Appendix B: Understanding OSHA's Laboratory Standard

The Occupational Safety and Health Administration (OSHA) has issued regulations to limit exposure of laboratory personnel to hazardous chemicals. The law "Occupational Exposures to Hazardous Chemicals in Laboratories," is often referred to as the OSHA Laboratory Standard. This rule has been adopted by Wisconsin's Department of Safety and Professional Services and applies to UWL laboratories.

This standard only covers laboratory hazards of chemicals. Non-laboratory chemical exposures are regulated by other OSHA standards. Other safety laws address the environmental hazards of chemicals and the hazards of biological and radioactive materials. As explained in Part D of this Guide, if laboratory exposures exceed certain OSHA limits, other substance-specific OSHA health standards apply.

The law requires laboratories using hazardous chemicals to take additional safety measures. In brief, the OSHA laboratory standard requires you to:

1. Keep laboratory personnel's exposures to chemicals below OSHA's permissible exposure limits (PEL's).
2. Write a Chemical Hygiene Plan.
3. Designate a Chemical Hygiene Officer to implement the plan.
4. Train and inform new laboratory personnel of:
    - The OSHA laboratory standard.
    - The Chemical Hygiene Plan and its details.
    - OSHA's permissible exposure limits.
    - The signs and symptoms of exposure to hazardous chemicals.
    - Access and use of Safety Data Sheets (SDS's).
    - This Laboratory Safety and Chemical Disposal Guide.
    - Methods to detect the presence of hazardous chemicals.
    - The physical and health hazards of the chemicals.
    - Measures to protect laboratory personnel from chemical hazards.
    - Potential hazards of chemical substances developed in your laboratory.
    - Selection, use, and care of Personal Protective Equipment.
5. In certain circumstances, provide laboratory personnel access to medical consultations and examinations.
6. Keep labels of supplied chemicals intact.
7. Maintain or make accessible SDS's for all your supplied chemicals.

The following sections provide a more detailed explanation of the law. Environmental Health and Safety will work with you to comply with the law and promote laboratory safety. The text of the OSHA Laboratory Safety Standard is included at the end of this appendix.

Appendix C is a template for a Chemical Hygiene Plan.

KEEP CHEMICAL EXPOSURES BELOW PERMISSIBLE LIMITS

Laboratory personnel's exposures to OSHA regulated substances may not exceed the permissible exposure limits (PEL's). (See Part 1910.1450(c) & (d) of the Standard.)

Permissible Exposure Limits (PEL's) are legal limits set by OSHA for certain regulated substances. They are based on airborne concentrations of those substances in the workplace. An employee's exposure to an OSHA regulated substance may not exceed its PEL.

How You Can Comply

Review the Safety Data Sheets (SDS's) of all laboratory chemicals to identify those that are OSHA regulated substances. A current list of OSHA regulated chemicals is available from Environmental Health and Safety. Prevent exposures to hazardous chemicals by using fume hoods, glove boxes, or other containment devices for all procedures that could cause exposures to volatile or airborne hazardous chemicals. If you have reason to believe that exposure levels for an OSHA regulated substance are routinely approached or exceeded, or if engineering controls or protective equipment is not working properly, contact Environmental Health and Safety for an evaluation. Environmental Health and Safety will determine if protective measures or air monitoring is needed, and help you meet this requirement.

An *action level* is established for many OSHA regulated substances. For any substance regulated by an OSHA standard that requires monitoring, an exposure measurement is required if there is a reason to believe that the exposure level for that substance routinely exceeds the action level (or, in the absence of an action level, the PEL).

LIMITING CHEMICAL EXPOSURES

OSHA requires that no laboratory personnel be exposed to a chemical above established Permissible Exposure Limits (PEL's). How can you be sure?

The Problem. PEL's are set as air concentrations of toxic chemicals that are volatile or airborne. To measure air concentrations, Environmental Health and Safety can collect air samples and have them analyzed by an accredited laboratory. Since laboratory operations are varied and usually not routine, it is very difficult to obtain a reliable and representative measurement to compare it to the PEL.

