

Title: Laboratory Chemical Hygiene Rule		Print Date: 2/19/2019
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Procedure

1. Purpose

The purpose of the Occupational Health and Safety Administration's Laboratory Safety Standard is to ensure workers in non-production laboratories are informed of hazards of chemicals in their workplace and are protected from chemical exposure exceeding permissible levels (OSHA permissible exposure levels). The purpose of this document is to set forth minimum performance expectations for safe handling of hazardous chemicals, and the preparation and maintenance of chemical hygiene plans (CHP), and inventories for laboratories on campus as required by the regulation (29 CFR 1910.1450).

2. Rule

A. Roles and Responsibilities:

1. DEANS and DEPARTMENT HEADS

Department heads and College Deans are ultimately responsible for ensuring regulatory compliance and providing necessary facility and equipment support for proper chemical hygiene in laboratories within their purview. They hold responsibility for corrective action in the event of non-compliance in labs within their purview.

2. PRINCIPAL INVESTIGATOR (PI)

The PI has the responsibility for preparation and implementation of the chemical hygiene plan for their laboratory. The PI may delegate this responsibility but must ensure that any delegated responsibilities are fulfilled.

(a) The Principal Investigator shall:

1. Appoint an individual within the lab to act as the laboratory's chemical hygiene officer (CHO)
2. Identify hazardous conditions or operations that may exist in the lab.
3. Determine the safety practices, procedures, controls necessary to mitigate said hazards.
4. Establish standard safety operating procedures, both general and protocol specific, and perform literature searches relevant to the safety and health measures appropriate for the work in the lab.
5. Ensure that all safety procedures are followed and enforced within the lab.
6. Ensure that all laboratory personnel are trained in basic chemical hygiene, all laboratory standard procedures, spill prevention and control, and the elements of this plan at least annually. This training shall be recorded on the training log sheet.
7. Review all chemical use within the lab and coordinate with OEHS for risk assessments of particularly hazardous chemicals, highly reactive chemicals, and/or high-hazard/risk procedures or operations.
8. Ensure that all applications, registrations and other prior approval requirements are met.
9. Maintain or designate a person to maintain the laboratory's chemical inventory and submit said inventory to OEHS at least annually.
10. Ensure that laboratory self-inspections are conducted as required (see Appendix A) and submitted to OEHS.
11. Review and evaluate the effectiveness of the CHP and all included SOPs at least annually and update as needed. This review shall be documented in the Log sheet found in the Chemical Hygiene Plan template (see Appendix B).
12. Ensuring that all engineering controls, such as Fume Hoods, emergency eyewash units, etc. are in good working order and coordinating repair of units not in good working order.
13. Promptly report all laboratory accidents and/or injuries to OEHS.
14. Ensure that all required medical surveillance/examinations/consultations are provided to employees
15. Maintain an accurate record of any required medical evaluations, consultations, and examinations provided to laboratory personnel.
16. Ensure that proper hazard communication (including signage, labeling, etc.) for non-laboratory personnel, such as custodial or maintenance personnel is in place, accurate, and up to date.

3. LABORATORY CHEMICAL HYGIENE OFFICER

The laboratory Chemical Hygiene Officer (CHO) is a lab employee designated by the principal investigator, 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

(a) The Laboratory Chemical Hygiene Officer shall

1. Be familiar with the requirements of the OSHA Lab standard (29 CFR 1910.1450)
2. Act as a primary point of contact for OEHS on chemical safety related issues.
3. Ensure that guidelines are in place and communicated to lab personnel for chemicals, especially particularly hazardous substances, regarding proper labeling, handling, use, and storage, selection of proper personal protective equipment.
4. Assist the PI in development and maintenance of the CHP and associated standard operating procedures.
5. Conduct laboratory safety training sessions for laboratory personnel and upon request by the PI
6. Under the direction of the PI, conduct laboratory self-inspections and recommend corrective actions.
7. Review reports for laboratory incidents, accidents, chemical spills, and near misses and work with the PI and OEHS to recommend follow up actions where appropriate.
8. Stay informed of plans for renovations or new laboratory construction projects and serve as a laboratory point of contact for issue related to chemical safety during construction projects in the lab
9. Keep the OEHS informed of progress of continued implementation of the Chemical Hygiene Plan and Lab Audit corrective actions; and bring campus-wide issues affecting laboratory safety to OEHS' attention.

4. LABORATORY PERSONNEL

All laboratory personnel bear the responsibility to work in such a manner as to keep their lab as safe and healthy as possible. They should work to develop a culture within their lab that promotes good safety practice.

