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242 FW 8
Laboratory Safety

8.1 What is the purpose of this chapter? This chapter describes the U.S. Fish and Wildlife Service (Service) requirements for protecting you from hazards you may encounter if you work in a laboratory setting.

8.2 What is the Service policy for minimizing exposure to laboratory hazards? Our policy is to develop a written safety program, which includes a Chemical Hygiene Plan, for each laboratory we run. Our Chemical Hygiene Plans, combined with employee training, help prevent harmful exposure to hazardous chemicals and ensure the safety of employees who work at or visit laboratories.

8.3 What is the scope of this chapter?

A. This policy applies to anyone working in or visiting Service laboratories where exposure to chemical hazards may occur.

B. We must write Chemical Hygiene Plans for all laboratories where “laboratory use of chemicals” occurs. The Occupational Safety and Health Administration (OSHA) defines laboratory use of chemicals as handling or using chemicals in a way in which all the following conditions are met:

(1) Employees use chemicals on a laboratory scale (see section 8.5A),

(2) Employees use multiple chemical procedures or chemicals,

(3) The procedures involved are not part of a production process, and

(4) Protective laboratory practices and equipment are available and in common use to minimize potential employee exposure to hazardous chemicals.

C. Examples of Service facilities or functions that may require a Chemical Hygiene Plan include:

(1) The Forensics Laboratory,

(2) The National Conservation Training Center Science Laboratory,

(3) Hatchery laboratories, and

(4) Ecological Services laboratories.

D. If your facility is not a laboratory, you may still have to meet other standards, such as OSHA’s Hazard Communications Standard (29 CFR 1910.1200) and the Air Contaminants Standard (29 CFR 1910.1000 (Subpart Z)). You can review all the OSHA requirements for

laboratory safety at its Web site.

8.4 What are the authorities of this chapter?

A. Occupational Safety and Health Act (OSHA) Federal Agency Safety Programs and Responsibilities (Public Law 91-596, Sec 19).

B. Occupational Safety and Health Standards, Occupational Exposure to Hazardous Chemicals in Laboratories (29 CFR 1910.1450).

C. Occupational Safety and Health Standards, Hazard Communication (29 CFR 1910.1200).

D. Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters (29 CFR 1960).

E. Executive Order 12196, Occupational Safety and Health Programs for Federal Employees.

F. 485 DM 17, Industrial Hygiene Program.

G. National Fire Protection Association, Standard on Fire Protection for Laboratories Using Chemicals (Chapter 45).

H. Department of the Interior Occupational Medicine Program Handbook, Tab 8, Specific Medical Program Requirements.

8.5 What terms do you need to know to understand this chapter?

A. Laboratory scale means the size of an operation is such that the containers employees use for reactions, transfers, and handling are designed so that one person can easily and safely manipulate them.

B. Hazardous chemical means a chemical that has:

(1) Statistically significant evidence that if a person is exposed to it, their health may be acutely or chronically affected, and

(2) A Hazard Rating (in accordance with NFPA 704) of 2, 3, or 4 for flammability, health, or instability.

C. Permissible Exposure Limit (PEL) is the airborne chemical concentration determined by OSHA that an average individual can be exposed to during an average work shift without harm.

D. Chemical and hazardous waste means surplus chemicals or byproducts that cannot be used or reused. The generator must characterize the waste to determine if they are regulated or non-regulated wastes according to Federal and State regulations.

8.6 Who is responsible for the Laboratory Safety program?

A. The **Director:**

(1) Ensures that the Service maintains an effective and comprehensive occupational safety

and health program, and

(2) Approves our laboratory safety policy.

B. The **Assistant Director – Business Management and Operations:**

(1) Ensures that the Service has a laboratory safety policy, and

(2) That the Headquarters Office has sufficient support and resources to implement the policy.

C. Regional Directors and the Director, National Conservation Training Center must provide sufficient support and resources to effectively implement the laboratory safety program in their areas of responsibility.