Solutions. If you work with a toxic chemical that is volatile or airborne you can increase the probability that your chemical exposure is below the PEL by:

- Using the chemical in a fume hood, glove box, or other very well ventilated area.
- Request Environmental Health and Safety to review your procedures when working with chemicals. An assessment will determine if sampling is necessary or if work practices can be used to meet the exposure standard.
- Use other campus expertise. Your colleagues, along with Environmental Health and Safety have knowledge of the exposure risks of certain laboratory procedures. This experience in chemical exposures, laboratory practices, PEL's, and previous evaluations will often suggest protective measures to comply with the law and good safety practices. If you are in doubt, it is best to consult with others before conducting laboratory operations.

If monitoring is required, Environmental Health and Safety can perform periodic monitoring and notify laboratory personnel as required.

Exposure monitoring is the method of measuring employee exposure to an airborne substance. Environmental Health and Safety has the capability and expertise to conduct such monitoring.

WRITE A CHEMICAL HYGIENE PLAN

OSHA requires the development and implementation of a written Chemical Hygiene Plan that is capable of protecting UWL employees from the hazards of chemical exposure in their laboratory. UWL has developed a campus Chemical Hygiene Plan to address campus wide issues and this Plan is available from Environmental Health and Safety. Since each laboratory's operation is unique, each Principal Investigator, Laboratory Director, and Laboratory Supervisor is responsible for the preparation of a chemical hygiene plan for the laboratories under their direction. The plan may be for one or several laboratories so long as it covers the activities of that unit and meets the OSHA requirements.

At UWL, each Principal Investigator, Laboratory Director, or Laboratory Supervisor is responsible for the preparation of a chemical hygiene plan for the laboratories under their direction.

Appendix C is a fill-in-the-blank template for a laboratory specific Chemical Hygiene Plan that you may can use for your laboratory. Your Chemical Hygiene Plan must describe, in writing, what you do to protect people from the chemical health hazards in your laboratory, including:

- Standard operating procedures for chemical safety.
- The criteria you use to implement exposure control measures.
- Measures to ensure proper performance of fume hoods and other protective equipment.
- Provision of chemical safety information and training to laboratory personnel.
- Circumstances that require prior approval.
- Provision for medical consultation and examination.
- Additional protection for work with particularly hazardous substances (see Appendix D for a list).

How You Can Comply

Appendix C provides a template for a Chemical Hygiene Plan. Note that the contents of your Chemical Hygiene Plan are enforceable. Make sure you carry out all of the provisions of your written plan.

Remember that the plan need only address chemical hazards in your laboratory. Safety procedures for other laboratory hazards should be referred to as supplemental materials.

INFORM AND TRAIN LABORATORY PERSONNEL

All laboratory personnel must be informed of the hazards of chemicals present in their workplace, including specified information and training. Laboratory personnel should receive this information and training at the time of their initial assignment to a work area where these chemical hazards are present, and prior to assignments involving new exposure situations. The frequency of refresher training is left to your discretion. However, refresher training is necessary when individuals are not demonstrating compliance with your lab specific Plan.

Appendix G contains an outline for training new laboratory personnel.

How You Can Comply

Appendix G includes a training outline for laboratory personnel. Other resources for safety training are listed there and in Appendix C. Sources of chemical safety information and training are listed below.

Keep written records of the training that your employees receive.

Information and Training Required for Laboratory Personnel	**Source of Information**
The OSHA Laboratory Standard.	Includes at the end of this Appendix of the Laboratory Safety and Chemical Disposal Guide.
Your laboratory's Chemical Hygiene Plan and its details.	Your completed Chemical Hygiene Plan. (See Appendix C for a template.)
Permissible exposure limits (PEL's) for OSHA regulated substances or recommended exposure limits for other hazardous substances.	The Safety Data Sheet (SDS) for each chemical in your lab. Environmental Health and Safety can supply this information or they are readily available online. Refer to the SDS and chemical labeling poster in your laboratory.
Signs and symptoms associated with exposure to hazardous chemicals.	The SDS for each chemical in your laboratory.
The location and availability of reference material on the hazards, safe handling, storage, and disposal of hazardous chemicals.	Part B of this Guide describes the hazards of laboratory chemicals. Handling and storage information can be found in Part D. Part G describes chemical disposal procedures.
Methods and observations used to detect the presence or release of a hazardous chemical.	The SDS for each chemical in your laboratory.

