



# Louisiana State University Chemical Hygiene Plan

Office of Occupational and Environmental Safety  
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1. PURPOSE AND SCOPE

The purpose of this Plan is to describe the safe and proper use, handling practices, and procedures to be followed by personnel working in University laboratories necessary to protect them from potential health and physical hazards presented by chemicals used in the workplace, and to keep chemical exposures

and Dean for action. Deliberate failure to comply which results in serious jeopardy to personnel safety and health or the environment may result in loss of laboratory privileges.

A. Deans, Directors, and Department

- xi. Plan for accidents and ensure that appropriate supplies are in place and procedures are established for responding to an accident, including cleaning up chemical spills.
  - xii. Monitor the safety performance of the staff to ensure that the required safety equipment, practices and techniques are understood and are being employed and ensure that action is taken to correct work practices that may lead to chemical exposures or releases.
  - xiii. Report all accidents involving an employee's chemical exposure or involving a chemical spill that may constitute a danger of environmental contamination to the Supervisor and OES. If the spill is significant, also notify LSU Police immediately.
  - xiv. Investigate all chemical accidents and near misses to determine the cause and take appropriate corrective action to prevent similar accidents. Contact the CHO or the OES Office, when needed, for assistance with investigations, assessment, and recommendations for corrective action.
- E. Employees, staff, students, and visitors working with or around hazardous chemicals in a laboratory responsibilities include the following:
- i. Follow LSU's chemical hygiene procedures and all safety and health standards and rules.
  - ii. Understand and follow all standard operating procedures.
  - iii. Develop good personal hygiene habits.
  - iv. Report all hazardous conditions to the supervisor.
  - v. Wear or use prescribed protective equipment.
  - vi. Refrain from operating equipment without proper training or equipment that has safety defects.
  - vii. Attended and apply training sessions on the Chemical Hygiene Program.
  - viii. Understand the hazards of chemicals they handle and the signs and symptoms of excessive exposure.
  - ix. If an emergency occurs related to an experiment, provide emergency response personnel with information about the conditions that caused the emergency and the existing situation in the laboratory.

#### 4. LABORATORY AND CHEMICAL SECURITY

The Chemical Facility Anti-Terrorism Standards (6 CFR Part 27) and the efforts of the Department of Homeland Security (DHS) has increased the awareness of laboratory and chemical security. DHS has defined specific chemicals as "high risk" and has initiated controls on these chemicals if a facility exceeds a trigger amount. LSU has many of these compounds in levels below the trigger level. While LSU is not required to comply with the formal DHS requirements, it is important to be aware of the need for increased laboratory security. To minimize the theft and improper use of hazardous chemicals including toxic and corrosive substances the following actions should be taken.

- A. Complete a chemical Inventory your laboratory and maintain the inventory in the chemical inventory data base. Note particularly hazardous substances and particular security risks.
- B. Close and lock laboratory doors when no one is present.
- C. Do not leave hazardous materials unattended at any time when not secured.
- D. Areas where biological agents, radioactive material or particularly hazardous chemicals are stored should be kept secure when not in use.
- E. Restrict access to the laboratory to authorized personnel only and become familiar with these people.
- F. Report any missing inventory to your PI or an OES Representative.
- G. Prohibit the use of lab space, materials and equipment without the knowledge and approval of the PI.



OSHA has ruled that electronic access to MSDSs is an acceptable alternative to maintaining paper files. Each lab, department, or work group has the option to maintain a hard copy MSDS binder or file. As a minimum, each should maintain an inventory of hazardous materials names and suppliers and methods to access the MSDS. The OES webpage provides a number of Internet accessible MSDS servers. Please contact the OES Office if you need assistance in interpreting MSDS information.

ii. Chemical Container Labels

Chemical container labels are a good resource for information on chemical hazards. All containers of hazardous chemicals must have labels attached. Labels on purchased chemicals must include:

1. The common name of the chemical;
2. The name, address and telephone number of the company responsible for the product;
3. Appropriate hazard warnings.

The warning may be a single word (e.g. Danger, Caution, Warning) or may identify the primary hazard both physical (e.g. water reactive, flammable, or explosive) and health (e.g. carcinogen, corrosive or irritant).

Most labels provide additional safety information to help personnel protect themselves from the substance. This information may include protective measures and/or protective clothing to be used, first aid instructions, storage information and emergency procedures.