(a) Laboratory Personnel shall:

1. Plan and conduct all work within the lab in accordance with the practices and procedures established in the CHP. In the event that the research requires a deviation from the Standard Operating Procedure prior approval from the PI or their designee must be obtained. All deviations should be documented and SOPs updated as needed.
2. Review and understand the hazards of materials and processes in their laboratory prior to beginning work in the lab. Especially for high hazard operations or materials.
3. Use equipment, materials, etc. only for their designated purpose.
4. Be familiar with emergency procedures, including knowledge of the location and proper use of emergency equipment within the lab or area such as emergency eyewash stations, spill kits, etc.

5. Be familiar with appropriate hazard control strategies including engineering controls administrative controls, and personal protective equipment (PPE) within the lab.
6. Be familiar with the use and care of any required PPE in the lab.
7. At all times utilize basic minimum PPE when working in the lab (see Section 3.D).
8. Be alert to unsafe and actions that may arise, call attention to situation, and implementing any corrective action that may be deemed necessary.
9. Promptly report incidents, unsafe conditions, inoperative safety equipment (such as a fume hood), etc. to the PI or their designee. Employees may also report unsafe conditions to OEHS by calling 801-581-6590. For repairs to fume hoods contact Facilities Maintenance by calling 801-581-7221.
10. Participate in all required medical surveillance or examinations.
11. Participate in ALL required health, safety, and environmental training.
12. Understand the capabilities, and limitations, of any PPE issued to them.

(b) Added Duties of Laboratory Personnel Working Autonomously.

In addition to the above responsibilities, laboratory personnel working autonomously or performing independent research shall:

1. Provide the PI/Laboratory Supervisor with a written scope of work for their proposed research.
2. Notify and consult with the PI/Laboratory Supervisor, in advance, if they intend to deviate from their written scope or scale of work. PI approval must be given before deviation or scale-up is allowed.
3. Prepare written SOPs and perform literature searches relevant to safety and health that are appropriate for their work and incorporate appropriate safety measures into prepared SOPs.
4. Update written SOPs when deviations or scale-up is approved by the PI.
5. Provide appropriate oversight, training and safety information to laboratory personnel they supervise or direct.

(c) Added Responsibilities for lab workers who wish to work alone

In general **working alone is not recommended**. In situations where lab personnel work alone the following apply:

1. The PI must approve all work that will be conducted alone.
2. Working alone conducting highly hazardous operations is not permitted
3. When working alone notify someone outside the lab that you will be working in the lab alone, make arrangements for them to contact you at regular intervals to check on you.

5. Occupational and Environmental Health and Safety(OEHS) Chemical Hygiene Officers

The University of Utah OEHS Research Safety Program, which includes designated Chemical Hygiene Officers, is responsible for providing technical guidance to personnel at all levels of responsibility on matters pertaining to laboratory use of hazardous chemicals.

(a) The OEHS Chemical Hygiene Officer (CHO) shall:

1. Assist the PI, their designee, and the laboratory CHO in the selection of appropriate safety control/hazard mitigation measures. Including, but not limited to, engineering controls, laboratory practices, personal protective equipment, and training.
2. Perform hazard/risk assessments, as needed in conjunction with the PI, their designee, or the laboratory CHO.
3. Conduct exposure monitoring as required/needed. Maintain records of exposure monitoring and provide the PI/Lab Supervisor with a report of the results of any monitoring.
4. Review and provided counsel on prepared laboratory SOPs.
5. Provide technical consultation and investigation, as appropriate, for laboratory incidents and injuries.
6. Stay up to date on regulatory requirements concerning hazardous materials and communicate any changes to PIs and laboratory CHOs.
7. Assist the PI/Laboratory CHO in determination of medical Surveillance/examination requirements.
8. Facilitate laboratory safety audits as required
9. As part of the lab audit process, review and evaluate the effectiveness of this plan at least annually and recommend updates as needed.
10. Coordinate with other OEHS subject matter experts as needed on issues which impact the CHP and/or its implementation.

3. Procedure

To help ensure safe use of chemicals in university research operations the following elements are required:

A. Chemical Hygiene Plan

All labs are required to create and maintain a chemical hygiene plan. 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. The plan must be review and updated at least annually. This review shall be documented.