Physical and health hazards of chemicals.	Part B describes chemical hazards. This information is also included on SDS's.
Measures laboratory personnel can take to protect themselves from chemical hazards, including work practices, emergency procedures, and personal protective equipment.	Part D of this Guide describes safety procedures for chemical laboratories. SDS's also contain this information. Part E describes laboratory emergency procedures.

PROVIDE FOR MEDICAL CONSULTATIONS AND EXAMINATIONS

The Chemical Hygiene Plan must describe provisions for medical consultation and examination for laboratory personnel who work with hazardous chemicals. The OSHA standard (see Appendix B), requires that laboratory personnel be given an opportunity to receive medical attention when:

- Laboratory personnel develop signs or symptoms associated with a hazardous chemical to which they may have been exposed in the laboratory.
- Exposure monitoring reveals an action level, or Permissible Exposure Limit (PEL) if there is no action level, is routinely exceeded for any OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements.
- There has been a spill, leak, explosion, or other occurrence in the work area resulting in the likelihood of a hazardous exposure.

How You Can Comply

Provide laboratory personnel working with hazardous chemicals an opportunity to receive medical attention in the above circumstances. UWL laboratory personnel may receive medical care through their chosen health care plan or by seeking care from any chosen health care provider and filing a Worker Compensation claim through their supervisor or the Human Resources Office. Students, who are not covered by the OSHA standard, but whom we are still obligated to protect, may receive medical care from the UWL Health Center. For more information or guidance, contact Environmental Health and Safety.

KEEP CHEMICAL LABELS INTACT

Do not remove or deface labels on incoming chemicals. The Chemical Storage and Management section in Part D of this Guide gives additional guidelines for labeling your chemicals.

Note also that, if your laboratory develops or synthesizes a chemical and supplies it to a user outside of the University of Wisconsin System, you must properly label and prepare a Safety Data Sheet.

MAINTAIN SAFETY DATA SHEETS

All laboratory personnel must have ready access to Safety Data Sheets (SDS's). Send copies of all SDS's that you receive to Environmental Health and Safety. If desired, retain a copy for immediate use in your laboratory.

How You Can Comply

There are many ways to comply with this requirement. The objective is to make SDS's available to your laboratory personnel for all the supplied chemicals used in the lab. To comply with this law and to ensure a safe laboratory, laboratory personnel should regularly consult SDS's or equivalent information on hazardous substances.

Electronic SDS's. Internet access to SDS's is the chosen method to make these documents readily accessible. UWL has developed an SDS homepage accessible by searching for Safety Data Sheet from UWL's homepage. If you require additional assistance with locating SDS's, contact Environmental Health and Safety.

Paper SDS's. Chemical manufacturers or their suppliers are required to supply UWL with an SDS for any chemical purchased by UWL. Environmental Health and Safety is the campus repository for SDS's. Contact Environmental Health and Safety if you need an SDS for an existing chemical.

If desired, paper copies of SDS's can be kept in each laboratory or other centralized location in the immediate area of the laboratory. Keep them in a place where laboratory personnel can easily access them during the times they work in the laboratory. It is best to assign a person from within your operational area the task of filing and maintaining your SDS files.

TAKE PRECAUTIONS WITH RESPIRATORS

If laboratory personnel must use a respirator, they must be used in accordance with OSHA requirements.

How You Can Comply

OSHA has established regulations related to the selection, use, medical monitoring, and other aspects associated with using respirators. Environmental Health and Safety must be consulted prior to the use of any respirator. Environmental Health and Safety will provide an assessment to select the type of respirator and complete mandated training.

Selection is a critical component of protecting the health of the wearer. Selection is also a major factor in applying the OSHA rules. These rules vary for dust masks being worn for comfort purposes and respirators being worn to control chemical exposures below a Permissible Exposure Limit (PEL). Contact Environmental Health and Safety to assure health protection of the respirator wearer and OSHA compliance.