Laboratory personnel are responsible for:

1. Inspecting incoming containers to be sure that labels are attached and are in good condition and contain the information outlined above.
2. Reading the container label each time a newly purchased chemical is used. It is possible that the manufacturer may have added new hazard information or reformulated the product since the last purchase.
3. Ensuring that chemical container labels are not removed or defaced, except when containers are empty.
4. Labeling any secondary containers used in the laboratory, to prevent unknown chemicals

D. Avoidance of Routine Exposure.

Each laboratory employee with the training, education and resources provided by supervision, shall develop and implement work habits and e

- vi. Thermal-resistant gloves shall be worn for



## I. General Laboratory Use Policy

Laboratories are usually shared areas and it is the responsibility of all lab personnel to be aware of the activities in the lab.

- i. **Sole Occupancy of Building.** Under normal circumstances, work should not be done in the laboratory when the only person in the building is the laboratory person performing the work. If necessary, special arrangements need to be made to ensure periodic checks on that person.
- ii. **Hazardous Operations.** All hazardous operations are to be performed during a time when at least two people are present in the laboratory. At no time shall a laboratory person, while working alone in the laboratory, perform work which is considered hazardous. The determination of hazardous operations shall be made by the laboratory supervisor and/or CHO.
- iii. **New Procedures or Chemicals.** Prior to the use of new procedures or chemicals, a review of potential hazards created must be undertaken within the department. The review should also be completed when there is a substantial change in the amount of chemicals used or a change in the equipment used in the procedure.
- iv. **Unattended Operations.** When laboratory operations are performed which will be unattended by laboratory personnel (continuous operations, overnight reactions, etc.), the following procedures will be employed:
  - a. The laboratory supervisor will review work procedures to ensure the safe completion of the operation.
  - b. An appropriate sign will be posted at all entrances to the laboratory.
  - c. The overhead lights in the laboratory will be left on.
  - d. Precautions shall be made for the interruption of utility services during the unattended operation (loss of water pressure, electricity, etc.).
  - e. Containment will be provided in the event of unexpected hazardous material releases.
  - f. Tubing for running water must be in good condition and secured at connections by clamps or wire.

## J. Special Procedures for Highly Hazardous Substances.

Special precautions shall be taken when performing laboratory work with any of the following

untested substances that may be hazardous are also frequently encountered. Thus, it is essential that all laboratory personnel understand the types of toxicity, recognize the routes of exposure, and are familiar with the major hazard classes of chemicals. The most important single generalization regarding toxicity in chemical research is to treat all compounds as potentially harmful, especially new and unfamiliar materials, and work with them under conditions to minimize exposure by skin contact and inhalation.

The OSHA Laboratory Standard defines a hazardous chemical as "a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed personnel. The term

interpreted by OSHA as being substances that "may be fatal or cause damage to target organs as the result of a single exposure or exposures of short duration".

D. Reproductive and Developmental Toxins

Reproductive toxins can affect the reproductive health of both male and female personnel and students if proper procedures and controls are not used. For women, exposure to reproductive toxins during pregnancy can cause adverse effects on the fetus; these effects include embryo lethality (death of the fertilized egg, embryo or fetus), malformations (teratogenic effects), and postnatal functional defects. Examples of embryotoxins include thalidomide and certain antibiotics such as tetracycline. Women of childbearing potential should note that embryotoxins have the greatest impact during the first trimester of pregnancy. Because a woman often does not know that she is pregnant during this period of high susceptibility, special caution is advised when working with all chemicals, especially those rapidly absorbed through the skin (e.g., formamide). Pregnant women and women intending to become pregnant should consult with their laboratory supervisor and OES before working with substances that are suspected to be reproductive toxins.

F. Corrosive Substances

Corrosive substances cause destruction of, or alterations in, living tissue by chemical action at the site of contact. Major classes of corrosive substances include strong acids (e.g., sulfuric, nitric, hydrochloric, and hydrofluoric acids), strong bases (sodium hydroxide, potassium hydroxide, and ammonium hydroxide), dehydrating agents (sulfuric acid, sodium hydroxide, phosphorus pentoxide, and calcium oxide), and oxidizing agents (hydrogen peroxide, chlorine, and bromine). Symptoms of exposure for inhalation include a burning sensation, coughing, wheezing, laryngitis, shortness of breath, nausea, and vomiting. For eyes, symptoms include pain, blood shot eyes, tearing, and blurring of vision. For skin, symptoms may include reddening, pain, inflammation, bleeding, blistering and burns. As a physical hazard, corrosive substances may corrode materials they come in contact with and may be highly reactive with other substances. It is important to review information regarding materials they corrode, and their reactivity with other substances, as well as information on health effects.

