

Syracuse University
Environmental Health and Safety Services

Laboratory Chemical Safety Plan

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1.0 Introduction

Syracuse University's Laboratory Chemical Safety Plan (Plan) outlines the responsibilities, requirements, and procedures the University has put into place to protect laboratory workers from all hazards associated with hazardous chemicals used in University laboratories. This Plan is intended to serve as operational guidance for laboratories to enhance safety and incorporate prudent safety practices into their specific laboratory operations. The Plan was prepared in accordance with the US Occupational Safety and Health Administration's (OSHA) Laboratory Standard, 29 CFR 1910.1450 - Occupational Exposures to Hazardous Chemicals in Laboratories. The Plan is also referred to as the Chemical Hygiene Plan.

The contents of this Plan are aligned with the requirements of the Laboratory Standard. The Plan is provided in a general form which can be adapted and expanded by individual departments and laboratories to meet their specific needs, procedures, and chemical hazards.

2.0 Applicability

The OSHA Laboratory Standard and the University's Laboratory Chemical Safety Plan (Plan) is applicable to all University employees engaged in the use of hazardous laboratory chemicals. Principal Investigators (PI) and laboratory personnel where chemicals are used, stored, or handled are required to implement the applicable components of the Plan in their respective laboratories and follow the practices and procedures provided in the Plan to minimize the risks related to the use of hazardous chemicals.

Syracuse University's Plan is administered by the University's Environmental Health and Safety Services (EHSS) department, located in 029 Lyman Hall. EHSS maintains the Plan on their website and updates it periodically to reflect the most current regulation, requirements, and best practices.

Laboratory safety and compliance assistance is available by contacting EHSS at 315.443.4132 or ehss@syr.edu.

3.0 Responsibilities

The roles and responsibilities for implementing this Plan and providing for the safe use of chemicals in University laboratories is generally outlined as follows.

3.1. Deans, Directors, and Department Heads

The deans, directors, and department heads of schools, colleges, and departments where chemical use laboratories are present are responsible for the safety of their laboratory personnel. They fulfill this responsibility, in part, by ensuring that their laboratory personnel understand and take seriously their roles in implementing the Plan and overseeing and assisting with compliance of all requirements, procedures, and practices outlined in this Plan.

3.2. Principal Investigators

The Principal Investigator (PI) of each laboratory has the ultimate responsibility for the health and safety of the laboratory personnel working in their laboratory. The PI may delegate the safety duties for which he/she is responsible for to senior personnel but must ensure that all duties are completed.

The PI responsibilities include:

1. Ensure laboratory practices and operating procedures align with the requirements and rules outlined in the Plan and current best laboratory safety practices.
2. Ensure that laboratory personnel are sufficiently trained on the chemical hazards specific to the laboratory, have attended EHSS Initial Laboratory Safety Training, and have completed any other required EHSS safety training.
3. Determine PPE required generally in the laboratory, and for chemicals that require specific PPE in order to be used in the lab. Provide, at no cost, all required personal protective equipment (PPE) to laboratory personnel.

4. Identify and implement all feasible control measures to reduce the chemical hazards and chemical exposures in the laboratory.
5. Identify and label the use and storage location(s) of hazardous materials in the lab.
6. Have an accurate, up to date laboratory door sign indicating the primary hazards and laboratory emergency contact information.
7. Provide specific training/instruction to laboratory personnel on the safe use of hazardous material(s) and/or equipment and develop laboratory standard operating procedures (SOPs) for the use of particularly hazardous substances.
8. Inform non-laboratory personnel (e.g., campus facilities, vendors, visitors) of potential hazards when they are required to enter the laboratory.
9. Report laboratory incidents and near misses to EHSS.
10. Communicate, document, and maintain an accurate chemical inventory, description of laboratory activities, laboratory locations, and list of laboratory personnel with EHSS.
11. Advise laboratory personnel of the means of accessing chemical safety data sheets and other chemical safety information specific to their laboratory.
12. Ensure waste chemicals and other wastes generated in the laboratory are disposed of properly and in compliance with all applicable rules and requirements.
13. Comply with the [University Minors in Laboratories Guidelines](#) if hosting individuals under the age of 18 in the laboratory.

3.3. Laboratory Personnel

Laboratory personnel are responsible for supporting the implementation and adhering to the requirements of the Plan and laboratory specific safety requirements in the laboratory(s) where they work.

