the medical removal provision required under paragraph (n) of this section.

- (4) *Access to training materials.*
 - (i) The employer shall make readily available to all affected employees, without cost, all written materials relating to the employee training program, including a copy of this regulation.
 - (ii) The employer shall provide to the Assistant Secretary and the Director, upon request, all information and training materials relating to the employee information and training program.

(o) Recordkeeping

- (6) *Training records.* The employer shall maintain all employee training records for one (1) year beyond the last date of employment.

1926.61 Retention of DOT markings, placards and labels

[**Note:** The requirements applicable to construction work under this section are identical to those set forth at 1910.1201 of this chapter.]

1910.1201(d) For non-bulk packages which will not be reshipped, the provisions of this section are met if a label or other acceptable marking is affixed in accordance with the Hazard Communication Standard (29 CFR 1910.1200). [See 1910.1200(h) for required employee information and training, including explanations of labels.]

1926.62 Lead in Construction

(l)(1) through (3);
and Appendix B (X)

(l) Communication of hazards

- (1) *General*
 - (i) *Hazard communication.* The employer shall include lead in the program established to comply with the Hazard Communication Standard (HCS) (1910.1200). The employer shall ensure that each employee has access to labels on containers of lead and safety data sheets, and is trained in accordance with the provisions of HCS and paragraph (l) of this section. The employer shall ensure that at least the following hazards are addressed:
 - (A) Reproductive/developmental toxicity;
 - (B) Central nervous system effects;
 - (C) Kidney effects;
 - (D) Blood effects; and
 - (E) Acute toxicity effects.

- (ii) The employer shall train each employee who is subject to exposure to lead at or above the action level on any day, or who is subject to exposure to lead compounds which may cause skin or eye irritation (e.g., lead arsenate, lead azide), in accordance with the requirements of this section. The employer shall institute a training program and ensure employee participation in the program.
 - (iii) The employer shall provide the training program as initial training prior to the time of job assignment or prior to the start up date for this requirement, whichever comes last.
 - (iv) The employer shall also provide the training program at least annually for each employee who is subject to lead exposure at or above the action level on any day.
- (2) *Training program.* The employer shall assure that each employee is trained in the following:
- (i) The content of this standard and its appendices;
 - (ii) The specific nature of the operations which could result in exposure to lead above the action level;
 - (iii) The purpose, proper selection, fitting, use, and limitations of respirators;
 - (iv) The purpose and a description of the medical surveillance program, and the medical removal protection program including information concerning the adverse health effects associated with excessive exposure to lead (with particular attention to the adverse reproductive effects on both males and females and hazards to the fetus and additional precautions for employees who are pregnant);
 - (v) The engineering controls and work practices associated with the employee's job assignment including training of employees to follow relevant good work practices described in Appendix B of this section;
 - (vi) The contents of any compliance plan in effect;
 - (vii) Instructions to employees that chelating agents should not routinely be used to remove lead from their bodies and should not be used at all except under the direction of a licensed physician; and
 - (viii) The employee's right of access to records under 29 CFR 1910.20.

- (3) *Access to information and training materials.*
 - (i) The employer shall make readily available to all affected employees a copy of this standard and its appendices.
 - (ii) The employer shall provide, upon request, all materials relating to the employee information and training program to affected employees and their designated representatives, and to the Assistant Secretary and the Director.

Appendix B to 1926.62 — Employee Standard Summary

X. Employee Information and Training — Paragraph (L)

Your employer is required to provide an information and training program for all employees exposed to lead above the action level or who may suffer skin or eye irritation from lead compounds such as lead arsenate or lead azide. The program must train these employees regarding the specific hazards associated with their work environment, protective measures which can be taken, including the contents of any compliance plan in effect, the danger of lead to their bodies (including their reproductive systems), and their rights under the standard. All employees must be trained prior to initial assignment to areas where there is a possibility of exposure over the action level.

This training program must also be provided at least annually thereafter unless further exposure above the action level will not occur.

1926.64 Process safety management of highly hazardous chemicals

(g)(1) through (3); (h)(3)(i) through (iii); (i)(2)(iv); (j)(3); (l)(3); and all Appendix C except (1), (7) and (10)

(g) Training

(1) Initial training

- (i) Each employee presently involved in operating a process, and each employee before being involved in operating a newly assigned process, shall be trained in an overview of the process and in the operating procedures as specified in paragraph (f) of this section. The training shall include emphasis on the specific safety and health hazards, emergency operations including shutdown, and safe work practices applicable to the employee's job tasks.
- (ii) In lieu of initial training for those employees already involved in operating a process on May 26, 1992, an employer may certify in writing that the employee has the required knowledge, skills, and abilities to safely carry out the duties and responsibilities as specified in the operating procedures.

- (2) *Refresher training.* Refresher training shall be provided at least every three years, and more often if necessary, to each employee involved in operating a process to assure that the employee understands and adheres to the current operating procedures of the process. The employer, in consultation with the employees involved in operating the process, shall determine the appropriate frequency of refresher training.
- (3) *Training documentation.* The employer shall ascertain that each employee involved in operating a process has received and understood the training required by this paragraph. The employer shall prepare a record which contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training.

(h) Contractors

- (3) *Contract employer responsibilities*
 - (i) The contract employer shall assure that each contract employee is trained in the work practices necessary to safely perform his/her job.
 - (ii) The contract employer shall assure that each contract employee is instructed in the known potential fire, explosion, or toxic release hazards related to his/her job and the process, and the applicable provisions of the emergency action plan.
 - (iii) The contract employer shall document that each contract employee has received and understood the training required by this paragraph. The contract employer shall prepare a record which contains the identity of the contract employee, the date of training, and the means used to verify that the employee understood the training.

(i) Pre-startup safety review

- (2) The pre-startup safety review shall confirm that prior to the introduction of highly hazardous chemicals to a process:
 - (iv) Training of each employee involved in operating a process has been completed.

(j) Mechanical integrity

- (3) *Training for process maintenance activities.* The employer shall train each employee involved in maintaining the on-going integrity of process equipment in an overview of that process and its hazards and in the procedures applicable to the employee's job tasks to assure that the employee can perform the job tasks in a safe manner.

(1) **Management of change**

- (3) Employees involved in operating a process and maintenance and contract employees whose job tasks will be affected by a change in the process shall be informed of, and trained in, the change prior to start-up of the process or affected part of the process.

Appendix C to 1926.64 — Compliance Guidelines and Recommendations for Process Safety Management (Nonmandatory)

This appendix serves as a nonmandatory guideline to assist employers and employees in complying with the requirements of this section, as well as provides other helpful recommendations and information. Examples presented in this appendix are not the only means of achieving the performance goals in the standard. This appendix neither adds nor detracts from the requirements of the standard.

- 2. Employee Involvement in Process Safety Management.** Section 304 of the Clean Air Act Amendments states that employers are to consult with their employees and their representatives regarding the employers' efforts in the development and implementation of the process safety management program elements and hazard assessments. Section 304 also requires employers to train and educate their employees and to inform affected employees of the findings from incident investigations required by the process safety management program. Many employers, under their safety and health programs, have already established means and methods to keep employees and their representatives informed about relevant safety and health issues and employers may be able to adapt these practices and procedures to meet their obligations under this standard. Employers who have not implemented an occupational safety and health program may wish to form a safety and health committee of employees and management representatives to help the employer meet the obligations specified by this standard. These committees can become a significant ally in helping the employer to implement and maintain an effective process safety management program for all employees.
- 3. Process Safety Information.** Complete and accurate written information concerning process chemicals, process technology, and process equipment is essential to an effective process safety management program and to a process hazards analysis. The compiled information will be a necessary resource to a variety of users including the team that will perform the process hazards analysis as required under paragraph (e); those developing the training programs and the operating procedures; contractors whose employees will be working with the process; those conducting the pre-startup reviews; local emergency preparedness planners; and insurance and enforcement officials.