1. Standard operating procedures relevant to safety and health considerations to be followed when laboratory work involves the use of hazardous chemicals
2. Criteria that the Principal Investigator 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
3. 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

4. Provisions for information and training of lab personnel
5. The circumstances under which a particular laboratory operation, procedure or activity shall require prior approval from the PI or the PI's designee before implementation;
6. Provisions for required medical consultation and medical examinations
7. Designation of personnel responsible for implementation of the Chemical Hygiene Plan including the assignment of a Chemical Hygiene Officer
8. Emergency Procedures for incidents involving chemicals
9. 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:
 - a. Establishment of designated work areas
 - b. Use of containment devices such as fume hoods or glove boxes
 - c. Procedures for safe removal of contaminated waste
 - d. Decontamination procedures

A non-mandatory CHP template is included in appendix B to assist the PI, or their designee, in preparation and maintenance of the CHP. The CHP may take any format desired as long as it contains the required elements as listed above.

B. Chemical Inventory

1. All labs are required to maintain a current (within 1 year) inventory of all chemicals in the lab. This inventory must be maintained in the Laboratory Management system provided by OEHS (available via the OEHS website). Compressed gases in the lab must be included in the chemical inventory.

C. Safety Data Sheets

1. An SDS must be available for all hazardous chemicals in the lab. These sheets should be organized in a manner conducive to locating information quickly when needed. For example: printed sheets kept in a binder, organized alphabetically, tabbed, with an index in the front of the binder. Designated Lab Chemical Hygiene Officers are responsible for keeping SDSs current and accessible to lab personnel. SDS must be in a central location, known to all lab personnel, which is readily accessible in the event of an emergency.

D. Laboratory Hygiene

- a. Minimum Required Personal Protective Equipment (PPE)
Personnel working in university labs must wear the following minimum PPE at all times when entering and/or working in the lab:
 - a. Long pants
 - b. Closed toe shoes
 - c. Fully Buttoned Lab Coat

- d. Protective eyewear (safety glasses or goggles as appropriate)
- b. Food and drink are not allowed in university labs
- c. Headphones, earbuds, etc. should not be worn in the lab
- d. It is the Principal Investigator's responsibility to provide all necessary PPE and train lab personnel in proper usage.
- e. Laboratories must be equipped with a spill kit appropriate for the chemicals in use in their space

E. Emergency Response

- 1. Laboratory personnel must be trained in basic spill response methods
- 2. Laboratories must have an emergency response plan that includes, but is not limited to, emergency evacuation instructions, instructions for dealing with basic emergencies (power outage, fire, flood, chemical spill, etc.), and medical emergencies.
- 3. Laboratories must post the most current version of the Campus Emergency flip chart in a prominent location near the lab telephone
- 4. Laboratories must be equipped with a hard-wired land line telephone.

F. Hazard Communication

All laboratories and laboratory support spaces on campus are required to be posted with uniform signage as provided by OEHS. The signage is designed to communicate in a general manner, to emergency response and maintenance personnel and other non-lab individuals, the potential hazards present in the lab. The signs are posted and provided by OEHS and are available by completing the sign questionnaire found on the OEHS website (<http://ehs.utah.edu/research-safety/laboratory-signage>).

G. Employee Information and Training

All laboratory personnel shall be informed and trained in the following:

- 1. The requirements of the OSHA standard entitled, *Occupational Exposure to Hazardous Chemicals in Laboratories* (29 CFR 1910.1450).
- 2. The contents, availability, and requirements of the laboratory CHP.
- 3. The physical and health hazards associated with chemicals stored and/or used in their work area.
- 4. Methods and observations that may be used to detect or monitor the presence or release of hazardous materials in the lab
- 5. Applicable exposure limits for regulated materials in the lab.
- 6. Signs and symptoms associated with exposure to hazardous materials in the lab.
- 7. The location of reference materials and information regarding hazards, safe handling, storage, and disposal of hazardous chemicals in the lab, including, but not limited to, Safety Data Sheets (SDS – formerly known as MSDS).
- 8. Applicable sections of the OSHA Hazard Communication Standard (29 CFR 1910.1200).
- 9. Standard operating procedures for working with chemicals in the lab including, but not limited to, the following:
 - a) The hazards specific the chemicals being used as determined by a review of the SDS or other appropriate references

- b) Safeguards that must be in place, including engineering, work practice, and PPE controls, that must be in place prior to working with chemicals
- c) Proper storage of chemicals
- d) Proper personal hygiene practices
- e) Proper procedures for disposal of unwanted materials
- f) Emergency procedures, including spill cleanup procedures

H. Laboratory Safety Audits

1. OEHS personnel shall conduct laboratory audits of all University of Utah laboratories annually unless a different audit frequency is warranted based on the results of a documented risk assessment of activities within the laboratory. Audits will be based on the criteria established in the OEHS laboratory self-audit form as shown in Appendix A
2. Results of OEHS laboratory safety audits will be provided to the PI and/or their designee within 2 business days of completion of the audit.
3. The PI or their designee must respond to any noted deficiencies within the time frames indicated in the report.