Instead of using a respirator, OSHA regulations require UWL to use engineering controls (e.g., fume hood and glove boxes) or other means to limit chemical exposures whenever possible. See the section on Engineering Controls in Part D of this Guide for more information. If you still feel that respirators are necessary, contact Environmental Health and Safety to arrange compliance with the OSHA respirator standard.

KEEP SAFETY RECORDS

The law requires that records be retained of any medical consultations or examinations that were initiated because of this standard. The health care institution and medical professional who conducted the consultation or examination should retain these medical records.

The law also requires keeping records of any exposure monitoring done because of this standard. Environmental Health and Safety will retain records of all exposure monitoring perform in your laboratory. All exposure monitoring results are shared with the laboratory.

COMPLETE TEXT OF THE OSHA LABORATORY SAFETY STANDARD

The following is the text of the OSHA standard on Occupational Exposures to Hazardous Chemical in Laboratories, also known as OSHA Lab Standard, Title 29, Code of Federal Regulations, Part 1910.1450 as of February 2019.

Please note that OSHA regulations change periodically. For the most recent version of this standard refer to the OSHA website and search for "Laboratory Safety Standard".

Standard Number: 29 CFR 1910.1450
Title: Occupational exposure to hazardous chemicals in laboratories.

1910.1450(a)
Scope and application.
1910.1450(a)(1)
This section shall apply to all employers engaged in the laboratory use of hazardous chemicals as defined below.
1910.1450(a)(2)
Where this section applies, it shall supersede, for laboratories, the requirements of all other OSHA health standards in 29 CFR part 1910, subpart Z, except as follows:
1910.1450(a)(2)(i)
For any OSHA health standard, only the requirement to limit employee exposure to the specific permissible exposure limit shall apply for laboratories, unless that particular standard states otherwise or unless the conditions of paragraph (a)(2)(iii) of this section apply.
1910.1450(a)(2)(ii)
Prohibition of eye and skin contact where specified by any OSHA health standard shall be observed.
1910.1450(a)(2)(iii)
Where the action level (or in the absence of an action level, the permissible exposure limit) is routinely exceeded for an OSHA regulated substance with exposure monitoring and medical surveillance requirements paragraphs (d) and (g)(1)(ii) of this section shall apply.
1910.1450(a)(3)
This section shall not apply to:
1910.1450(a)(3)(i)
Uses of hazardous chemicals which do not meet the definition of laboratory use, and in such cases, the employer shall comply with the relevant standard in 29 CFR part 1910, subpart Z, even if such use occurs in a laboratory.
1910.1450(a)(3)(ii)
Laboratory uses of hazardous chemicals which provide no potential for employee exposure. Examples of such conditions might include:
1910.1450(a)(3)(ii)(A)
Procedures using chemically-impregnated test media such as Dip-and-Read tests where a reagent strip is dipped into the specimen to be tested and the results are interpreted by comparing the color reaction to a color chart supplied by the manufacturer of the test strip; and
1910.1450(a)(3)(ii)(B)

Commercially prepared kits such as those used in performing pregnancy tests in which all of the reagents needed to conduct the test are contained in the kit.
1910.1450(b)

Definitions —

Action level means a concentration designated in 29 CFR part 1910 for a specific substance, calculated as an eight (8)-hour time-weighted average, which initiates certain required activities such as exposure monitoring and medical surveillance.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Carcinogen (see *select carcinogen*).

Chemical Hygiene Officer means an employee who is designated by the employer, and who is qualified by training or experience, to provide technical guidance in the development and implementation of the provisions of the Chemical Hygiene Plan. This definition is not intended to place limitations on the position description or job classification that the designated individual shall hold within the employer's organizational structure.

Chemical Hygiene Plan means a written program developed and implemented by the employer which sets forth procedures, equipment, personal protective equipment and work practices that (i) are capable of protecting employees from the health hazards presented by hazardous chemicals used in that particular workplace and (ii) meets the requirements of paragraph (e) of this section.

Emergency means any occurrence such as, but not limited to, equipment failure, rupture of containers or failure of control equipment which results in an uncontrolled release of a hazardous chemical into the workplace.

Employee means an individual employed in a laboratory workplace who may be exposed to hazardous chemicals in the course of his or her assignments.