Laboratory personnel responsibilities include:

1. Abide by the Plan, all laboratory safety rules, regulations, and SOPs applicable to the task performed.
2. Review and understand the hazards presented by the chemicals and operations in their laboratory research prior to beginning work.
3. Store and label chemicals properly and safely.
4. Complete all required safety trainings, including EHSS's Initial Laboratory Safety Training course, required or recommended EHSS supplemental laboratory safety trainings, and any laboratory specific chemical or operational safety trainings required by the laboratory principal investigator. The initial laboratory safety trainings should be completed prior to beginning work and the supplemental and laboratory specific trainings should be completed before using the chemicals or performing the operations the trainings are applicable to.
5. Use appropriate engineering controls, safety procedures, and PPE to control laboratory hazards.
6. Understand the proper use and limitations of required PPE and use the PPE properly.
7. Maintain an organized work area free of chemical residue and unnecessary clutter.
8. Consult with PI before using high hazard chemicals, such as Particularly Hazardous Substances or highly reactive chemicals, or conducting certain high-risk experimental procedures.
9. Manage chemical and other wastes generated in the laboratory properly and in compliance with all applicable rules and requirements.
10. Report laboratory incidents and near misses to the PI and EHSS.

3.4. Environmental Health and Safety Services and the Laboratory Chemical (Hygiene) Safety Officer

EHSS has the role of administrating and maintaining the Plan. EHSS's Assistant Director of Research and Laboratory Safety as the University's Chemical Hygiene Officer (CHO). The CHO, supported by other EHSS personnel, provides PIs, laboratory managers, and laboratory personnel with assistance in implementing this Plan, and supports the University's overall chemical safety efforts. EHSS's and the CHO's responsibilities in support of the Plan also include:

1. Conduct periodic review of the Plan to verify that the written text reflects current University Policy, guidance, and/or regulatory requirements.

2. Conduct individual laboratory safety assessments to monitor compliance with the Plan and provide recommended corrective actions to laboratory supervisors as appropriate.
3. Develop and provide general laboratory safety training, guidance documents, written directives, and laboratory safety initiatives as appropriate in order to enhance chemical safety.
4. Assist with the coordination of emergency response for chemical spills and investigate associated laboratory accidents, incidents, and near-misses.
5. Provide general laboratory safety training and maintain records of attendance.
6. Conduct personal exposure assessments and maintain assessment records for laboratory personnel.
7. Provide compliance and safety assistance to laboratory personnel as needed.
8. Provide safety data sheets and conduct chemical hazard assessments upon request.

4.0 Laboratory Safety Rules

Laboratory personnel must follow the standard University laboratory rules and practices listed below. In addition to these standard rules, individual laboratories may have their own additional safety rules based on the chemicals and operations performed in their specific laboratories.

4.1. General Safety

- Know and follow all University laboratory safety policies, procedures, and practices.
- Only perform approved procedures.
- Do not use hazardous chemicals or materials or operate equipment without proper training.
- Complete required laboratory safety trainings. Complete EHSS's Initial Laboratory Safety Training and other trainings applicable to the laboratory and the hazardous materials to be used.
- Do not eat or drink in the laboratory.
- Keep all work areas, and especially work benches, clear of clutter, and obstructions. Clean your work areas regularly and at the end of each day.
- Keep floors clean and dry. Keep all aisles, hallways, and stairs clear of all chemicals and obstructions. Stairways and hallways should not be used as storage areas.
- Do not obstruct access to emergency equipment, utility controls, showers, eyewashes, fire extinguishers, or exits.
- Avoid working alone in the laboratory. Individuals who must work alone in the laboratory must notify someone that they will be working alone in the laboratory and request periodic check-ins.
- Notify others in the laboratory when working with highly hazardous chemicals and only conduct this type of work during normal working hours.
- The use of headphones/earbuds and other distractions in the laboratories should be avoided.
- Wash hands before leaving the laboratory.
- Inspect equipment or apparatus for damage before use. Do not use damaged equipment.

4.2. Hazardous Chemical Safety

- Do not use hazardous chemicals without:
 - Review of Safety Data Sheet (SDS)
 - Proper ventilation
 - Proper protective clothing and equipment (PPE)
- Use hazardous chemicals and all laboratory equipment only as directed or for their intended purpose.
- Know the proper methods for storage, transport, and disposal of chemicals within the facility. Store chemicals appropriately and segregated by hazard class. Do not store chemicals directly on floors and minimize chemical storage outside of chemical cabinets.
- Label all secondary chemical containers with appropriate chemical identification information.
- Keep chemical containers closed when not in use.
- Operations using volatile or toxic substances should only be performed in a chemical fume hood.

- Ensure fume hood is operating and used properly.
- Post a sign on the fume hood or at the door to the lab, indicating a contact name, contact information, and hazardous materials involved when experiments will operate continuously or overnight when no one is present in the laboratory.