I. Escalation

1. Failure to respond to notification of noted deficiencies will result in the following escalation process:
 - a. At the date of expiration of time frames noted in the report, the PI will receive a reminder notification that the noted deficiencies have not been addressed and a new time frame will be established for corrective action – not to exceed 15 calendar days.
 - b. At the expiration of the identified time frame, if deficiencies have not been addressed a reminder notification will be sent to the PI with a copy to their cognizant Dean. A new time frame will be established for corrective action.
 - c. If deficiencies are still not been addressed within the identified time frame a notification will be sent to the cognizant Senior Vice President.

J. Self-Audit

1. The PI or their designee should conduct regular self-inspections of labs using the form found in appendix A. It is recommended that laboratories complete the self-inspection on a monthly basis. The OEHS website has an online self-inspection tool which should be used to submit completed self-inspection checklist to OEHS. OEHS regularly audits research operations and will review completed self-inspections prior to a scheduled audit. For assistance contact OEHS at 801-581-6590.

4. References:

- a. 29 CFR 1910.1450 - Occupational exposure to hazardous chemicals in laboratories (commonly known as the Lab Standard)
- b. 29 CFR 1910.1200 – Hazard Communication Standard
- c. *Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards*, National Academies Press, 2011

5. University of Utah Contacts:

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Appendix A

Laboratory Self-Audit Form



Environmental Health and Safety Laboratory Safety Self-Audit Checklist

Building # _____ Building Name: _____

Room #: _____ Survey Date: _____

PI Name: _____ PI Phone #: _____ PI Email: _____

Department: _____

Lab Contact: _____

Lab Contact Email: _____ Lab Contact Phone: _____

24 Hour Lab Emergency Contact: _____

24 Hour Emergency Contact Phone: _____

		Yes	No	N/A
1	Hazard Warning Sign is complete, current, and properly posted.			
2	Campus Emergency Guide Flipchart is posted and required information is complete and current.			
3	Is the lab equipped with an accessible phone, or a phone nearby?			
4	References such as SDS and/or a Chemical Dictionary, Prudent Practices in the Lab etc. are current and readily accessible.			
5	Chemical Inventory is complete and entered into the Laboratory Management System			
6	Chemical Hygiene Plan is written and readily accessible			
7	Chemical Hygiene Plan has been reviewed annually by PI or designated responsible party			
8	Annual Chemical Hygiene Training is complete and properly documented			
9	All other required training is current and properly documented.			
10	Ice Machines are labeled "Not for Human Consumption"			
11	Lab Refrigerators labeled "No Food or Drink"			
12	Lab personnel are trained and enrolled in the Occupational Health Program (IACUC only)			
13	Laboratory work and storage areas are clean and orderly			
14	Lab is free from slip, trip or fall hazards.			

		Yes	No	N/A
15	When possible, eating and drinking are prohibited? When eating and drinking are permitted, it is only in designated areas and food is stored properly, i.e. not in refrigerators or cabinets used to store laboratory samples or chemicals.			
16	A trash container specifically designated for glass is available and properly managed.			
17	All containers are clearly and properly labeled.			
18	Chemicals are stored correctly including hazard classification and compatibility.			
19	Liquids are stored below eye level.			
20	Flammable liquids in excess of 10 gallons are properly stored in a flammable storage cabinet.			
21	Household-type refrigerators are not used for flammable liquid storage.			
22	Lab is free from old unused chemicals and excessive storage.			
23	Unwanted hazardous materials are properly labeled and prepared for transport.			
24	Unwanted hazardous materials containers are kept capped except when adding chemicals.			
25	Peroxidizable and/or shock sensitive compounds (SHOX) are properly stored and labeled with the last opened date.			
26	Water and air reactive compounds are stored properly.			
27	Appropriate scavenging system in place for all anesthesia machines			
28	Annual waste anesthetic gas assessment is complete.			
29	Risk assessments have been conducted for chemicals with regulatory requirement such as formaldehyde, glutaraldehyde, benzene, methylene chloride, etc. Identify specific chemicals:			
30	Application for use of hazardous chemicals in animal protocols completed and approval letter issued			
31	Fume Hood Tested Annually and free from excessive storage			
32	Biological safety cabinet(s) and clean bench certification(s) are completed annually or immediately following relocation			
33	Emergency Shower and/or eyewash available within 70-100ft or 10 second unimpeded travel time and inspected annually			