G. Irritants

Irritants are defined as non-corrosive chemicals that cause reversible inflammatory effects on living tissue by chemical action at the site of contact. A wide variety of organic and inorganic compounds, including many chemicals that are in a powder or crystalline form, are irritants and consequently, skin contact with all laboratory chemicals should always be avoided.

H. Sensitizers

A sensitizer (allergen) is a substance that causes exposed people to develop an allergic reaction in normal tissue after repeated exposure to the substance. Examples of allergens include diazomethane, chromium, nickel, formaldehyde, isocyanates, arylhydrazines, benzylic and allylic halides, and many phenol derivatives.

I. Flammable and Explosive Substances

A number of highly flammable substances are in common use in campus laboratories. Explosive substances are materials that decompose under





- their respective management. After a suitable time frame to correct outstanding issues, the area can be reviewed by the lead auditor so that corrective actions can be documented.
- vii. The lead auditor is responsible for completing a final audit report. This report will include all relevant issues and their corrections. The final report will be issued to the Director of OES and copied to departmental management. Upon review of the final report, the Director of OES can certify that the laboratory is in compliance with the applicable standards.

### C. Compliance and Enforcement

Each individual at the Institute is responsible for complying with all LSU, state, and federal rules, regulations, and required procedures; and is held accountable for their actions. If a PI/Supervisor does not take appropriate action to address problems noted during inspection or audits, he or she may be subject to compliance and enforcement action. Issues of non-compliance will be taken to the Department Head and respective Dean for recommendations regarding disciplinary action. Deliberate failure to comply that result in serious jeopardy to personnel safety and health or the environment may result in loss of laboratory privileges.

## 7. CHEMICAL PROCUREMENT, DISTRIBUTION, AND STORAGE

### A. Procurement.

- i. Before a substance is received, information on proper handling, storage, and disposal should be known to those who will be involved.
- ii. No container should be accepted without an adequate identifying label.
- iii. All substances should be received in a central location.
- iv. OES has implemented an internet based chemical inventory system. It is the responsibility of each lab to maintain the inventory by adding compounds upon receipt and deleting



area. The safety coordinator and lab supervisor of each area will then be responsible for implementing and customizing training for their laboratory users.

B. Training Timing and Frequency.

Information and training shall be provided to laboratory personnel on the following basis:

- i. Initially, all laboratory personnel shall complete a training program.
- ii. Individuals who are assigned to use new hazardous chemicals and/or new laboratory work procedures must have their training upgraded.
- iii. New personnel shall complete a training program.
- iv. All personnel shall be provided with updated information on an annual basis.

C. Training Components.

This training shall include methods of detecting the presence of hazardous chemicals, physical and health hazards of chemicals in the lab, and measure personnel can take to protect themselves from these hazards. The training shall present the details of the Chemical Hygiene Plan and shall include:

- i. The contents of the Chemical Hygiene Plan.
- ii. The location and availability of the Chemical Hygiene Plan.
- iii. The permissible exposure limits for OSHA regulated substances or recommended exposure values for other hazardous chemicals not regulated by OSHA which are present in the laboratory.
- iv. The physical and health hazards of chemicals in the work area.
- v. Signs and symptoms associated with exposure to the chemicals present in the laboratory.
- vi. Location, availability, and how to use reference material on chemical hygiene including Material Safety Data Sheets.
- vii. The criteria for selection and use of personal protective equipment and the limits of its protection.
- viii. Emergency procedures and the location of emergency equipment

D. Training Documentation.

The PI and lab supervisors are responsible for documenting employee training. OES will maintain records of training provided by their instructors.

## 12. WASTE DISPOSAL PROGRAM

All chemicals shall be disposed of in accordance with the LSU Hazardous Waste Disposal Program, the details of which are available on the OES website at [www.lsu.edu/oes](http://www.lsu.edu/oes).



- J. Attend and document annual training for all persons generating hazardous wastes.
- K. Conduct weekly inspections of hazardous waste collection area and maintain an inspection log.
- L. Maintain emergency equipment (eyewash, showers, etc.) and know what to do in the event of a chemical spill, fire, or explosion.
- M. Post the name and phone numbers for responsible

cabinet and are equipped with flame-arrester screens. Always read the manufacturer's information and follow prudent safety practices such as:

- a. Store only compatible materials inside the cabinet.
- b. Store chemicals of similar vapor density together when using mechanical ventilation (e.g., heavier than air vapors are vented through the bottom vent and lighter than air vapors through the top vent).
- c. Do not store paper or cardboard inside cabinets with the chemicals.
- d. Do not overload the cabinet.