4.3. Protective Clothing and Equipment (PPE)

- Wear long sleeve shirts, long pants, and closed toed shoes in the laboratory.
- Wear lab coat, gloves and eye protection when working with hazardous materials.
- Use additional personal protective clothing and equipment (PPE) appropriate for the hazard present.
- Inspect PPE to ensure good integrity or proper function before use.
- Tie back loose hair, secure loose clothing, and jewelry.
- Remove PPE before leaving laboratory. Never touch door handles, elevator buttons, etc. with gloved hands.
- Wash hands thoroughly with soap and water after removing gloves.

4.4. First Aid and Emergencies

- Know the location of the fire extinguisher, eyewash, safety shower, and first aid station/kit.
- Be familiar with emergency response procedures.
- Report fires, accidents, spillage, burns, injuries, and other emergencies immediately.
- Report laboratory emergencies to the Department of Public Safety at 315.443.2224.

5.0 Chemical Safety Information

Laboratory personnel shall be provided access to chemical safety information specific to the potential hazards they may encounter in the laboratory. Chemical safety information resources at the University includes:

- The labels found on containers of hazardous chemicals
- Chemical Safety Data Sheets (SDS)
- Laboratory door signs and other signage, labels, and postings visible in the laboratories
- EHSS's Laboratory Safety webpage and online resources

In addition to these resources, Environmental Health and Safety Services (EHSS) staff can also be contacted to assist with specific chemical safety questions and requests for information. Contact EHSS staff at ehss@syr.edu.

5.1. Container Labeling

All laboratory containers (secondary containers, portable containers, glassware, squeeze bottles, etc.) containing chemicals must be labeled, with the chemicals name and words, pictures, symbols, or combination thereof, which provide at least general information regarding the hazards of the chemicals.

There may be practical limitations to labeling small containers such as sample vials and tubes. Alternatives such as labeling a tray or rack that holds the containers or applying a numbering or coding system are acceptable provided that the chemicals' identity and associated hazard information is readily accessible (e.g., in a notebook, reference sheet, etc.).

5.2. Chemical Safety Data Sheets (SDS)

A Safety Data Sheet (SDS) is a fact sheet developed by the manufacturer that contains information on health and physical hazards associated with a particular chemical. It also provides guidance on how to protect persons from these hazards and emergency information/procedures in the event of an accident.

The University's online [BioRAFT Chemical Management Platform](#) provides access to search and view a comprehensive library of Safety Data Sheets (SDS) of many chemicals present in research laboratories. Online access to Safety Data Sheets is available to all active employees, students, and staff, and can be accessed by logging into [BioRAFT](#) with your Syracuse University NetID and Password. For more information on accessing and searching for an SDS, please refer

to [BioRAFT How to Search for an SDS Instructions](#)

Additional information concerning the content or use of SDS can be obtain by contacting EHSS at ehss@syr.edu.

5.3. Laboratory Door Signs

A standardized laboratory door sign must be posted at the entrance door of each laboratory. The door sign must indicate the primary hazards in the laboratory space and the names of the PI and other responsible laboratory personnel. Laboratory hazards are communicated on the door sign using pictograms that visually describe the primary hazards present inside the laboratory.

Standardized laboratory door signs are obtained through EHSS. PI's can create and update their laboratory door sign by completing an [Online Door Sign Form](#) located on the EHSS website.

5.4. In-Laboratory Hazard Postings and Signage

In-laboratory hazard postings should be used to identify and communicate the primary hazards used and/or storage locations in the laboratory.

Standardized in-laboratory hazard posting labels can be obtained from EHSS. The standardized postings are peel and stick vinyl labels roughly the size of a business card. They contain a pictogram and wording to communicate the hazards present. The pictograms used on the in-laboratory posting labels correspond to the pictograms used on the laboratory door sign.

Radiation safety, biological safety, and laser safety signs, labels and posting should be used in laboratories where these hazards are present. The University's Radiation Safety Program, Biological Safety Program, and/or Laser Safety Program should be referenced for more specific information.

6.0 Laboratory Safety Trainings

The OSHA Laboratory Standard requires that individuals who will be working with chemicals in the laboratory be provided with sufficient training to enable them to conduct their work safely. The training must be provided prior to the time when individuals begin work involving chemicals and whenever there is a significant change in the types or quantities of chemicals used. PI's, laboratory managers, and/or laboratory supervisors are responsible for ensuring that their laboratory personnel have been adequately trained and kept apprised of the chemical hazards present in their laboratory. Initial Laboratory Safety Training and supplemental online laboratory and chemical safety trainings are offered by EHSS. Laboratory specific chemical and operational safety trainings must be provided by the laboratory principal investigator or laboratory manager and/or their designee.