Hazardous chemical means any chemical which is classified as health hazard or simple asphyxiant in accordance with the Hazard Communication Standard (§1910.1200).

Health hazard means a chemical that is classified as posing one of the following hazardous effects: Acute toxicity (any route of exposure); skin corrosion or irritation; serious eye damage or eye irritation; respiratory or skin sensitization; germ cell mutagenicity; carcinogenity; reproductive toxicity; specific target organ toxicity (single or repeated exposure); aspiration hazard. The criteria for determining whether a chemical is classified as a health hazard are detailed in appendix A of the Hazard Communication Standard (§1910.1200) and §1910.1200(c) (definition of "simple asphyxiant").

Laboratory means a facility where the "laboratory use of hazardous chemicals" occurs. It is a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis.

Laboratory scale means work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by one person. "Laboratory scale" excludes those workplaces whose function is to produce

commercial quantities of materials.

Laboratory-type hood means a device located in a laboratory, enclosure on five sides with a moveable sash or fixed partial enclosed on the remaining side; constructed and maintained to draw air from the laboratory and to prevent or minimize the escape of air contaminants into the laboratory; and allows chemical manipulations to be conducted in the enclosure without insertion of any portion of the employee's body other than hands and arms.

Walk-in hoods with adjustable sashes meet the above definition provided that the sashes are adjusted during use so that the airflow and the exhaust of air contaminants are not compromised and employees do not work inside the enclosure during the release of airborne hazardous chemicals.

Laboratory use of hazardous chemicals means handling or use of such chemicals in which all of the following conditions are met:

(i) Chemical manipulations are carried out on a "laboratory scale;"

(ii) Multiple chemical procedures or chemicals are used;

(iii) The procedures involved are not part of a production process, nor in any way simulate a production process; and

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

Medical consultation means a consultation which takes place between an employee and a licensed physician for the purpose of determining what medical examinations or procedures, if any, are appropriate in cases where a significant exposure to a hazardous chemical may have taken place.

Mutagen means chemicals that cause permanent changes in the amount or structure of the genetic material in a cell. Chemicals classified as mutagens in accordance with the Hazard Communication Standard (§1910.1200) shall be considered mutagens for purposes of this section.

Physical hazard means a chemical that is classified as posing one of the following hazardous effects: Explosive; flammable (gases, aerosols, liquids, or solids); oxidizer (liquid, solid, or gas); self reactive; pyrophoric (gas, liquid or solid); self-heating; organic peroxide; corrosive to metal; gas under pressure; in contact with water emits flammable gas; or combustible dust. The criteria for determining whether a chemical is classified as a physical hazard are in appendix B of the Hazard Communication Standard (§1910.1200) and §1910.1200(c) (definitions of "combustible dust" and "pyrophoric gas").

Protective laboratory practices and equipment means those laboratory procedures, practices and equipment accepted by laboratory health and safety experts as effective, or that the employer can show to be effective, in minimizing the potential for employee exposure to hazardous chemicals.

Reproductive toxins mean chemicals that affect the reproductive capabilities including adverse effects on sexual function and fertility in adult males and females, as well as adverse effects on the development of the offspring. Chemicals classified as reproductive toxins in accordance with the Hazard Communication Standard (§1910.1200) shall be considered reproductive toxins for

purposes of this section.

Select carcinogen means any substance which meets one of the following criteria:

(i) It is regulated by OSHA as a carcinogen; or

(ii) It is listed under the category, "known to be carcinogens," in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (latest edition); or

(iii) It is listed under Group 1 ("carcinogenic to humans") by the International Agency for Research on Cancer Monographs (IARC) (latest editions); or

(iv) It is listed in either Group 2A or 2B by IARC or under the category, "reasonably anticipated to be carcinogens" by NTP, and causes statistically significant tumor incidence in experimental animals in accordance with any of the following criteria:

(A) After inhalation exposure of 67 hours per day, 5 days per week, for a significant portion of a lifetime to dosages of less than 10 mg/m^3;

(B) After repeated skin application of less than 300 (mg/kg of body weight) per week; or

(C) After oral dosages of less than 50 mg/kg of body weight per day.