5. Operating Procedures and Practices

...Operating procedures and instructions are important for training operating personnel. The operating procedures are often viewed as the standard operating practices (SOPs) for operations. Control room personnel and operating staff, in general, need to have a full understanding of operating procedures. If workers are not fluent in English then procedures and instructions need to be prepared in a second language understood by the workers. In addition, operating procedures need to be changed when there is a change in the process as a result of the management of change procedures. The consequences of operating procedure changes need to be fully evaluated and the information conveyed to the personnel. For example, mechanical changes to the process made by the maintenance department (like changing a valve from steel to brass or other subtle changes) need to be evaluated to determine if operating procedures and practices also need to be changed. All management of change actions must be coordinated and integrated with current operating procedures and operating personnel must be oriented to the changes in procedures before the change is made. When the process is shut down in order to make a change, then the operating procedures must be updated before startup of the process.

Training in how to handle upset conditions must be accomplished as well as what operating personnel are to do in emergencies such as when a pump seal fails or a pipeline ruptures. Communication between operating personnel and workers performing work within the process area, such as nonroutine tasks, also must be maintained. The hazards of the tasks are to be conveyed to operating personnel in accordance with established procedures and to those performing the actual tasks. When the work is completed, operating personnel should be informed to provide closure on the job.

- 6. Employee Training.** All employees, including maintenance and contractor employees, involved with highly hazardous chemicals need to fully understand the safety and health hazards of the chemicals and processes they work with for the protection of themselves, their fellow employees and the citizens of nearby communities. Training conducted in compliance with 1926.59, the Hazard Communication standard, will help employees to be more knowledgeable about the chemicals they work with as well as familiarize them with reading and understanding MSDS. However, additional training in subjects such as operating procedures and safety work practices, emergency evacuation and response, safety procedures, routine and nonroutine work authorization activities, and other areas pertinent to process safety and health will need to be covered by an employer's training program.

In establishing their training programs, employers must clearly define the employees to be trained and what subjects are to be covered in their training. Employers in setting up their training program will need to clearly establish the goals and objectives they wish to achieve with the training that they provide to their employees. The learning goals or objectives should be written in clear measurable terms before the training begins. These goals and objectives need to be tailored to each of the specific training modules or segments. Employers should describe the important actions and conditions under which the employee will demonstrate competence or knowledge as well as what is acceptable performance.

Hands-on-training where employees are able to use their senses beyond listening, will enhance learning. For example, operating personnel, who will work in a control room or at control panels, would benefit by being trained at a simulated control panel or panels. Upset conditions of various types could be displayed on the simulator, and then the employee could go through the proper operating procedures to bring the simulator panel back to the normal operating parameters. A training environment could be created to help the trainee feel the full reality of the situation but, of course, under controlled conditions. This realistic type of training can be very effective in teaching employees correct procedures while allowing them to also see the consequences of what might happen if they do not follow established operating procedures. Other training techniques using videos or on-the-job training can also be very effective for teaching other job tasks, duties, or other important information. An effective training program will allow the employee to fully participate in the training process and to practice their skill or knowledge.

Employers need to periodically evaluate their training programs to see if the necessary skills, knowledge, and routines are being properly understood and implemented by their trained employees. The means or methods for evaluating the training should be developed along with the training program goals and objectives. Training program evaluation will help employers to determine the amount of training their employees understood, and whether the desired results were obtained. If, after the evaluation, it appears that the trained employees are not at the level of knowledge and skill that was expected, the employer will need to revise the training program, provide retraining, or provide more frequent refresher training sessions until the deficiency is resolved. Those who conducted the training and those who received the training should also be consulted as to how best to improve the training process. If there is a language barrier, the language known to the trainees should be used to reinforce the training messages and information.

Careful consideration must be given to assure that employees including maintenance and contract employees receive current and updated training. For example, if changes are made to a process, impacted employees must be trained

in the changes and understand the effects of the changes on their job tasks (e.g., any new operating procedures pertinent to their tasks). Additionally, as already discussed the evaluation of the employee's absorption of training will certainly influence the need for training.

8. Pre-Startup Safety

...For existing processes that have been shut down for turnaround, or modification, etc., the employer must assure that any changes other than “replacement in kind” made to the process during shutdown go through the management of change procedures. P&IDs will need to be updated as necessary, as well as operating procedures and instructions. If the changes made to the process during shutdown are significant and impact the training program, then operating personnel as well as employees engaged in routine and nonroutine work in the process area may need some refresher or additional training in light of the changes. Any incident investigation recommendations, compliance audits or PHA recommendations need to be reviewed as well to see what impacts they may have on the process before beginning the startup.

9. **Mechanical Integrity.** Employers will need to review their maintenance programs and schedules to see if there are areas where “breakdown” maintenance is used rather than an on-going mechanical integrity program. Equipment used to process, store, or handle highly hazardous chemicals needs to be designed, constructed, installed and maintained to minimize the risk of releases of such chemicals. This requires that a mechanical integrity program be in place to assure the continued integrity of process equipment. Elements of a mechanical integrity program include the identification and categorization of equipment and instrumentation, inspections and tests, testing and inspection frequencies, development of maintenance procedures, training of maintenance personnel, the establishment of criteria for acceptable test results, documentation of test and inspection results, and documentation of manufacturer recommendations as to meantime to failure for equipment and instrumentation.

... Appropriate training is to be provided to maintenance personnel to ensure that they understand the preventive maintenance program procedures, safe practices, and the proper use and application of special equipment or unique tools that may be required. This training is part of the overall training program called for in the standard.

11. Managing Change

... Employers may wish to develop a form or clearance sheet to facilitate the processing of changes through the management of change procedures. A typical change form may include a description and the purpose of the change, the technical basis for the change, safety and health considerations, documentation of changes for the operating procedures, maintenance procedures, inspection and testing, P&IDs, electrical classification, training and communications, pre-startup inspection, duration if a temporary change, approvals and authorization...

12. Investigation of Incidents. Incident investigation is the process of identifying the underlying causes of incidents and implementing steps to prevent similar events from occurring. The intent of an incident investigation is for employers to learn from past experiences and thus avoid repeating past mistakes. The incidents for which OSHA expects employers to become aware and to investigate are the types of events which result in or could reasonably have resulted in a catastrophic release. Some of the events are sometimes referred to as “near misses,” meaning that a serious consequence did not occur, but could have.

Employers need to develop in-house capability to investigate incidents that occur in their facilities. A team needs to be assembled by the employer and trained in the techniques of investigation including how to conduct interviews of witnesses, needed documentation and report writing. A multi-disciplinary team is better able to gather the facts of the event and to analyze them and develop plausible scenarios as to what happened, and why. Team members should be selected on the basis of their training, knowledge and ability to contribute to a team effort to fully investigate the incident.

13. Emergency Preparedness. Each employer must address what actions employees are to take when there is an unwanted release of highly hazardous chemicals. Emergency preparedness or the employer’s tertiary (third) lines of defense are those that will be relied on along with the secondary lines of defense when the primary lines of defense which are used to prevent an unwanted release fail to stop the release. Employers will need to decide if they want employees to handle and stop small or minor incidental releases. Whether they wish to mobilize the available resources at the plant and have them brought to bear on a more significant release. Or whether employers want their employees to evacuate the danger area and promptly escape to a preplanned safe zone area, and allow the local community emergency response organizations to handle the release. Or whether the employer wants to use some combination of these actions. Employers will need to select how

many different emergency preparedness or tertiary lines of defense they plan to have and then develop the necessary plans and procedures, and appropriately train employees in their emergency duties and responsibilities and then implement these lines of defense...