6.1. EHSS Initial Laboratory Safety Training

All laboratory personnel must complete EHSS Initial Laboratory Safety Training prior to beginning any work in a research laboratory. Initial Laboratory Safety Training covers the following:

1. The contents of the OSHA Laboratory Standard and its appendices.
2. The location and availability of applicable details of the University's Laboratory Chemical Safety (Hygiene) Plan.
3. Permissible Exposure limits (PELs) for OSHA regulated substances and recommended exposure limits for other hazardous chemicals where there is no applicable OSHA standard.
4. Recognizing signs and symptoms associated with exposures to hazardous chemicals used in University laboratories.
5. Methods and observations that may be used to detect the presence or release of a hazardous chemical.
6. A description of physical and health hazards of chemicals.
7. Measures laboratory personnel can take to protect themselves from laboratory hazards.

6.2. Additional EHSS Laboratory Safety Training Modules

Additional EHSS laboratory safety trainings may be required or recommended for laboratory personnel depending on the hazardous chemical, materials, and/or equipment present and/or being used in a research laboratory.

EHSS provides on-line [EHSS Supplemental laboratory safety training modules](#) for fume hoods, emergency wash equipment and certain types of hazardous materials and equipment. These supplemental training modules provide a more in-depth review of the hazards and safety precautions to consider when using these specific types of hazardous chemicals, materials, or equipment. These supplemental laboratory safety training modules will be required or recommended for laboratory personnel depending on the chemical, operations, and equipment in use in the laboratory.

Certain types of hazardous materials require the completion of more extensive safety training, including radioactive materials, radiation producing equipment, biohazardous materials, and lasers. Prior to using these types of materials in the laboratory, laboratory personnel should contact EHSS or access the EHSS website to determine the training requirements specific to these materials.

A complete listing of available laboratory safety related trainings offered by EHSS can be found online at: <https://ehss.syr.edu/laboratory-safety/laboratory-safety-training-catalog/>.

Laboratory personnel are able to access and review their EHSS training requirements, and training history, by logging onto the [My Training Status](#) web-page.

6.3. Laboratory Specific Training

PI's, laboratory managers and/or designee(s), must provide laboratory specific training/instruction to laboratory personnel that will engage in the use of hazardous material and/or equipment. The training/instruction should include adequate details regarding the potential hazard(s) associated with the chemical, experiment or operation and instruction on how laboratory personnel can protect themselves, including, safety procedures, control measures, and PPE.

7.0 Particularly Hazardous Substances (PHS)

Certain substances are defined as "Particularly Hazardous Substances" (PHS) by the Occupational Safety and Health Administration (OSHA) because of their potential to cause severe adverse health effects. These include carcinogens, reproductive toxins, and substances with a high acute toxicity. The increased risk associated with the use of chemicals considered to be PHS requires the implementation of stringent safety precautions and operating procedures. Laboratories using [carcinogens, reproductive toxins](#) (including teratogens and mutagens), and [acutely toxicity materials](#) must ensure these chemicals are identified, evaluated, and managed properly and that adequate protection from these hazards for laboratory personnel is provided. Standard operating procedures must be developed, and designated areas must be established if PHS are present in a laboratory.

- **Carcinogens:** Carcinogens are substances capable of causing cancer or tumor development. Carcinogens are chronically toxic substances in that they cause damage after repeated or long duration exposure and their effects become apparent after a long latency period. OSHA considers a chemical to be a carcinogen if it is included in any of the following lists:
 - OSHA regulated carcinogens as listed in Subpart Z of the OSHA general industry standard: <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1003>
 - Material listed under the category "known to be carcinogens" in the annual Report on Carcinogens published by the National Toxicology Program (NTP): [NTP Report on Carcinogens](#)
 - Material listed under Group 1 (carcinogenic to humans) by the International Agency for Research on Cancer Monographs (IARC): [IARC](#)
 - Material 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.

- **Reproductive Toxins:** Reproductive toxins are chemicals that may have adverse effects on various aspects of reproduction in both women and men, including fertility, gestation/pregnancy, birth defects, lactation, genetic effects, and general reproductive performance.
 - Reproductive toxins may affect reproductive capabilities by causing chromosomal damage (mutation) and adverse effects on fetal development (teratogen).
 - Adverse effects of exposure may not be evident until children are desired.
 - Many reproductive toxins are also classified as acutely toxic, flammable, or pyrophoric. Safe use requires assessing all potential hazards.