D. The **Chief, Division of Safety and Health**:

(1) Recommends revisions to this policy, as necessary, and

(2) Interprets the laboratory safety program requirements and serves as an advisor to resolve Servicewide questions and issues.

E. The **Regional Safety Managers**:

(1) Interpret the laboratory safety program requirements and serve as advisors to resolve questions and issues in their areas of responsibility,

(2) Evaluate the laboratory safety programs, and

(3) Help Project Leaders, facility managers, and supervisors ensure they develop laboratory safety programs that meet the needs of their employees.

F. Project Leaders, Facility Managers, and Supervisors responsible for laboratories must:

(1) Ensure that staff develop and implement a site-specific Chemical Hygiene Plan,

(2) Sign, review, and update the Chemical Hygiene Plan annually,

(3) Designate a Chemical Hygiene Officer (see section 8.6G),

(4) Provide required training to all laboratory employees and ensure its successful completion and documentation,

(5) Provide personal protective equipment (PPE) and ensure employees use, maintain, and store it properly,

(6) Make medical consultation and treatment available, if necessary,

(7) Ensure that laboratories meet minimum fire safety standards and that employees use and store chemicals properly and comply with requirements of the Chemical Hygiene Plan, and

(8) Properly identify, manage, and dispose of chemical and hazardous wastes at their facilities.

G. Chemical Hygiene Officers must:

(1) Advise management on the requirements and technical aspects of laboratory operations and the Chemical Hygiene Plan,

(2) Review the Chemical Hygiene Plan annually, when we start a new process or use a new chemical, and at other times, as needed, and

(3) Modify the plan when necessary.

H. Servicing Human Resource Offices must manage records as this chapter requires.

I. Employees who work in laboratories must:

(1) Successfully complete laboratory safety program training and comply with the requirements in this chapter;

(2) Take the following measures if PPE is required or we provide it to you to perform your job safely:

(a) Inspect it before use,

(b) Report any problems with your PPE to your supervisor immediately. Do not use defective or damaged PPE until the problem has been resolved or the PPE has been replaced,

(c) Use PPE correctly (as designed),

(d) Protect it from damage,

(e) Wear, clean, maintain, and dispose of PPE as the manufacturer requires, and

(f) Store it properly in a clean location that your Project Leader/facility manager/supervisor designates;

(3) Read, understand, and comply with all parts of the Chemical Hygiene Plan;

(4) Report or repair missing or damaged container labels; and

(5) Report any potential safety problems to your Project Leader/facility manager/supervisor.

8.7 What are the components of a laboratory safety program? A laboratory safety program includes the following components:

A. Employee exposure assessment,

B. A Chemical Hygiene Plan,

C. Training,

D. Medical consultation and examination,

E. Hazard identification,

F. Compliance with chemical use and storage and laboratory fire protection features, and

G. Management and disposal of chemical and hazardous waste.

8.8 How does a Project Leader/Facility Manager/Supervisor conduct an employee exposure assessment? Employee exposure assessments are a two step process that includes the development of job hazard assessments and the required personal exposure air sampling based on employee exposure determination or the use of certain chemicals.

A. Job Hazard Assessment (JHA) is a systematic process for identifying real or potential safety and health hazards inherent in a system or operation. The JHA may include any combination of personnel, equipment, facilities, and environment in a functional unit. See 240 FW 1 for information on conducting a JHA.

B. Personal exposure air sampling is where we can definitively determine what the actual chemical exposure levels to our employees are during performance of their duties. The methods for testing and observation vary depending on the type of chemicals.

(1) A qualified technician or someone who receives training on how to perform chemical-specific testing may conduct personal employee exposure testing. For more information, contact your Regional Safety Office.

(2) The results of the assessments and air sampling determine what procedures to use and what level of PPE to use in the laboratory to ensure safety of the employees working there.