... If the employer wants specific employees in the release area to control or stop the minor emergency or incidental release, these actions must be planned for in advance and procedures developed and implemented. Preplanning for handling incidental releases for minor emergencies in the process area needs to be done, appropriate equipment for the hazards must be provided, and training conducted for those employees who will perform the emergency work before they respond to handle an actual release. The employer's training program, including the Hazard Communication standard training is to address the training needs for employees who are expected to handle incidental or minor releases...

... Responders may be working under very hazardous conditions and therefore the objective is to have them competently led by an on-scene incident commander and the commander's staff, properly equipped to do their assigned work safely, and fully trained to carry out their duties safely before they respond to an emergency. Drills, training exercises, or simulations with the local community emergency response planners and responder organizations is one means to obtain better preparedness. This close cooperation and coordination between plant and local community emergency preparedness managers will also aid the employer in complying with the Environmental Protection Agency's Risk Management Plan criteria...

14. Compliance Audits. Employers need to select a trained individual or assemble a trained team of people to audit the process safety management system and program. A small process or plant may need only one knowledgeable person to conduct an audit. The audit is to include an evaluation of the design and effectiveness of the process safety management system and a field inspection of the safety and health conditions and practices to verify that the employer's systems are effectively implemented. The audit should be conducted or led by a person knowledgeable in audit techniques and who is impartial towards the facility or area being audited. The essential elements of an audit program include planning, staffing, conducting the audit, evaluation and corrective action, follow-up and documentation...

... The selection of effective audit team members is critical to the success of the program. Team members should be chosen for their experience, knowledge, and training and should be familiar with the processes and with auditing techniques, practices and procedures...

An effective audit includes a review of the relevant documentation and process safety information, inspection of the physical facilities, and interviews with all levels of plant personnel. Utilizing the audit procedure and checklist developed in the preplanning stage, the audit team can systematically analyze compliance with the provisions of the standard and any other corporate policies that are relevant. For example, the audit team will review all aspects of the training program as part of the overall audit. The team will review the written training program for adequacy of content, frequency of training, effectiveness of training in terms of its goals and objectives as well as to how it fits into meeting the standard’s requirements, documentation, etc. Through interviews, the team can determine the employee’s knowledge and awareness of the safety procedures, duties, rules, emergency response assignments, etc. During the inspection, the team can observe actual practices such as safety and health policies, procedures, and work authorization practices. This approach enables the team to identify deficiencies and determine where corrective actions or improvements are necessary.

1926.65 Hazardous waste operations and emergency response

(a)(3); (b)(1)(i) and (ii)(D); (b)(3)(iv); (b)(4)(i), (ii)(B) and (C), and (iii); (c)(5)(iv), (c)(7)(i) and (c)(8); (e)(1) through (9); (g)(5)(vi); (i); (j)(1)(vi); (k)(2)(i); (l)(3)(iv); (p)(7); (p)(8)(iii); and (iv)(C); (q)(5) through (8) and (10), (11); Appendix C (1), (2) and (9); Appendix—Training Curriculum Guidelines

(a) Definitions

- (3) *Qualified person* means a person with specific training, knowledge and experience in the area for which the person has the responsibility and the authority to control.

(b) Safety and health program

Note to (b): Safety and health programs developed and implemented to meet other Federal, state, or local regulations are considered acceptable in meeting this requirement if they cover or are modified to cover the topics required in this paragraph. An additional or separate safety and health program is not required by this paragraph.

- (1) *General.*
 - (i) Employers shall develop and implement a written safety and health program for their employees involved in hazardous waste operations. The program shall be designed to identify, evaluate, and control safety and health hazards, and provide for emergency response for hazardous waste operations.
 - (ii) The written safety and health program shall incorporate the following:
 - (D) The safety and health training program [described in detail in Appendix C of 1926.65]

- (3) *Comprehensive workplan part of the site program.* The comprehensive workplan part of the program shall address the tasks and objectives of the site operations and the logistics and resources required to reach those tasks and objectives.
 - (iv) The comprehensive workplan shall provide for the implementation of the training required in paragraph (e) of this section.
 - (4) *Site-specific safety and health plan part of the program.*
 - (i) *General.* The site safety and health plan, which must be kept on site, shall address the safety and health hazards of each phase of site operation and include the requirements and procedures for employee protection.
 - (ii) *Elements.* The site safety and health plan, as a minimum, shall address the following:
 - (B) Employee training assignments to assure compliance with paragraph (e) of this section
 - (C) Personal protective equipment to be used by employees for each of the site tasks and operations being conducted as required by the personal protective equipment program in paragraph (g)(5) of this section.
 - (iii) *Pre-entry briefing.* The site specific safety and health plan shall provide for pre-entry briefings to be held prior to initiating any site activity, and at such other times as necessary to ensure that employees are apprised of the site safety and health plan and that this plan is being followed. The information and data obtained from site characterization and analysis work required in paragraph (c) of this section shall be used to prepare and update the site safety and health plan.
- (c) Site characterization and analysis**
- (5) *Personal protective equipment.* Personal protective equipment (PPE) shall be provided and used during initial site entry in accordance with the following requirements:
 - (iv) Once the hazards of the site have been identified, the appropriate PPE shall be selected and used in accordance with paragraph (g) of this section. [See paragraph (g)(5)(vi) PPE training and proper fitting.]

(7) *Risk identification.*

- (i) Once the presence and concentrations of specific hazardous substances and health hazards have been established, the risks associated with these substances shall be identified. Employees who will be working on the site shall be informed of any risks that have been identified. In situations covered by the Hazard Communication Standard, 29 CFR 1926.59, training required by that standard need not be duplicated.

Note to (c)(7). Risks to consider include, but are not limited to:

- (c)(7)(i)(a) Exposures exceeding the permissible exposure limits and published exposure levels.
- (c)(7)(i)(b) IDLH concentrations.
- (c)(7)(i)(c) Potential skin absorption and irritation sources.
- (c)(7)(i)(d) Potential eye irritation sources.
- (c)(7)(i)(e) Explosion sensitivity and flammability ranges.
- (c)(7)(i)(f) Oxygen deficiency.

(c) Site characterization and analysis

- (8) *Employee notification.* Any information concerning the chemical, physical, and toxicologic properties of each substance known or expected to be present on site that is available to the employer and relevant to the duties an employee is expected to perform shall be made available to the affected employees prior to the commencement of their work activities. The employer may utilize information developed for the hazard communication standard for this purpose. [See 1910.1200 for training requirements.]

(e) Training

- (1) *General.*
 - (i) All employees working on site (such as but not limited to equipment operators, general laborers and others) exposed to hazardous substances, health hazards, or safety hazards and their supervisors and management responsible for the site shall receive training meeting the requirements of this paragraph before they are permitted to engage in hazardous waste operations that could expose them to hazardous substances, safety, or health hazards, and they shall receive review training as specified in this paragraph.

- (ii) Employees shall not be permitted to participate in or supervise field activities until they have been trained to a level required by their job function and responsibility.
- (2) *Elements to be covered.* The training shall thoroughly cover the following:
 - (i) Names of personnel and alternates responsible for site safety and health;
 - (ii) Safety, health and other hazards present on the site;
 - (iii) Use of personal protective equipment;
 - (iv) Work practices by which the employee can minimize risks from hazards;
 - (v) Safe use of engineering controls and equipment on the site;
 - (vi) Medical surveillance requirements, including recognition of symptoms and signs which might indicate overexposure to hazards; and
 - (vii) The contents of paragraphs (G) through (J) of the site safety and health plan set forth in paragraph (b)(4)(ii) of this section.
- (3) *Initial training.*
 - (i) General site workers (such as equipment operators, general laborers and supervisory personnel) engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor.
 - (ii) Workers on site only occasionally for a specific limited task (such as, but not limited to, ground water monitoring, land surveying, or geo-physical surveying) and who are unlikely to be exposed over permissible exposure limits and published exposure limits shall receive a minimum of 24 hours of instruction off the site, and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.
 - (iii) Workers regularly on site who work in areas which have been monitored and fully characterized indicating that exposures are under permissible exposure limits and published exposure limits where respirators are not necessary, and the

characterization indicates that there are no health hazards or the possibility of an emergency developing, shall receive a minimum of 24 hours of instruction off the site and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.