A list of reproductive toxins can be found at <https://oehha.ca.gov/proposition-65/proposition-65-list>

- **Acutely Toxics:** Chemicals are considered to have an ‘acute toxicity’ if adverse health effects occur after oral or dermal administration of a single dose of a chemical or multiple doses within 24 hours, or an inhalation exposure of four hours. These adverse effects, caused by short term exposure, can range from illness to death. OSHA states that a chemical is highly toxic if it falls within any of the following lethal dose 50 (LD 50) categories:
 - LD50 - ingestion: < 50 mg/kg
 - LD50 - contact (24hrs): < 200 mg/kg
 - LD50 - inhalation: < 200 ppm/1hr

7.1. PHS Standard Operating Procedures

If PHS are present in a laboratory, a laboratory specific PHS standard operating procedure (SOP) must be developed by the PI or laboratory manager. At a minimum, the PHS SOP must contain the following information:

- Hazards associated with the material
- Procedures for safe handling and disposal
- The designated area for working with the substance
- Required personnel protective equipment
- Decontamination procedures
- Emergency response procedures

The University provides SOP templates as a resource for PI’s and laboratory managers to use to assist in the creation of laboratory specific PHS SOPs. [SOP templates](https://ehss.syr.edu/laboratory-safety/chemical-safety/standard-operating-procedures/) can be found online at the following EHSS website: <https://ehss.syr.edu/laboratory-safety/chemical-safety/standard-operating-procedures/>

7.2. PHS Designated Areas

Designated work area for PHS must be established in laboratories where PHS are used. The designated areas must be identified and demarcated with an appropriate posting that includes a pictogram and wording to communicate the hazards present. A designated area may be an entire laboratory, a defined area within the laboratory, or a device such as a laboratory fume hood. Contact EHSS at ehss@syr.edu to request PHS posting labels.

8.0 Laboratory Activities Requiring Prior Approval of Laboratory Activities

The possession and/or use of the following materials, or activities conducted with these materials require additional University review and approval:

- Radioactive material and radiation producing equipment
- Biohazardous material
- Animals/animal parts
- DEA Controlled Substances
- Federal Select Agents and Toxins
- Lasers (Class 3B and 4)

Contact EHSS at ehss@syr.edu for assistance with the review and approval process.

9.0 Chemical Hazard Controls

The OSHA Laboratory Standard requires that laboratory personnel implement appropriate control measures to ensure that chemical exposures are maintained below regulatory limits and as low as reasonably achievable. In general, control measures can be categorized as administrative controls, engineering controls, procedural controls (i.e., standard operating procedures), or personal protection.

- **Administrative Controls:**
Administrative controls include procedural measures that have been put in place administratively by the PI's, the department, school, college, EHSS, etc., to promote safety and reduce chemical hazards in the lab. Administrative controls generally do not eliminate the hazard but reduce or prevent exposure to the hazard. Examples of administrative controls include signage, training, written safety plans, supervision, operating procedures, etc. PI's should take steps to implement administrative controls whenever feasible to reduce chemical hazards in the laboratory. All laboratory personnel must adhere to the administrative controls established at the University, in this Plan and in the laboratories where they work.
- **Procedural Controls:**
Standard operating procedures (SOPs) are written instructions that detail the steps to be followed when performing an experimental process in the laboratory. SOPs should include information about potential hazards associated with the chemicals to be used in the process and how to best mitigate these hazards. PI's are responsible for approving and/or preparing SOPs for the experimental processes conducted in their laboratory. SOPs should be readily available to laboratory personnel.
- **Engineering Controls:**
Engineering controls should be used to the greatest extent feasible to reduce exposure to hazardous chemicals. PI's, in conjunction with their laboratory personnel, must evaluate the experimental processes performed in their laboratory and implement appropriate engineering controls to reduce the hazard.

Examples of engineering controls that can help to reduce or eliminate exposures to hazardous chemicals include:

- Isolation of the operator or the process (e.g., use of a glove box, protective barrier, etc.)
- Use of a controlled ventilation system (e.g., chemical fume hood, biological safety cabinet).

Section 11.1 of this Plan provides additional information on chemical fume hoods.

- **Personal Protective Equipment**
Personal protective equipment (PPE) is protective gear and clothing used to keep laboratory personnel safe while performing their research. Examples of PPE include face shields, goggles, laboratory coats, and disposable gloves.

PPE should be selected after all feasible engineering and administrative controls have been put in place to eliminate or reduce the hazard.

Section 10.0 of this Plan provides additional information on PPE.

10.0 Personal Protective Equipment

Personal protective equipment (PPE) is protective gear and clothing used to keep laboratory personnel safe while performing their research. Examples of PPE include face shields, goggles, laboratory coats, and disposable gloves.