1910.1450(c)
Permissible exposure limits. For laboratory uses of OSHA regulated substances, the employer shall assure that laboratory employees' exposures to such substances do not exceed the permissible exposure limits specified in 29 CFR part 1910, subpart Z.

1910.1450(d)
Employee exposure determination --
1910.1450(d)(1)
Initial monitoring. The employer shall measure the employee's exposure to any substance regulated by a standard which requires monitoring if there is reason to believe that exposure levels for that substance routinely exceed the action level (or in the absence of an action level, the PEL).
1910.1450(d)(2)
Periodic monitoring. If the initial monitoring prescribed by paragraph (d)(1) of this section discloses employee exposure over the action level (or in the absence of an action level, the PEL), the employer shall immediately comply with the exposure monitoring provisions of the relevant standard.
1910.1450(d)(3)
Termination of monitoring. Monitoring may be terminated in accordance with the relevant standard.
1910.1450(d)(4)
Employee notification of monitoring results. The employer shall, within 15 working days after the receipt of any monitoring results, notify the employee of these results in writing either individually or by posting results in an appropriate location that is accessible to employees.

1910.1450(e)
Chemical hygiene plan -- General. (Appendix A of this section is non-mandatory but provides guidance to assist employers in the development of the Chemical Hygiene Plan).

1910.1450(e)(1)
Where hazardous chemicals as defined by this standard are used in the workplace, the employer shall develop and carry out the provisions of a written Chemical Hygiene Plan which is:
1910.1450(e)(1)(i)
Capable of protecting employees from health hazards associated with hazardous chemicals in that laboratory and
1910.1450(e)(1)(ii)
Capable of keeping exposures below the limits specified in paragraph (c) of this section.
1910.1450(e)(2)
The Chemical Hygiene Plan shall be readily available to employees, employee representatives and, upon request, to the Assistant Secretary.
1910.1450(e)(3)
The Chemical Hygiene Plan shall include each of the following elements and shall indicate specific measures that the employer will take to ensure laboratory employee protection;
1910.1450(e)(3)(i)
Standard operating procedures relevant to safety and health considerations to be followed when laboratory work involves the use of hazardous chemicals;
1910.1450(e)(3)(ii)
Criteria that the employer will use to determine and implement control measures to reduce employee exposure to hazardous chemicals including engineering controls, the use of personal protective equipment and hygiene practices; particular attention shall be given to the selection of control measures for chemicals that are known to be extremely hazardous;
1910.1450(e)(3)(iii)
A requirement that fume hoods and other protective equipment are functioning properly and specific measures that shall be taken to ensure proper and adequate performance of such equipment;
1910.1450(e)(3)(iv)
Provisions for employee information and training as prescribed in paragraph (f) of this section;
1910.1450(e)(3)(v)
The circumstances under which a particular laboratory operation, procedure or activity shall require prior approval from the employer or the employer's designee before implementation;
1910.1450(e)(3)(vi)
Provisions for medical consultation and medical examinations in accordance with paragraph (g) of this section;
1910.1450(e)(3)(vii)
Designation of personnel responsible for implementation of the Chemical Hygiene Plan including the assignment of a Chemical Hygiene Officer, and, if appropriate, establishment of a Chemical Hygiene Committee; and
1910.1450(e)(3)(viii)
Provisions for additional employee protection for work with particularly hazardous substances. These include "select carcinogens," reproductive toxins and substances which have a high degree of acute toxicity. Specific consideration shall be given to the following provisions which shall be included where appropriate:
1910.1450(e)(3)(viii)(A)
Establishment of a designated area;
1910.1450(e)(3)(viii)(B)
Use of containment devices such as fume hoods or glove boxes;
1910.1450(e)(3)(viii)(C)
Procedures for safe removal of contaminated waste; and
1910.1450(e)(3)(viii)(D)
Decontamination procedures.

1910.1450(e)(4)
The employer shall review and evaluate the effectiveness of the Chemical Hygiene Plan at least annually and update it as necessary.