- (iv) Workers with 24 hours of training who are covered by paragraphs (e)(3)(ii) and (e)(3)(iii) of this section, and who become general site workers or who are required to wear respirators, shall have the additional 16 hours and two days of training necessary to total the training specified in paragraph (e)(3)(i).
- (4) *Management and supervisor training.* On-site management and supervisors directly responsible for, or who supervise employees engaged in, hazardous waste operations shall receive 40 hours initial training, and three days of supervised field experience (the training may be reduced to 24 hours and one day if the only area of their responsibility is employees covered by paragraphs (e)(3)(ii) and (e)(3)(iii)) and at least eight additional hours of specialized training at the time of job assignment on such topics as, but not limited to, the employer's safety and health program and the associated employee training program, personal protective equipment program, spill containment program, and health hazard monitoring procedure and techniques.
- (5) *Qualifications for trainers.* Trainers shall be qualified to instruct employees about the subject matter that is being presented in training. Such trainers shall have satisfactorily completed a training program for teaching the subjects they are expected to teach, or they shall have the academic credentials and instructional experience necessary for teaching the subjects. Instructors shall demonstrate competent instructional skills and knowledge of the applicable subject matter.
- (6) *Training certification.* Employees and supervisors that have received and successfully completed the training and field experience specified in paragraphs (e)(1) through (e)(4) of this section shall be certified by their instructor or the head instructor and trained supervisor as having successfully completed the necessary training. A written certificate shall be given to each person so certified. Any person who has not been so certified or who does not meet the requirements of paragraph (e)(9) of this section shall be prohibited from engaging in hazardous waste operations.

- (7) *Emergency response.* Employees who are engaged in responding to hazardous emergency situations at hazardous waste clean-up sites that may expose them to hazardous substances shall be trained in how to respond to such expected emergencies.
 - (8) *Refresher training.* Employees specified in paragraph (e)(1) of this section, and managers and supervisors specified in paragraph (e)(4) of this section, shall receive eight hours of refresher training annually on the items specified in paragraph (e)(2) and/or (e)(4) of this section, any critique of incidents that have occurred in the past year that can serve as training examples of related work, and other relevant topics.
 - (9) *Equivalent training.* Employers who can show by documentation or certification that an employee's work experience and/or training has resulted in training equivalent to that training required in paragraphs (e)(1) through (e)(4) of this section shall not be required to provide the initial training requirements of those paragraphs to such employees and shall provide a copy of the certification or documentation to the employee upon request. However, certified employees or employees with equivalent training new to a site shall receive appropriate, site specific training before site entry and have appropriate supervised field experience at the new site. Equivalent training includes any academic training or the training that existing employees might have already received from actual hazardous waste site work experience.
- (g) Engineering controls, work practices, and personal protective equipment for employee protection.**
- (5) *Personal protective equipment (PPE) program.* A written personal protective equipment program, which is part of the employer's safety and health program required in paragraph (b) of this section or required in paragraph (p)(1) of this section and which is also a part of the site-specific safety and health plan shall be established. The PPE program shall address the elements listed below. When elements, such as donning and doffing procedures, are provided by the manufacturer of a piece of equipment and are attached to the plan, they need not be rewritten into the plan as long as they adequately address the procedure or element.
 - (vi) PPE training and proper fitting
 - (i) **Informational programs.** Employers shall develop and implement a program, which is part of the employer's safety and health program required in paragraph (b) of this section, to inform employees,

contractors, and subcontractors (or their representative) actually engaged in hazardous waste operations of the nature, level and degree of exposure likely as a result of participation in such hazardous waste operations. Employees, contractors and subcontractors working outside of the operations part of a site are not covered by this standard.

(j) Handling drums and containers

(1) *General.*

- (vi) Prior to movement of drums or containers, all employees exposed to the transfer operation shall be warned of the potential hazards associated with the contents of the drums or containers.

(k) Decontamination

(2) *Decontamination procedures.*

- (i) A decontamination procedure shall be developed, communicated to employees and implemented before any employees or equipment may enter areas on site where potential for exposure to hazardous substances exists.

(l) Emergency response by employees at uncontrolled hazardous waste sites

(3) *Procedures for handling emergency incidents.*

- (iv) The emergency response plan shall be rehearsed regularly as part of the overall training program for site operations.

(p) Certain operations conducted under the Resource Conservation and Recovery Act of 1976 (RCRA)

(7) *Training program.*

- (i) *New employees.* The employer shall develop and implement a training program, which is part of the employer's safety and health program, for employees exposed to health hazards or hazardous substances at TSD operations to enable the employees to perform their assigned duties and functions in a safe and healthful manner so as not endanger themselves or other employees. The initial training shall be for 24 hours and refresher training shall be for eight hours annually. Employees who have received the initial training required by this paragraph shall be given a written certificate attesting that they have successfully completed the necessary training.

- (ii) *Current employees.* Employers who can show by an employee's previous work experience and/or training that the employee has had training equivalent to the initial training required by this paragraph, shall be considered as meeting the initial training requirements of this paragraph as to that employee. Equivalent training includes the training that existing employees might have already received from actual site work experience. Current employees shall receive eight hours of refresher training annually.
 - (iii) *Trainers.* Trainers who teach initial training shall have satisfactorily completed a training course for teaching the subjects they are expected to teach or they shall have the academic credentials and instruction experience necessary to demonstrate a good command of the subject matter of the courses and competent instructional skills.
- (8) *Emergency response program.*
- (iii) Training
 - (A) Training for emergency response employees shall be completed before they are called upon to perform in real emergencies. Such training shall include the elements of the emergency response plan, standard operating procedures the employer has established for the job, the personal protective equipment to be worn and procedures for handling emergency incidents.

Exception #1: An employer need not train all employees to the degree specified if the employer divides the work force in a manner such that a sufficient number of employees who have responsibility to control emergencies have the training specified, and all other employees, who may first respond to an emergency incident, have sufficient awareness training to recognize that an emergency response situation exists and that they are instructed in that case to summon the fully trained employees and not attempt control activities for which they are not trained.

Exception #2: An employer need not train all employees to the degree specified if arrangements have been made in advance for an outside fully-trained emergency response team to respond in a reasonable period and all employees, who may come

to the incident first, have sufficient awareness training to recognize that an emergency response situation exists and they have been instructed to call the designated outside fully-trained emergency response team for assistance.

- (B) Employee members of TSD facility emergency response organizations shall be trained to a level of competence in the recognition of health and safety hazards to protect themselves and other employees. This would include training in the methods used to minimize the risk from safety and health hazards; in the safe use of control equipment; in the selection and use of appropriate personal protective equipment; in the safe operating procedures to be used at the incident scene; in the techniques of coordination with other employees to minimize risks; in the appropriate response to over exposure from health hazards or injury to themselves and other employees; and in the recognition of subsequent symptoms which may result from over exposures.
- (C) The employer shall certify that each covered employee has attended and successfully completed the training required in paragraph (p)(8)(iii) of this section, or shall certify the employee's competency at least yearly. The method used to demonstrate competency for certification of training shall be recorded and maintained by the employer.

(iv) *Procedures for handling emergency incidents.*

- (C) The emergency response plan shall be rehearsed regularly as part of the overall training program for site operations.