PPE should be selected after all feasible engineering and administrative controls have been put in place to eliminate or reduce the hazard. Examples of administrative and engineering controls that should be considered for implementation to eliminate or reduce hazardous material exposures include:

- Substitution of a less hazardous substance
- Scaling down the size of experiment
- Local and general ventilation (e.g., use of fume hoods)

In order to determine what PPE is needed during a particular laboratory operation/experiment, the PI and/or laboratory manager must identify all hazards associated with the chemicals involved and identify all potential exposure pathways based on the manner in which the chemicals will be used. In addition, the performance capabilities and limitations listed by the PPE manufacturer should be reviewed and evaluated to determine if the selection will adequately protect against the chemical hazards identified.

PI's must provide an adequate supply of properly fitting PPE to laboratory personnel at no cost.

EHSS is available to assist the researcher with the selection and assessment of PPE upon request. Contact EHSS at ehss@syr.edu for assistance.

10.1. Eye and Face Protection

Laboratory personnel are required to wear appropriate eye and/or face protection any time they may be potentially exposed to eye/face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.

Safety glasses should always be worn by laboratory personnel when working in a laboratory. Safety goggles and/or a face shield may be more appropriate in certain circumstances depending on the type of work to be performed. All eye protection should be approved by the American National Standard Institute (ANSI) and appropriate for the work being performed.

10.2. Protective Clothing

All laboratory work involving a hazardous material should be conducted wearing a lab coat. Clothing worn underneath the lab coat shall at a minimum include a shirt, long pants, and closed-toed shoes.

Flame resistant lab coats must be worn when using pyrophoric materials or flammable liquids. It is also recommended that 100% cotton (or other non-synthetic material) clothing be worn underneath the flame-resistant lab coat.

In addition to a lab coat, protective aprons, foot coverings, additional leg and arm coverings, and/or a full body protective suit, may be required to provide additional protection against unique chemicals hazards, and/or situations that may result in a potential full body exposure to a hazardous chemical.

10.3. Gloves and Hand Protection

Appropriate hand protection must be used for laboratory work where there is a potential for hands to be exposed to a hazardous chemical or a physical hazard that could result in skin damage, chemical absorption, severe cuts or lacerations, abrasions, punctures, or harmful temperatures. Chemical resistant gloves must be worn when using or handling hazardous chemicals and chemical containers.

Gloves must be evaluated and selected based on their effectiveness for the specific hazardous chemical being handled. Some gloves are more suitable for certain chemicals than others. The chemical's SDS and the glove manufacturer's glove chart should be consulted when selecting the most appropriate glove for the chemical(s) to be used.

10.4. Respiratory Protection

Airborne releases of hazardous chemicals can create a respiratory hazard and result in respiratory exposures. Respiratory exposure to potentially hazardous chemical substances must be controlled and minimized by utilizing engineering controls (such as fume hood ventilation), procedural controls and/or product substitution using less hazardous substances. In rare situations, the use of these controls may not reasonably mitigate the hazard and the use of personal respiratory protective equipment may be necessary.

PI's and lab personnel are responsible for notifying EHSS of situations where additional protection from airborne contaminants may be required. EHSS will work collaboratively with the PI and laboratory personnel to evaluate the respiratory hazard and associated respiratory exposure potential and will make a determination if respiratory protection is needed.

Use of respiratory protection by laboratory personnel must comply with the requirements of the University's Respiratory Protection program. Any assignment of respiratory protection, and/or use of a respirator by any laboratory personnel at Syracuse University, requires prior EHSS review and approval. Laboratory personnel required to wear respiratory protection must be medically evaluated, trained, and fit tested by EHSS prior to wearing a respirator.

Additional information on Respiratory Protection may be found on the EHSS website at:
<http://ehss.syr.edu/health-and-safety/respiratory-protection/>

11.0 Safety Equipment

11.1. Fume Hoods

Any work with hazardous substances that could generate airborne gases, vapors, aerosols, mists, dusts, or smoke must be performed in a laboratory fume hood.

EHSS inspects fume hoods in University laboratories at least annually to verify proper performance. Fume hoods that fail to meet these criteria are identified and reported to Facilities Services for repair. The PI will be notified if a fume hood in their laboratory does not meet acceptable performance standards and will be advised to cease work that requires use of the fume hood.

Any problems or operation concerns associated with a fume hood should be reported to EHSS and/or Facilities Services immediately.

Additional information on the proper use, operation and limitations of fume hoods can be obtained by completing the online EHSS [Fume hood Operation Training](https://ehssapps.syr.edu/TrainingPresentations/FumeHoodTraining/index.html?_ga=2.252229257.1493122231.1539700066-75479329.1539376366).
https://ehssapps.syr.edu/TrainingPresentations/FumeHoodTraining/index.html?_ga=2.252229257.1493122231.1539700066-75479329.1539376366

11.2. Eyewashes

Emergency eyewash equipment is located in laboratories where corrosive chemicals are used. In the event of eye contact with a corrosive chemical, an eyewash should be used to flush the eyes for a minimum of 15 minutes.