1910.1450(f)
Employee information and training.
1910.1450(f)(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.
1910.1450(f)(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.
1910.1450(f)(3)
Information. Employees shall be informed of:
1910.1450(f)(3)(i)
The contents of this standard and its appendices which shall be made available to employees;
1910.1450(f)(3)(ii)
the location and availability of the employer's Chemical Hygiene Plan;
1910.1450(f)(3)(iii)
The permissible exposure limits for OSHA regulated substances or recommended exposure limits for other hazardous chemicals where there is no applicable OSHA standard;
1910.1450(f)(3)(iv)
Signs and symptoms associated with exposures to hazardous chemicals used in the laboratory; and
1910.1450(f)(3)(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.
1910.1450(f)(4)
Training.
1910.1450(f)(4)(i)
Employee training shall include:
1910.1450(f)(4)(i)(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.);
1910.1450(f)(4)(i)(B)
The physical and health hazards of chemicals in the work area; and
1910.1450(f)(4)(i)(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.
1910.1450(f)(4)(ii)
The employee shall be trained on the applicable details of the employer's written Chemical Hygiene Plan.

1910.1450(g)
Medical consultation and medical examinations.

1910.1450(g)(1)
The employer shall provide all employees who work with hazardous chemicals an opportunity to receive medical attention, including any follow-up examinations which the examining physician determines to be necessary, under the following circumstances:
1910.1450(g)(1)(i)
Whenever an employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory, the employee shall be provided an opportunity to receive an appropriate medical examination.
1910.1450(g)(1)(ii)
Where exposure monitoring reveals an exposure level routinely above the action level (or in the absence of an action level, the PEL) for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements, medical surveillance shall be established for the affected employee as prescribed by the particular standard.
1910.1450(g)(1)(iii)
Whenever an event takes place in the work area such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure, the affected employee shall be provided an opportunity for a medical consultation. Such consultation shall be for the purpose of determining the need for a medical examination.
1910.1450(g)(2)
All medical examinations and consultations shall be performed by or under the direct supervision of a licensed physician and shall be provided without cost to the employee, without loss of pay and at a reasonable time and place.
1910.1450(g)(3)
Information provided to the physician. The employer shall provide the following information to the physician:
1910.1450(g)(3)(i)
The identity of the hazardous chemical(s) to which the employee may have been exposed;
1910.1450(g)(3)(ii)
A description of the conditions under which the exposure occurred including quantitative exposure data, if available; and
1910.1450(g)(3)(iii)
A description of the signs and symptoms of exposure that the employee is experiencing, if any.
1910.1450(g)(4)
Physician's written opinion.
1910.1450(g)(4)(i)
For examination or consultation required under this standard, the employer shall obtain a written opinion from the examining physician which shall include the following:
1910.1450(g)(4)(i)(A)
Any recommendation for further medical follow-up;
1910.1450(g)(4)(i)(B)
The results of the medical examination and any associated tests;
1910.1450(g)(4)(i)(C)
Any medical condition which may be revealed in the course of the examination which may place the employee at increased risk as a result of exposure to a hazardous workplace; and
1910.1450(g)(4)(i)(D)
A statement that the employee has been informed by the physician of the results of the consultation or medical examination and any medical condition that may require further examination or treatment.
1910.1450(g)(4)(ii)
The written opinion shall not reveal specific findings of diagnoses unrelated to occupational exposure.

1910.1450(h)
Hazard identification.
1910.1450(h)(1)
With respect to labels and safety data sheets:
1910.1450(h)(1)(i)
Employers shall ensure that labels on incoming containers of hazardous chemicals are not removed or defaced.
1910.1450(h)(1)(ii)
Employers shall maintain any safety data sheets that are received with incoming shipments of hazardous chemicals, and ensure that they are readily accessible to laboratory employees.
1910.1450(h)(2)
The following provisions shall apply to chemical substances developed in the laboratory:
1910.1450(h)(2)(i)
If the composition of the chemical substance which is produced exclusively for the laboratory's use is known, the employer shall determine if it is a hazardous chemical as defined in paragraph (b) of this section. If the chemical is determined to be hazardous, the employer shall provide appropriate training as required under paragraph (f) of this section.
1910.1450(h)(2)(ii)
If the chemical produced is a byproduct whose composition is not known, the employer shall assume that the substance is hazardous and shall implement paragraph (e) of this section.
1910.1450(h)(2)(iii)
If the chemical substance is produced for another user outside of the laboratory, the employer shall comply with the Hazard Communication Standard (29 CFR 1910.1200) including the requirements for preparation of safety data sheets and labeling.