(q) Emergency response to hazardous substance releases. This paragraph covers employers whose employees are engaged in emergency response no matter where it occurs except that it does not cover employees engaged in operations specified in paragraphs (a)(1)(i) through (a)(1)(iv) of this section. Those emergency response organizations who have developed and implemented programs equivalent to this paragraph for handling releases of hazardous

substances pursuant to section 303 of the Superfund Amendments and Reauthorization Act of 1986 (Emergency Planning and Community Right-to-Know Act of 1986, 42 U.S.C. 11003) shall be deemed to have met the requirements of this paragraph

- (5) *Specialist employees.* Employees who, in the course of their regular job duties, work with and are trained in the hazards of specific hazardous substances, and who will be called upon to provide technical advice or assistance at a hazardous substance release incident to the individual in charge, shall receive training or demonstrate competency in the area of their specialization annually.
- (6) *Training.* Training shall be based on the duties and function to be performed by each responder of an emergency response organization. The skill and knowledge levels required for all new responders, those hired after the effective date of this standard, shall be conveyed to them through training before they are permitted to take part in actual emergency operations on an incident. Employees who participate, or are expected to participate, in emergency response, shall be given training in accordance with the following paragraphs:
 - (i) *First responder awareness level.* First responders at the awareness level are individuals who are likely to witness or discover a hazardous substance release and who have been trained to initiate an emergency response sequence by notifying the proper authorities of the release. They would take no further action beyond notifying the authorities of the release. First responders at the awareness level shall have sufficient training or have had sufficient experience to objectively demonstrate competency in the following areas:
 - (A) An understanding of what hazardous substances are, and the risks associated with them in an incident.
 - (B) An understanding of the potential outcomes associated with an emergency created when hazardous substances are present.
 - (C) The ability to recognize the presence of hazardous substances in an emergency.
 - (D) The ability to identify the hazardous substances, if possible.

- (E) An understanding of the role of the first responder awareness individual in the employer's emergency response plan including site security and control and the U.S. Department of Transportation's *Emergency Response Guidebook*.
 - (F) The ability to realize the need for additional resources, and to make appropriate notifications to the communication center.
- (ii) *First responder operations level*. First responders at the operations level are individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release. They are trained to respond in a defensive fashion without actually trying to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposures. First responders at the operational level shall have received at least eight hours of training or have had sufficient experience to objectively demonstrate competency in the following areas in addition to those listed for the awareness level and the employer shall so certify:
- (A) Knowledge of the basic hazard and risk assessment techniques.
 - (B) Know how to select and use proper personal protective equipment provided to the first responder operational level.
 - (C) An understanding of basic hazardous materials terms.
 - (D) Know how to perform basic control, containment and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit.
 - (E) Know how to implement basic decontamination procedures.
 - (F) An understanding of the relevant standard operating procedures and termination procedures.
- (iii) *Hazardous materials technician*. Hazardous materials technicians are individuals who respond to releases or potential releases for the purpose of stopping the release.

They assume a more aggressive role than a first responder at the operations level in that they will approach the point of release in order to plug, patch or otherwise stop the release of a hazardous substance. Hazardous materials technicians shall have received at least 24 hours of training equal to the first responder operations level and in addition have competency in the following areas and the employer shall so certify:

- (A) Know how to implement the employer's emergency response plan.
 - (B) Know the classification, identification and verification of known and unknown materials by using field survey instruments and equipment.
 - (C) Be able to function within an assigned role in the Incident Command System.
 - (D) Know how to select and use proper specialized chemical personal protective equipment provided to the hazardous materials technician.
 - (E) Understand hazard and risk assessment techniques.
 - (F) Be able to perform advance control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with the unit.
 - (G) Understand and implement decontamination procedures.
 - (H) Understand termination procedures.
 - (I) Understand basic chemical and toxicological terminology and behavior.
- (iv) *Hazardous materials specialist.* Hazardous materials specialists are individuals who respond with and provide support to hazardous materials technicians. Their duties parallel those of the hazardous materials technician, however, those duties require a more directed or specific knowledge of the various substances they may be called upon to contain. The hazardous materials specialist would also act as the site liaison with Federal, state, local and other government authorities in regards to site activities. Hazardous materials specialists shall have received at least

24 hours of training equal to the technician level and in addition have competency in the following areas and the employer shall so certify:

- (A) Know how to implement the local emergency response plan.
 - (B) Understand classification, identification and verification of known and unknown materials by using advanced survey instruments and equipment.
 - (C) Know of the state emergency response plan.
 - (D) Be able to select and use proper specialized chemical personal protective equipment provided to the hazardous materials specialist.
 - (E) Understand in-depth hazard and risk techniques.
 - (F) Be able to perform specialized control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available.
 - (G) Be able to determine and implement decontamination procedures.
 - (H) Have the ability to develop a site safety and control plan.
 - (I) Understand chemical, radiological and toxicological terminology and behavior.
- (v) *On scene incident commander.* Incident commanders, who will assume control of the incident scene beyond the first responder awareness level, shall receive at least 24 hours of training equal to the first responder operations level and in addition have competency in the following areas and the employer shall so certify:
- (A) Know and be able to implement the employer's incident command system.
 - (B) Know how to implement the employer's emergency response plan.
 - (C) Know and understand the hazards and risks associated with employees working in chemical protective clothing.
 - (D) Know how to implement the local emergency response plan.

- (E) Know of the state emergency response plan and of the Federal Regional Response Team.
 - (F) Know and understand the importance of decontamination procedures.
- (7) Trainers who teach any of the above training subjects shall have satisfactorily completed a training course for teaching the subjects they are expected to teach, such as the courses offered by the U.S. National Fire Academy, or they shall have the training and/or academic credentials and instructional experience necessary to demonstrate competent instructional skills and a good command of the subject matter of the courses they are to teach.
- (8) *Refresher training.*
- (i) Those employees who are trained in accordance with paragraph (q)(6) of this section shall receive annual refresher training of sufficient content and duration to maintain their competencies, or shall demonstrate competency in those areas at least yearly.
 - (ii) A statement shall be made of the training or competency, and if a statement of competency is made, the employer shall keep a record of the methodology used to demonstrate competency.
- (10) *Chemical protective clothing.* Chemical protective clothing and equipment to be used by organized and designated HAZMAT team members, or to be used by hazardous materials specialists, shall meet the requirements of paragraphs (g)(3) through (5) of this section. [SEE: 1926.65(g)(5)(vi) for PPE training and fitting.]
- (11) *Post-emergency response operations.* Upon completion of the emergency response, if it is determined that it is necessary to remove hazardous substances, health hazards, and materials contaminated with them (such as contaminated soil or other elements of the natural environment) from the site of the incident, the employer conducting the clean-up shall comply with one of the following:
- (i) Meet all of the requirements of paragraphs (b) through (o) of this section; or
 - (ii) Where the clean-up is done on plant property using plant or workplace employees, such employees shall have completed the training requirements of the following: 29 CFR 1926.35, 1926.59, and 1926.103, and other appropriate safety and health training made necessary by the tasks that they are expected

to be performed such as personal protective equipment and decontamination procedures. All equipment to be used in the performance of the clean-up work shall be in serviceable condition and shall have been inspected prior to use.

Appendix C to 1926.65—Compliance Guidelines

- 1. Occupational Safety and Health Program.** Each hazardous waste site clean-up effort will require an occupational safety and health program headed by the site coordinator or the employer's representative. The purpose of the program will be the protection of employees at the site and will be an extension of the employer's overall safety and health program. The program will need to be developed before work begins on the site and implemented as work proceeds as stated in paragraph (b). The program is to facilitate coordination and communication of safety and health issues among personnel responsible for the various activities which will take place at the site. It will provide the overall means for planning and implementing the needed safety and health training and job orientation of employees who will be working at the site. The program will provide the means for identifying and controlling worksite hazards and the means for monitoring program effectiveness. The program will need to cover the responsibilities and authority of the site coordinator or the employer's manager on the site for the safety and health of employees at the site, and the relationships with contractors or support services as to what each employer's safety and health responsibilities are for their employees on the site. Each contractor on the site needs to have its own safety and health program so structured that it will smoothly interface with the program of the site coordinator or principal contractor.