8.9 What must a Chemical Hygiene Plan include?

A. The Chemical Hygiene Plan must:

(1) Include the necessary work practices, procedures, and policies that employees must follow to protect themselves from potentially hazardous chemicals in their laboratory work area.

(2) Be specific to the laboratory for which it is written.

B. Exhibit 1 is an example plan for full laboratory operations. You can also download sample plans from OSHA's Web site.

C. Consult with your Regional Safety Office for assistance in developing the plan.

8.10 What are the training requirements for employees working in a laboratory?

A. Project Leaders/facility managers/supervisors must provide employees with information and training:

(1) To ensure that they know the proper identification, handling, storage, labeling, transportation and disposal of hazardous materials and wastes in their work areas, and that they can protect themselves from exposure (see 561 FW 6).

(2) When they initially assign an employee to the work area and before assignments involving

any new exposure situations.

B. Employees must receive training on:

(1) How to detect the presence or release of a hazardous chemical;

(2) The hazards of chemicals in the work area and the symptoms associated with exposure;

(3) What they must do to protect themselves from these hazards, including appropriate work practices, use of PPE, and emergency procedures;

(4) The contents of the laboratory's Chemical Hygiene Plan and where it is available for reference;

(5) How to access the information in OSHA's Occupational Exposure to Hazardous Chemicals in Laboratories standard (29 CFR 1910.1450);

(6) How to access Material Safety Data Sheets for each hazardous chemical that the employees may be exposed to; and

(7) OSHA's permissible exposure limits (PELs) or recommended exposure limits for other hazardous chemicals where there is no applicable OSHA standard.

8.11 What does a Project Leader/Facility Manager/Supervisor do if an employee is exposed to hazardous chemicals? If an employee's exposure to chemicals exceeds any applicable OSHA PEL, or the employee exhibits signs and symptoms of exposure to chemicals, the Project Leader/facility manager/supervisor must provide him/her with immediate access to medical attention.

8.12 Will the Service issue respirators to employees working with hazardous chemicals in laboratories? Yes, a Project Leader/facility manager/supervisor must issue respirators to employees if they are necessary to maintain exposure below PELs. Medical qualification, respirator fit-testing, and training are major requirements when issuing and using respirators. See 242 FW 14 and consult your Regional Safety Office for assistance with using respirators.

8.13 Are there any labeling requirements for hazardous chemicals under the lab safety program? Yes.

A. All containers must be clearly marked with their contents and associated hazards in accordance with 29 CFR 1910.1200 and 1910.1450.

B. You must not remove or deface labels on hazardous chemicals.

C. The Project Leader/facility manager/supervisor or Chemical Hygiene Officer must ensure that:

(1) A Material Safety Data Sheet is available and easily accessible for each chemical in the laboratory,

(2) Staff maintains a chemical inventory of all chemicals, including hazardous waste, in the laboratory, and

(3) Staff dates hazardous chemical containers with the month and year received.

8.14 What are the fire protection features required in laboratories?

A. Laboratories must comply with NFPA 45, *Standard on Fire Protection for Laboratories Using Chemicals*. We must:

(1) Protect all new laboratories with an automatic fire sprinkler system in accordance with NFPA 45 and NFPA 13;

(2) Provide a second means of access to an exit:

(a) If the laboratory is greater than 1,000 square feet,

(b) When a chemical fume hood is located adjacent to the primary exit, or

(c) A compressed gas cylinder could prevent safe egress during an accidental release of pressurized gas.

(3) Provide emergency lighting in any laboratory where a second means of exit access is required;

(4) Based on the Hazard Rating of the laboratory, maintain fire separation between a laboratory and surrounding occupancies; and

(5) Locate electrical outlets, switches, or controls so they are not subject to liquid spills.