1910.1450(i)
Use of respirators. Where the use of respirators is necessary to maintain exposure below permissible exposure limits, the employer shall provide, at no cost to the employee, the proper respiratory equipment. Respirators shall be selected and used in accordance with the requirements of 29 CFR 1910.134.

1910.1450(j)
Recordkeeping.
1910.1450(j)(1)
The employer shall establish and maintain for each employee an accurate record of any measurements taken to monitor employee exposures and any medical consultation and examinations including tests or written opinions required by this standard.
1910.1450(j)(2)
The employer shall assure that such records are kept, transferred, and made available in accordance with 29 CFR 1910.1020.

1910.1450(k)
[Reserved]
1910.1450(l)

Appendices. The information contained in the appendices is not intended, by itself, to create any additional obligations not otherwise imposed or to detract from any existing obligation.

[55 FR 3327, Jan. 31, 1990; 55 FR 7967, March, 6, 1990; 55 FR 12777, March 30, 1990; 61 FR 5507, Feb. 13, 1996; 71 FR 16674, April 3, 2006; 77 FR 17887, March 26, 2012]

REVIEW QUESTIONS

1. The OSHA Laboratory Standard applies:
   a) Only to industrial laboratories.
   b) Only to laboratories that use 1,000 kg or more of OSHA regulated chemicals in a calendar year.
   c) To all UWL laboratories that use hazardous chemicals.
   d) Only to laboratories where more than three people are employed.

2. Environmental Health and Safety should be contacted for airborne chemical monitoring:
   a) Whenever somebody gets a brief smell of a chemical released in the laboratory.
   b) If there is reason to believe that someone is routinely exposed to a hazardous chemical through the airborne route.
   c) Whenever you plan to use a hazardous chemical in your laboratory.
   d) Before you decide to use a fume hood.

3. All laboratories that use hazardous chemicals
   a) Can use the same Chemical Hygiene Plan.
   b) Should have the Fire Department write a Chemical Hygiene Plan for them.
   c) Should have a lab specific Chemical Hygiene Plan that covers the chemical hazards that they work with.
   d) Should have a copy of their Chemical Hygiene Plan posted at every entrance.

4. Laboratories that use hazardous chemicals should:
   a) Have access to the UWL Laboratory Safety and Chemical Disposal Guide
   b) Have a complete copy of the OSHA Laboratory Standard.
   c) Have a written Chemical Hygiene Plan.
   d) All of the above.

5. Employees working with hazardous chemicals in a laboratory should seek medical attention:
   a) When they feel sick.
   b) Before they work with any OSHA regulated chemical.
   c) If they exhibit signs or symptoms from a hazardous chemical exposure.
   d) All of the above.

6. Safety Data Sheets (SDS's):
   a) Are not necessary if the chemical vendor does not supply them.
   b) Should be readily accessible to everyone who works in the laboratory.
   c) Are not necessary for chemicals that have no hazard.
   d) Should only be reviewed after an accident or injury occurs that is associated with the chemical being used.

7. Respirators:
   a) Should be available for everyone in the laboratory.
   b) Are the best way to ensure you are safe from exposure to hazardous powders.
   c) Should be worn whenever you are unsure of respiratory hazards.
   d) Must be used in compliance with OSHA Standards with prior consultation provided by Environmental Health and Safety.

ANSWERS

1. c) To all UWL laboratories that use hazardous chemicals.

2. b) If there is reason to believe that someone is routinely exposed to a hazardous chemical though the airborne route.

3. c) Should have a lab specific Chemical Hygiene Plan that covers the chemical hazards that they work with.

4. d) All of the above.

5. c) If they exhibit signs or symptoms from a hazardous chemical exposure.

6. b) Should be readily accessible to everyone who works in the laboratory.

7. d) Must be used in compliance with OSHA Standards with prior consultation provided by Environmental Health and Safety.