Also those employers involved with treating, storing or disposal of hazardous waste as covered in paragraph (p) must have implemented a safety and health program for their employees. This program is to include the hazard communication program required in paragraph (p)(1) and the training required in paragraphs (p)(7) and (p)(8) as parts of the employer's comprehensive overall safety and health program. This program is to be in writing.

Each site or workplace safety and health program will need to include the following: (1) Policy statements of the line of authority and accountability for implementing the program, the objectives of the program and the role of the site safety and health supervisor or manager and staff; (2) means or methods for the development of procedures for identifying and controlling workplace hazards at the site; (3) means or methods for the development and communication to employees of the various plans,

work rules, standard operating procedures and practices that pertain to individual employees and supervisors; (4) means for the training of supervisors and employees to develop the needed skills and knowledge to perform their work in a safe and healthful manner; (5) means to anticipate and prepare for emergency situations; and (6) means for obtaining information feedback to aid in evaluating the program and for improving the effectiveness of the program. The management and employees should be trying continually to improve the effectiveness of the program thereby enhancing the protection being afforded those working on the site.

Accidents on the site or workplace should be investigated to provide information on how such occurrences can be avoided in the future. When injuries or illnesses occur on the site or workplace, they will need to be investigated to determine what needs to be done to prevent this incident from occurring again. Such information will need to be used as feedback on the effectiveness of the program and the information turned into positive steps to prevent any recurrence. Receipt of employee suggestions or complaints relating to safety and health issues involved with site or workplace activities is also a feedback mechanism that can be used effectively to improve the program and may serve in part as an evaluative tool(s).

For the development and implementation of the program to be the most effective, professional safety and health personnel should be used. Certified Safety Professionals, Board Certified Industrial Hygienists or Registered Professional Safety Engineers are good examples of professional stature for safety and health managers who will administer the employer's program.

- 2. Training.** The training programs for employees subject to the requirements of paragraph (e) of this standard should address: the safety and health hazards employees should expect to find on hazardous waste clean-up sites; what control measures or techniques are effective for those hazards; what monitoring procedures are effective in characterizing exposure levels; what makes an effective employer's safety and health program; what a site safety and health plan should include; hands on training with personal protective equipment and clothing they may be expected to use; the contents of the OSHA standard relevant to the employee's duties and function; and, employee's responsibilities under OSHA and other regulations. Supervisors will need training in their responsibilities under the safety and health program and its subject areas such as the spill containment program, the personal protective equipment program, the medical surveillance program, the emergency response plan and other areas.

The training programs for employees subject to the requirements of paragraph (p) of this standard should address: the employer's safety and health program elements impacting employees; the hazard communication program; the medical surveillance program; the hazards and the controls for such hazards that employees need to know for their job duties and functions. All require annual refresher training.

The training programs for employees covered by the requirements of paragraph (q) of this standard should address those competencies required for the various levels of response such as: the hazards associated with hazardous substances; hazard identification and awareness; notification of appropriate persons; the need for and use of personal protective equipment including respirators; the decontamination procedures to be used; preplanning activities for hazardous substance incidents including the emergency response plan; company standard operating procedures for hazardous substance emergency responses; the use of the incident command system and other subjects. Hands-on training should be stressed whenever possible. Critiques done after an incident which include an evaluation of what worked and what did not and how could the incident be better handled the next time may be counted as training time.

For hazardous materials specialists (usually members of hazardous materials teams), the training should address the care, use and/or testing of chemical protective clothing including totally encapsulating suits, the medical surveillance program, the standard operating procedures for the hazardous materials team including the use of plugging and patching equipment and other subject areas.

Officers and leaders who may be expected to be in charge at an incident should be fully knowledgeable of their company's incident command system. They should know where and how to obtain additional assistance and be familiar with the local district's emergency response plan and the state emergency response plan.

Specialist employees such as technical experts, medical experts or environmental experts that work with hazardous materials in their regular jobs, who may be sent to the incident scene by the shipper, manufacturer or governmental agency to advise and assist the person in charge of the incident should have training on an annual basis. Their training should include the care and use of personal protective equipment including respirators; knowledge of the incident command system and how they are to relate to it; and those areas needed to keep them current in their respective field as it relates to safety and health involving specific hazardous substances.

Those skilled support personnel, such as employees who work for public works departments or equipment operators who operate bulldozers, sand trucks, backhoes, etc., who may be called to the incident scene to provide emergency support

assistance, should have at least a safety and health briefing before entering the area of potential or actual exposure. These skilled support personnel, who have not been a part of the emergency response plan and do not meet the training requirements, should be made aware of the hazards they face and should be provided all necessary protective clothing and equipment required for their tasks.

There are two National Fire Protection Association standards, NFPA 472—“Standard for Professional Competence of Responders to Hazardous Material Incidents” and NFPA 471—“Recommended Practice for Responding to Hazardous Material Incidents,” which are excellent resource documents to aid fire departments and other emergency response organizations in developing their training program materials. NFPA 472 provides guidance on the skills and knowledge needed for first responder awareness level, first responder operations level, hazmat technicians, and hazmat specialist. It also offers guidance for the officer corp that will be in charge of hazardous substance incidents.

9. New Technology and Spill Containment Programs.

...All workers performing hazardous substance spill control work are expected to wear the proper protective clothing and equipment for the materials present and to follow the employer’s established standard operating procedures for spill control. All involved workers need to be trained in the established operating procedures; in the use and care of spill control equipment; and in the associated hazards and control of such hazards of spill containment work.

Appendix [E] to 1926.65 — Training Curriculum Guidelines

The following *non-mandatory* general criteria may be used for assistance in developing site-specific training curriculum used to meet the training requirements of 29 CFR 1926.65(e); 29 CFR 1926.65(p)(7), (p)(8)(iii); and 29 CFR 1926.65(q)(6), (q)(7), and (q)(8). These are generic guidelines and they are not presented as a complete training curriculum for any specific employer. Site-specific training programs must be developed on the basis of a needs assessment of the hazardous waste site, RCRA/TSDF, or emergency response operation in accordance with 29 CFR 1926.65.

It is noted that the legal requirements are set forth in the regulatory text of 1926.65. The guidance set forth here presents a highly effective program that in the areas covered would meet or exceed the regulatory requirements. In addition, other approaches could meet the regulatory requirements.

Suggested General Criteria

Definitions:

Competent means possessing the skills, knowledge, experience, and judgment to perform assigned tasks or activities satisfactorily as determined by the employer.

Demonstration means the showing by actual use of equipment or procedures.

Hands-on training means training in a simulated work environment that permits each student to have experience performing tasks, making decisions, or using equipment appropriate to the job assignment for which the training is being conducted.

Initial training means training required prior to beginning work.

Lecture means an interactive discourse with a class lead by an instructor.

Proficient means meeting a stated level of achievement.

Site-specific means individual training directed to the operations of a specific job site.

Training hours means the number of hours devoted to lecture, learning activities, small group work sessions, demonstration, evaluations, or hands-on experience.

Suggested Core Criteria:

1. *Training facility.* The training facility should have available sufficient resources, equipment, and site locations to perform didactic and hands-on training when appropriate. Training facilities should have sufficient organization, support staff, and services to conduct training in each of the courses offered.
2. *Training Director.* Each training program should be under the direction of a training director who is responsible for the program. The Training Director should have a minimum of two years of employee education experience.
3. *Instructors.* Instructors should be deemed competent on the basis of previous documented experience in their area of instruction, successful completion of a “train-the-trainer” program specific to the topics they will teach, and an evaluation of instructional competence by the Training Director.