EHSS conducts routine annual inspections of the emergency eyewash equipment to verify proper function. If a problem is identified, a notice is posted at the eyewash and Facility Services is notified to make repair(s).

It is recommended that laboratory personnel activate the eyewash weekly to verify its function. Periodic activation of the eyewash will help prevent the accumulation of scale/sedimentation in the pipes supplying water to the eyewash.

Any problems or operation concerns associated with an emergency eyewash should be reported to EHSS and/or Facilities Services immediately.

Additional information on the proper use, operation and limitations of eyewash equipment can be obtained by watching the online EHSS [Emergency Wash Equipment Demonstration video](#).

https://ehssapps.syr.edu/TrainingPresentations/ChemicalSafety-WashEquipment-Video/index.html?_ga=2.252229257.1493122231.1539700066-75479329.1539376366

11.3. Safety Showers

Emergency safety showers are located in or outside of laboratories where chemicals are used. In the event of skin contact with a hazardous chemical, clothing should be removed from the affected area, and the shower should be used to flush the area for a minimum of 15 minutes.

EHSS conducts routine annual inspections to verify proper function of safety showers. If a problem is identified, a notice is posted at the shower and Facility Services is notified to make repair(s).

Any problems or operation concerns associated with a safety shower should be reported to EHSS and/or Facilities Services immediately.

Additional information on the proper use, operation and limitations of safety showers can be obtained by watching the online EHSS [Emergency Wash Equipment Demonstration video](#).

https://ehssapps.syr.edu/TrainingPresentations/ChemicalSafety-WashEquipment-Video/index.html?_ga=2.252229257.1493122231.1539700066-75479329.1539376366

11.4. Drench Hoses

Drench hoses are another mechanism to facilitate emergency washing. Drench hoses do not replace the need for an eyewash and/or a safety shower in the laboratory. If used as a body shower, follow-up washing, under a safety shower should be done to thoroughly rinse the body of chemicals.

Additional information on the proper use, operation and limitations of drench hoses equipment can be obtained by watching the online EHSS [Emergency Wash Equipment Demonstration video](#).

https://ehssapps.syr.edu/TrainingPresentations/ChemicalSafety-WashEquipment-Video/index.html?_ga=2.252229257.1493122231.1539700066-75479329.1539376366

12.0 Waste Disposal

The proper storage and disposal of wastes generated in University laboratories is essential to ensure safety and compliance with applicable rules, regulations, and best management practices. Laboratory personnel are responsible for properly managing the wastes they generate in the laboratory.

12.1. Chemical Wastes

Laboratory personnel must manage chemical waste in accordance with federal, state, and local waste management requirements, University policies, and EHSS Hazardous Waste Management Program. Disposal of chemicals to the sanitary sewer, or as municipal solid waste is prohibited.

All chemical wastes generated in the laboratories must be properly containerized, segregated, stored, and labeled to indicate the chemical contents and category of hazard(s) it contains. Chemical waste containers must be stored in satellite accumulation areas (SAAs) in the laboratory that are located at or near the location where the waste is generated. EHSS Hazardous Waste Management Program provides information and guidance to assist laboratories in properly managing their chemical waste. EHSS' Hazardous Waste Management Program is available online at: <http://ehss.syr.edu/waste-management/chemical-waste/hazardous-waste-management-manual/>.

EHSS is responsible for the ultimate disposal of chemical wastes generated in the laboratory. EHSS staff picks up the waste from the laboratory SAAs and prepares the waste for final disposal in accordance with applicable rules and regulations. Laboratories can contact EHSS to schedule a chemical waste pickup when needed by completing an [online request form](#), or by calling 315.443.6545.

Laboratory personnel must complete EHSS' Hazardous Waste Management Training prior to generating chemical waste in the laboratory. This training is included during EHSS' Initial Laboratory Safety Training.

12.2. Laboratory Glassware Waste

Laboratory glassware is not recyclable. Clean broken glassware must be segregated and placed in a puncture proof container prior to pick up by Facility Services Custodial Staff. "Empty" bottles and jars that formerly held the laboratory's chemical that has no residual material can be disposed in the trash.

12.3. Empty 5 Gallon Containers

Syracuse University may not dispose of empty 5 gallon (or larger) chemical containers in the municipal solid waste (trash). For an empty 5 gallon (or larger) chemical container that are to be disposed of, ensure the container is completely empty, write "EMPTY" in bold letters across the label of the container, and place the container in close proximity to your Hazardous Waste Satellite Accumulation Areas for pickup by EHSS.