		Yes	No	N/A
34	Centrifuges visually inspected before use and usage logs (as required) are current			
35	Proper machine guarding in place for equipment with moving parts (belts, fans, saw blades, etc.)			
36	Compressed gas cylinders stored properly and secured in an upright position			
37	Laser System interlocks and other safety devices as required are in place			
38	Required laser signage is in place			
39	Laser safety officer has been designated			
40	Written comprehensive laser safety program in place			
41	Electrical cord connected equipment if free from recognized hazards such as, frayed cords, loose connections, etc.			
42	Relocatable power taps (power strips) are secured, connected directly to a wall outlet, are not overloaded.			
43	All equipment is grounded or double insulated.			
44	Lab is free from inappropriate or permanent use of extension cords.			
45	36" clearance zone is maintained in front of all electrical panels at all times			
46	Autoclave(s) inspected and certified as required.			
47	Documented procedures in place to prevent overexposure to UV light sources			
48	Lab is free from Mercury containing devices, unless their use has been approved?			
49	Aisle ways are maintained with a minimum of 28" clearance?			
50	Exit doors are unobstructed?			
51	A fire extinguisher is readily accessible and Inspection date is current			
52	Flammable cabinets, shelving, etc. are secured to prevent tipping in the event of an earthquake			
53	Shelving, shelving clips, etc. in chemical storage areas (flammable cabinets, corrosive cabinets, lab shelving, etc.) are secure and undamaged			
54	First aid kit is readily available and adequately stocked			
55	Spill cleanup materials are present.			
56	Is there a comprehensive, documented and workable disaster/evacuation plan for the laboratory, including plans for any person with disabilities, including posted evacuation routes?			
57	Biohazard waste is properly handled and prepared for disposal			
58	Biohazard sharps containers are present, unmodified, and not overfilled			

		Yes	No	N/A
59	Needles are not being recapped, needlestick prevention devices are in use			
60	Pathogenic organisms are registered with EHS			
61	Required immunizations/vaccinations are current.			
62	PPE hazard assessment conducted and properly documented.			
63	If using respirators...Written respiratory protection program in place, reviewed annually, and required medical evaluations and fit-testing complete			
64	PPE as required is provided, clean, in good repair, and used appropriately.			

Certification of Inspection:

This laboratory safety self-inspection was conducted on _____
Insert date of inspection

by _____
Print name of person conducting inspection

Job Title: _____

Signature: _____

Appendix B

Chemical Hygiene Plan Template

Chemical Hygiene Plan

[illegible]

Certification of Principal Investigator Review of Chemical Hygiene Plan and associated Standard Operating Procedures (to be completed at least annually):

I do hereby certify that I have reviewed and approved the contents of this Chemical Hygiene Plan and all associated standard operating procedures:

[illegible]

Laboratory Worker Training Records:

Lab personnel must receive training specific to this plan and any hazards present in the lab. Include any hazard specific training records in this section.

All lab personnel must be trained on the contents of this plan and associated SOPs at least annually and whenever substantive changes are made to laboratory procedures. Record annual training participation using the following template:

[illegible]

Section 1: Standard Operating Procedures

Title 29 of the Code of Federal Regulations Section 1910.1450(e)(3)(i) requires that written standard operating procedures relevant to safety and health considerations be prepared and followed for all laboratory operations involving hazardous chemicals.

Written SOPs for the lab location listed above should be prepared and included in this section

Section 2: Control Measures

List the criteria that the Principal Investigator will use to determine and implement control measures to reduce employee exposure to hazardous chemicals.

List all engineering controls, required personal protective equipment, and hygiene practices.

Note: Particular attention shall be given to the selection of control measures for chemicals that are known to be extremely hazardous.

Section 3: Lab Safety Equipment

Verify that fume hoods and other protective equipment are functioning properly prior to beginning work with chemicals. Damaged equipment must be repaired or replaced – DO NOT USE damaged equipment.

List specific measures that must be taken to ensure proper and adequate performance of equipment.

List procedures for arranging for repair of equipment, etc.

Section 4: Training

List provisions for information and training of lab personnel

Section 5: Prior Approval Circumstances

List the circumstances under which a particular laboratory operation, procedure or activity shall require prior approval from the PI or the PI's designee before implementation

Section 6: Medical Surveillance

List any required medical surveillance and provisions for required medical consultation and medical examinations.

Section 7: Emergency Procedures

List emergency procedures for incidents involving chemicals

Section 8: Particularly Hazardous Substances

Particular hazardous substances 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:

- a. Establishment of designated work areas
- b. Use of containment devices such as fume hoods or glove boxes
- c. Procedures for safe removal of contaminated waste
- d. Decontamination procedures

This section is optional and may be deleted if no particularly hazardous substances are in use.

List provisions for additional employee protection for work with particularly hazardous substances.












Chem. Hygiene Rule - 02.2019

Final Audit Report

2019-02-20

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