Instructors should be required to maintain professional competency by participating in continuing education or professional development programs or by completing successfully an annual refresher course and having an annual review by the Training Director.

The annual review by the Training Director should include observation of an instructor’s delivery, a review of those observations with the trainer, and an analysis of any instructor or class evaluations completed by the students during the previous year.

4. *Course materials.* The Training Director should approve all course materials to be used by the training provider. Course materials should be reviewed and updated at least annually. Materials and equipment should be in good working order and maintained properly.

All written and audio-visual materials in training curricula should be peer reviewed by technically competent outside reviewers or by a standing advisory committee.

Reviews should possess expertise in the following disciplines were applicable: occupational health, industrial hygiene and safety, chemical/environmental engineering, employee education, or emergency response. One or more of the peer reviewers should be a employee experienced in the work activities to which the training is directed.

5. *Students.* The program for accepting students should include:
 - a. Assurance that the student is or will be involved in work where chemical exposures are likely and that the student possesses the skills necessary to perform the work.
 - b. A policy on the necessary medical clearance.
6. *Ratios.* Student-instructor ratios should not exceed 30 students per instructor. Hands-on activity requiring the use of personal protective equipment should have the following student-instructor ratios. For Level C or Level D personal protective equipment the ratio should be 10 students per instructor. For Level A or Level B personal protective equipment the ratio should be 5 students per instructor.
7. *Proficiency assessment.* Proficiency should be evaluated and documented by the use of a written assessment and a skill demonstration selected and developed by the Training Director and training staff. The assessment and demonstration should evaluate the knowledge and individual skills developed in the course of training. The level of minimum achievement necessary for proficiency shall be specified in writing by the Training Director.

If a written test is used, there should be a minimum of 50 questions. If a written test is used in combination with a skills demonstration, a minimum of 25 questions should be used. If a skills demonstration is used, the tasks chosen and the means to rate successful completion should be fully documented by the Training Director.

The content of the written test or of the skill demonstration shall be relevant to the objectives of the course. The written test and skill demonstration should be updated as necessary to reflect changes in the curriculum and any update should be approved by the Training Director.

The proficiency assessment methods, regardless of the approach or combination of approaches used, should be justified, document and approved by the Training Director.

The proficiency of those taking the additional courses for supervisors should be evaluated and documented by using proficiency assessment methods acceptable to the Training Director. These proficiency assessment methods must reflect the additional responsibilities borne by supervisory personnel in hazardous waste operations or emergency response.

8. *Course certificate.* Written documentation should be provided to each student who satisfactorily completes the training course. The documentation should include:
 - a. Student's name.
 - b. Course title.
 - c. Course date.
 - d. Statement that the student has successfully completed the course.
 - e. Name and address of the training provider.
 - f. An individual identification number for the certificate.
 - g. List of the levels of personal protective equipment used by the student to complete the course.

This documentation may include a certificate and an appropriate wallet-sized laminated card with a photograph of the student and the above information. When such course certificate cards are used, the individual identification number for the training certificate should be shown on the card.

9. *Recordkeeping.* Training providers should maintain records listing the dates courses were presented, the names of the individual course attenders, the names of those students successfully completing each course, and the number of training certificates issued to each successful student. These records should be maintained for a minimum of five years after the date an individual participated in a training program offered by the training provider. These records should be available and provided upon the student's request or as mandated by law.
10. *Program quality control.* The Training Director should conduct or direct an annual written audit of the training program. Program modifications to address deficiencies, if any, should be documented, approved, and implemented by the training provider. The audit and the program modification documents should be maintained at the training facility.

Suggested Program Quality Control Criteria

Factors listed here are suggested criteria for determining the quality and appropriateness of employee health and safety training for hazardous waste operations and emergency response.

A. Training Plan

Adequacy and appropriateness of the training program's curriculum development, instructor training, distribution of course materials, and direct student training should be considered, including:

1. The duration of training, course content, and course schedules/agendas;
2. The different training requirements of the various target populations, as specified in the appropriate generic training curriculum;
3. The process for the development of curriculum, which includes appropriate technical input, outside review, evaluation, program pretesting;
4. The adequate and appropriate inclusion of hands-on, demonstration, and instruction methods;
5. Adequate monitoring of student safety, progress, and performance during the training.

B. Program management, Training Director, staff, and consultants

Adequacy and appropriateness of staff performance and delivering an effective training program should be considered, including:

1. Demonstration of the training director's leadership in assuring quality of health and safety training.
2. Demonstration of the competency of the staff to meet the demands of delivering high quality hazardous waste employee health and safety training.
3. Organization charts establishing clear lines of authority.
4. Clearly defined staff duties including the relationship of the training staff to the overall program.
5. Evidence that the training organizational structure suits the needs of the training program.
6. Appropriateness and adequacy of the training methods used by the instructors.
7. Sufficiency of the time committed by the training director and staff to the training program.
8. Adequacy of the ratio of training staff to students.

9. Availability and commitment of the training program of adequate human and equipment resources in the areas of —
 - a. Health effects
 - b. Safety
 - c. Personal protective equipment (PPE)
 - d. Operational procedures
 - e. Employee protection practices/procedures
10. Appropriateness of management controls.
11. Adequacy of the organization and appropriate resources assigned to assure appropriate training.
12. In the case of multiple-site training programs, adequacy of satellite centers management.

C. Training facilities and resources

Adequacy and appropriateness of the facilities and resources for supporting the training program should be considered, including:

1. Space and equipment to conduct the training.
2. Facilities for representative hands-on training.
3. In the case of multiple-site programs, equipment and facilities at the satellite centers.
4. Adequacy and appropriateness of the quality control and evaluations program to account for instructor performance.
5. Adequacy and appropriateness of the quality control and evaluation program to ensure appropriate course evaluation, feedback, updating, and corrective action.
6. Adequacy and appropriateness of disciplines and expertise being used within the quality control and evaluation program.
7. Adequacy and appropriateness of the role of student evaluations to provide feedback for training program improvement.

D. Quality control and evaluation

Adequacy and appropriateness of quality control and evaluation plans for training programs should be considered, including:

1. A balanced advisory committee and/or competent outside reviewers to give overall policy guidance;
2. Clear and adequate definition of the composition and active programmatic role of the advisory committee or outside reviewers.
3. Adequacy of the minutes or reports of the advisory committee or outside reviewers' meetings or written communication.

4. Adequacy and appropriateness of the quality control and evaluations program to account for instructor performance.
5. Adequacy and appropriateness of the quality control and evaluation program to ensure appropriate course evaluation, feedback, updating, and corrective action.
6. Adequacy and appropriateness of disciplines and expertise being used within the quality control and evaluation program.
7. Adequacy and appropriateness of the role of student evaluations to provide feedback for training program improvement.

E. Students

Adequacy and appropriateness of the program for accepting students should be considered, including:

1. Assurance that the student already possesses the necessary skills for their job, including necessary documentation.
2. Appropriateness of methods the program uses to ensure that recruits are capable of satisfactorily completing training.
3. Review and compliance with any medical clearance policy.

F. Institutional Environment and Administrative Support

The adequacy and appropriateness of the institutional environment and administrative support system for the training program should be considered, including

1. Adequacy of the institutional commitment to the employee training program.
2. Adequacy and appropriateness of the administrative structure and administrative support.

G. Summary of Evaluation Questions

Key questions for evaluating the quality and appropriateness of an overall training program should include the following:

1. Are the program objectives clearly stated?
2. Is the program accomplishing its objectives?
3. Are appropriate facilities and staff available?
4. Is there an appropriate mix of classroom, demonstration, and hands-on training?
5. Is the program providing quality employee health and safety training that fully meets the intent of regulatory requirements?
6. What are the program's main strengths?
7. What are the program's main weaknesses?