13.0 Emergency Response

In the event of a hazardous material spill or other laboratory emergency, the following procedure should be followed:

1. Evacuate: Immediately notify personnel in the affected area and evacuate the area.
2. Notify: Call DPS at 315.443.2224 from a safe location outside of the affected area.
3. Stay: in the safe location to meet emergency responders.
4. Decontaminate: Individuals exposed to a hazardous material should remove contaminated clothing and wash contaminated body area(s) with water.
5. Do not re-enter the affected area until cleared to do so by EHSS or emergency response personnel.

Following any laboratory incident, laboratory personnel must notify Environmental Health and Safety Services via completion of the [laboratory incident report form](#). EHSS will work with the PI/supervisor to determine the cause of the incident and provide recommendations to prevent future occurrences.

14.0 Chemical Permissible Exposure Limits

Permissible exposure limits (PELs) are established by the Occupational Safety and Health Administration (OSHA) and define the quantity or concentration limit of a hazardous chemical an employee can be exposed to in a workplace setting.

The OSHA Permissible Exposure Limits (PELs) for hazardous chemicals can be viewed on line at the following OSHA website: <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1000TABLEZ1>

The PEL for a hazardous chemical is also referenced in Section 8 of manufacturer's Safety Data Sheet, if applicable.

Laboratory personnel exposures to hazardous chemicals at the University must remain below the associated PEL's. If there is a concern that laboratory personnel may be exceeding permissible exposure limits, contact EHSS at 315.443.4132 or by email (ehss@syr.edu) immediately.

15.0 Chemical Air Sampling and Monitoring

Routine air sampling and/or monitoring of airborne chemical hazards to determine personal exposures is not usually warranted in laboratories because chemicals are typically used for relatively short time periods, in small quantities, and/or inside laboratory fume hoods. EHSS will conduct chemical air sampling/monitoring to investigate chemical odor complaints, assess the potential for personal exposures to hazardous chemicals above an occupational exposure limit, and as requested by the PI. The results of air sampling/monitoring conducted will be reviewed to determine if an OSHA permissible exposure limit has been exceeded, and/or if controls need to be put in place to reduce exposures. The results for chemical air sampling and monitoring will be sent to the PI and other potentially affected laboratory personnel. A copy of the chemical air sampling/monitoring results will be kept on file at EHSS.

Laboratory personnel should call DPS at 315.443.2224 if they suspect they have been overexposed to a hazardous chemical, and/or are displaying adverse health effects or symptoms of any exposure.

16.0 Medical Care and Consultation

Laboratory personnel working with hazardous chemicals have an opportunity to receive medical care and consultation, including necessary follow-up visits, under the following circumstances:

1. Whenever an individual develops signs or symptoms associated with a hazardous chemical to which the individual may have been exposed in the laboratory.
2. Whenever exposure monitoring reveals an exposure level routinely above occupational exposure limits for an OSHA regulated substance.
3. Whenever an event takes place in the work area, such as a spill, leak, explosion, or other occurrence resulting in potential exposure to a hazardous material.

Laboratory personnel that have been exposed to a hazardous chemical, or are experiencing adverse health effects, should contact DPS (315.443.2224), to report the incident, and request medical care.

All medical care and consultations must be performed by or under the direct supervision of a licensed physician without cost to the worker, without loss of pay, and at a reasonable time and place.

16.1. Information Provided to the Health Care Provider

If a member of the laboratory is injured, or over exposed to a hazardous chemical, the University will make every effort to provide the following information to the health care provider treating the injured or exposed person.

1. The identity of the hazardous chemical(s) to which the employee may have been exposed.
2. The SDS's of the chemicals will be provided for each identified chemical.
3. A description of the conditions under which the exposure occurred including quantitative exposure data, if available.
4. A description of the signs and symptoms of exposure that the employee is experiencing, if any.

17.0 Record Keeping

The University maintains employee exposure assessments, and occupational medical consultation/examination reports in accordance with OSHA's medical records rule (29 CFR 1910.1020). Employees can access their exposure and medical records upon request.

Laboratory personnel may obtain copies of exposure assessment reports for exposure assessments conducted by EHSS by making a request in writing to Environmental Health and Safety Services at ehss@syr.edu. Syracuse University Human Resources should be contacted for other occupational medical records and reports.

18.0 Annual Review and Evaluation of the Chemical Safety Plan

The Laboratory Chemical Safety Plan will be evaluated annually, and updated as necessary, by EHSS' designated Chemical Safety Officer.

The Laboratory Chemical Safety Plan is administered by Environmental Health and Safety Services. Comments or questions may be addressed to the Chemical Hygiene Officer by contacting the EHSS at ehss@syr.edu