B. Whenever possible, we must construct and operate laboratories to meet NFPA 45 Class D (Minimal Fire Hazard) standards. We must:

(1) Limit quantities of flammable and combustible liquids outside of flammable liquid storage cabinets to less than 1 gallon per 100 square feet of floor space;

(2) Limit total quantities of flammable and combustible liquids to less than 2 gallons per 100 square feet of laboratory floor space;

(3) Locate no more than three flammable liquid storage cabinets in any single laboratory; and

(4) Limit containers of flammable or combustible liquids to no larger than 1 gallon.

8.15 Are there other safety equipment requirements for laboratories? Yes, we must:

A. Install chemical fume hoods according to NFPA 45 and the manufacturer's requirements:

(1) Each fume hood must have a measuring device for airflow installed and visible to hood users. This device must indicate either adequate (80 to 120 feet per minute at sash position) or inadequate airflow.

(2) Chemical fume hoods must not be located next to a single means of exit access or in high traffic areas.

B. Inspect (using NFPA 45 standards) and test fume hoods and exhaust systems when we

install or modify them and on an annual basis. The testing agency or contractor must affix a certification to the fume hood and the laboratory must maintain records of each inspection for a minimum of 5 years; and

C. Install eyewashes or emergency showers when required by OSHA 29 CFR 1910.151 and according to OSHA's and the manufacturer's standards. We must:

(1) Maintain free, unabated, access to all eyewashes and showers.

(2) Install an eyewash **and** shower when employees use formaldehyde solutions greater than 1%. (Only an eyewash is required when formaldehyde solutions are less than 1%, but greater than 0.1%.)

(3) Flush plumbed eyewashes and showers on a routine basis and at least once a month. Laboratory personnel must maintain records of routine flushing.

(4) Not flush portable self-contained-type eyewashes. Maintain these eyewashes in accordance with manufacturer standards.

8.16 Do NFPA 45 fire protection requirements apply to all laboratories? No.

A. The requirements of NFPA 45 do not apply to your facility if:

(1) Your laboratory does not use hazardous or flammable chemicals,

(2) Your laboratory does not have more than 1 gallon of flammable or combustible liquid or more than 75 standard cubic feet of flammable gas,

(3) All the chemicals in the laboratory have a Hazard Class rating of zero or one for Flammability, Health, or Reactivity, or

(4) Your physical, electronic, instrument, laser, or similar laboratory uses chemicals only for incidental purposes, such as cleaning.

B. Consult your Regional Safety Manager to help you determine if the fire protection requirements apply to your laboratory.

8.17 What are the recordkeeping requirements for laboratory safety programs?

A. Project Leaders/facility managers/supervisors must:

(1) Keep copies of employees' medical evaluations (i.e., physician opinions) for, at a minimum, the length of employment,

(2) Keep written records of the laboratory safety-related training employees receive for the length of employment (see section 8.10), and

(3) Maintain written inventory and final disposition of hazardous waste records.

B. The Servicing Human Resources Office must retain employees' personal exposure assessments, related evaluations (i.e., physician opinions), and medical evaluation results for, at a minimum, the length of employment.

C. Project Leaders/facility managers/supervisors and Human Resource Officers must collect and maintain records containing personal information (e.g., medical evaluations and physician statements, etc.) in compliance with 5 U.S.C. 552a (The Privacy Act of 1974) and 5 CFR Part 293, Subpart E. These records:

(1) Are sensitive and protected by The Privacy Act (see 204 FW 1 – 8 for more information on the Privacy Act),

(2) Must only be available to staff on a need-to-know basis,

(3) If electronic, must be password protected and only used in accordance with the routine uses identified in "OPM/GOVT-10, Employee Medical File System Records." Employees tasked with storing and maintaining such records must read and be familiar with OPM/GOVT-10, and

(4) If hard copy, kept in a locked file and locked room that is available only to staff who have a need to know this information in accordance with OPM/GOVT-10.

For information on the content of this chapter, contact the Division of Safety and Health. For information about this Web site, contact Krista Holloway in the Division of Policy and Directives Management.