8. What is recommended to improve the program?
9. Are instructors instructing according to their training outlines?
10. Is the evaluation tool current and appropriate for the program content?
11. Is the course material current and relevant to the target group?

Suggested Training Curriculum Guidelines

The following training curriculum guidelines are for those operations specifically identified in 29 CFR 1926.65 as requiring training. Issues such as qualifications of instructors, training certification, and similar criteria appropriate to all categories of operations addressed in 1926.65 have been covered in the preceding section and are not re-addressed in each of the generic guidelines. Basic core requirements for training programs that are addressed include:

1. General Hazardous Waste Operations
2. RCRA operations—Treatment, storage, and disposal facilities
3. Emergency Response

A. General Hazardous Waste Operations and Site-specific Training

1. Off-site training

Minimum training course content for hazardous waste operations, required by 29 CFR 1926.65(e), should include the following topics or procedures:

a. Regulatory knowledge

- (1) A review of 29 CFR 1926.65 and the core elements of an occupational safety and health program.
- (2) The content of a medical surveillance program as outlined in 29 CFR 1926.65(f).
- (3) The content of an effective site safety and health plan consistent with the requirements of 29 CFR 1926.65(b)(4)(ii).
- (4) Emergency response plan and procedures as outlined in 29 CFR 1910.38 and 29 CFR 1926.65(l).
- (5) Adequate illumination.
- (6) Sanitation recommendation and equipment.
- (7) Review and explanation of OSHA's hazard-communication standard (29 CFR 1910.1200) and lock-out-tag-out standard (29 CFR 1910.147).
- (8) Review of other applicable standards including but not limited to those in the construction standards (29 CFR part 1926).
- (9) Rights and responsibilities of employers and employees under applicable OSHA and EPA laws.

b. Technical knowledge

- (1) Type of potential exposures to chemical, biological, and radiological hazards; types of human responses to these hazards and recognition of those responses; principles of toxicology and information about acute and chronic hazards; health and safety considerations of new technology.
- (2) Fundamentals of chemical hazards including but not limited to vapor pressure, boiling points, flash points, ph, other physical and chemical properties.
- (3) Fire and explosion hazards of chemicals.
- (4) General safety hazards such as but not limited to electrical hazards, powered equipment hazards, motor vehicle hazards, walking-working surface hazards, excavation hazards, and hazards associated with working in hot and cold temperature extremes.
- (5) Review and knowledge of confined space entry procedures in 29 CFR 1910.146.
- (6) Work practices to minimize employee risk from site hazards.
- (7) Safe use of engineering controls, equipment, and any new relevant safety technology or safety procedures.
- (8) Review and demonstration of competency with air sampling and monitoring equipment that may be used in a site monitoring program.
- (9) Container sampling procedures and safeguarding; general drum and container handling procedures including special requirement for laboratory waste packs, shock-sensitive wastes, and radioactive wastes.
- (10) The elements of a spill control program.
- (11) Proper use and limitations of material handling equipment.
- (12) Procedures for safe and healthful preparation of containers for shipping and transport.
- (13) Methods of communication including those used while wearing respiratory protection.

c. Technical skills

- (1) Selection, use maintenance, and limitations of personal protective equipment including the components and procedures for carrying out a respirator program to comply with 29 CFR 1910.134.
- (2) Instruction in decontamination programs including personnel, equipment, and hardware; hands-on training including level A, B, and C ensembles and appropriate decontamination lines; field activities

including the donning and doffing of protective equipment to a level commensurate with the employee's anticipated job function and responsibility and to the degree required by potential hazards.

- (3) Sources for additional hazard information; exercises using relevant manuals and hazard coding systems.

d. Additional suggested items

- (1) A laminated, dated card or certificate with photo, denoting limitations and level of protection for which the employee is trained should be issued to those students successfully completing a course.
- (2) Attendance should be required at all training modules, with successful completion of exercises and a final written or oral examination with at least 50 questions.
- (3) A minimum of one-third of the program should be devoted to hands-on exercises.
- (4) A curriculum should be established for the 8-hour refresher training required by 29 CFR 1926.65(e)(8), with delivery of such courses directed toward those areas of previous training that need improvement or reemphasis.
- (5) A curriculum should be established for the required 8-hour training for supervisors. Demonstrated competency in the skills and knowledge provided in a 40-hour course should be a prerequisite for supervisor training.

2. Refresher training. The 8-hour annual refresher training required in 29 CFR 1926.65(e)(8) should be conducted by qualified training providers. Refresher training should include at a minimum the following topics and procedures:

- (a) Review of and retraining on relevant topics covered in the 40-hour program, as appropriate, using reports by the students on their work experiences.
- (b) Update on developments with respect to material covered in the 40-hour course.
- (c) Review of changes to pertinent provisions of EPA or OSHA standards or laws.
- (d) Introduction of additional subject areas as appropriate.
- (e) Hands-on review of new or altered PPE or decontamination equipment or procedures. Review of new developments in personal protective equipment.
- (f) Review of newly developed air and contaminant monitoring equipment.

3. *On-site training*

- a. The employer should provide employees engaged in hazardous waste site activities with information and training prior to initial assignment into their work area, as follows:
 - (1) The requirements of the hazard communication program including the location and availability of the written program, required lists of hazardous chemicals, and material safety data sheets.
 - (2) Activities and locations in their work area where hazardous substance may be present.
 - (3) Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearances, or other evidence (sight, sound or smell) of hazardous chemicals being released, and applicable alarms from monitoring devices that record chemical releases).
 - (4) The physical and health hazards of substances known or potentially present in the work area.
 - (5) The measures employees can take to help protect themselves from work-site hazards, including specific procedures the employer has implemented.
 - (6) An explanation of the labeling system and material safety data sheets and how employees can obtain and use appropriate hazard information.
 - (7) The elements of the confined space program including special PPE, permits, monitoring requirements, communication procedures, emergency response, and applicable lock-out procedures.
- b. The employer should provide hazardous waste employees information and training and should provide a review and access to the site safety and plan as follows: The unique code for this document is 131217
 - (1) Names of personnel and alternate responsible for site safety and health.
 - (2) Safety and health hazards present on the site.
 - (3) Selection, use, maintenance, and limitations of personal protective equipment specific to the site.
 - (4) Work practices by which the employee can minimize risks from hazards.
 - (5) Safe use of engineering controls and equipment available on site.

- (6) Safe decontamination procedures established to minimize employee contact with hazardous substances, including:
 - (A) Employee decontamination,
 - (B) Clothing decontamination, and
 - (C) Equipment decontamination.
- (7) Elements of the site emergency response plan, including:
 - (A) Pre-emergency planning.
 - (B) Personnel roles and lines of authority and communication.
 - (C) Emergency recognition and prevention.
 - (D) Safe distances and places of refuge.
 - (E) Site security and control.
 - (F) Evacuation routes and procedures.
 - (G) Decontamination procedures not covered by the site safety and health plan.
 - (H) Emergency medical treatment and first aid.
 - (I) Emergency equipment and procedures for handling emergency incidents.
- c. The employer should provide hazardous waste employees information and training on personal protective equipment used at the site, such as the following:
 - (1) PPE to be used based upon known or anticipated site hazards.
 - (2) PPE limitations of materials and construction; limitations during temperature extremes, heat stress, and other appropriate medical considerations; use and limitations of respirator equipment as well as documentation procedures as outlined in 29 CFR 1910.134.
 - (3) PPE inspection procedures prior to, during, and after use.
 - (4) PPE donning and doffing procedures.
 - (5) PPE decontamination and disposal procedures.
 - (6) PPE maintenance and storage.
 - (7) Task duration as related to PPE limitations.
- d. The employer should instruct the employee about the site medical surveillance program relative to the particular site, including:
 - (1) Specific medical surveillance programs that have been adapted for the site.