I. REFERENCES AND RESOURCES

Laws and Regulations:
Occupational Exposure to Hazardous Chemicals in Laboratories (OSHA Standards)

Toxic Substances Control Act (TSCA) Chemical Substance Inventory
https://www.epa.gov/tsca-inventory

University of California Policies:
Controlled Substance Policy
http://policy.ucop.edu/doc/3520503/BFB-BUS-50

Tax Free Ethanol Policy
http://policy.ucop.edu/doc/3220474/BFB-BUS-2

Minors in the Lab
http://policy.ucop.edu/doc/3500602/MinorsLabsShops

Personnel Protective Equipment Policy
http://policy.ucop.edu/doc/3500597/PersonalProtectiveEquip

Laboratory Safety Training Policy
http://policy.ucop.edu/doc/3500598/LabSafetyTraining

UC Merced Guidelines:
Lab Safety Information & UCM Laboratory Safety Plan
http://ehs.ucmerced.edu/researchers-labs
II. POLICY/PROCEDURE SUMMARY & SCOPE

The University of California Merced is committed to a laboratory safety program that is based on making safety an integral part of research and instructional activities. The purpose of this Policy is to assure a healthy and safe working environment in UC Merced laboratories for all members of the campus community by outlining minimum safety procedures and requirements. This policy also establishes a procedure for correcting deficiencies and issues of non-compliance. All individuals directly involved in or in support of instructional and research laboratory activities are responsible for and will be held accountable for the implementation and adherence to this policy.

III. DEFINITIONS

Laboratory: A facility or location where the laboratory use of hazardous chemicals, materials or equipment occurs; and where the physical, biological or chemical use processes or the use or storage of the materials or equipment may present a potential hazard. It includes but is not limited to: Research laboratories, teaching laboratories, remote field stations, waste accumulation areas/locations including solid waste, hazardous waste, universal waste, Toxic Substance Control Act (TSCA) regulated waste or special waste, cold rooms, machine shops and other workshops, vivaria, storage rooms, stock rooms, QA/QC and analytical laboratories.

Personal Protective Equipment (PPE): Personal protective equipment is worn to minimize exposure to a variety of hazards. Examples of PPE include such items as lab coats, gloves, foot protection (steel-toed shoes), eye protection (safety glasses or goggles), protective hearing devices (earplugs, muffs), hard hats, respirators, fall protection harnesses, etc.

Supervisor: The principal investigator (PI), faculty, or employee, who is responsible for the operations of a UC Merced lab. It includes employees who may have authority to hire personnel, evaluate performance, direct work assignments, apply progressive discipline, and direct resources to correct identified safety issues. Unless specified in writing, the default “supervisor” in laboratories is the Principal Investigator (PI).

Worker: For purposes of this policy, any individual who actively performs work functions with hazardous materials or equipment in a laboratory. A worker may be a faculty, staff, student, postdoctoral scholar, visitor, volunteer, or anyone else assisting or performing an experiment, research, or any process in a laboratory.

Laboratory Shutdown: A laboratory shut down under normal circumstances is pre-planned and for the purpose of containing and controlling hazards, including biological, chemical, and physical hazards, for the purpose of decommissioning a laboratory.

A laboratory shut down under extraordinary conditions is a reaction to a hazard that represents an imminent hazard to life and health.

In case of life safety matters or imminent danger to life or health, anyone has the authority to order the cessation of the activity until the hazardous condition is abated. The Director of EH&S or designee has authority to cease lab operations for other willful, repeat non-compliance.
Imminent Danger: Any conditions or practices in any place of employment which are such that a danger exists which could reasonably be expected to cause death or serious physical harm immediately or before the imminence of such danger can be eliminated. (Per OSHA)

Major Laboratory Finding: A finding of non-compliance with OSHA regulations and/or the Laboratory Safety Plan or Laboratory Safety Plan Supplement(s) that requires immediate corrective action due the nature of the finding and the immediate risk to human health and the environment.

Minor Laboratory Finding: A finding of non-compliance with the Laboratory Safety Plan or Laboratory Safety Plan Supplement(s) that does not present an immediate risk to human health or the environment. An example might include the need to update a laboratory standard operating procedure. It should be noted that repeated minor laboratory findings become systemic issues that will be considered major laboratory findings.

IV. COMPLIANCE ROLES AND RESPONSIBILITIES

A. Compliance / Management Roles and Responsibilities

1. Director of the Environmental Health and Safety (EH&S) Department

The Director of EH&S is responsible for ensuring that effective occupational safety and regulatory compliance programs are in place to reduce, to the greatest extent practicable, the risks associated with instructional and research laboratories. The Director of Environmental Health and Safety is responsible for supporting the Deans and the Vice Chancellor for Research in their efforts to effectively address issues of chronic negligence as exhibited by persistent unsafe behavior and/or unsafe conditions or non-compliance.

The Director of EH&S Environmental Health & Safety is responsible for supporting Laboratory PIs and instructors in the establishment of environmental regulatory compliance and laboratory health and safety compliance programs in order to support the PIs in their management of personnel safety and environmental compliance along with laboratory instructional and research activities. This compliance support and assistance includes, but is not limited to:

a. Supporting the implementation of required laboratory safety compliance programs including laboratory hazard and training assessments, fitting of Personal Protective Equipment (PPE), chemical inventory maintenance, etc.

b. Providing general laboratory safety training to PIs and all laboratory personnel.

c. Conducting inspections and monitoring of safety and environmental compliance practices in the laboratories.

d. Providing timely reports of laboratory safety and environmental compliance inspection findings to the respective PI or other supervisor, and assisting PI in the implementation of corrective action plans.

e. Providing support and assistance to laboratory PIs and laboratory personnel with any and all general laboratory safety practices and environmental compliance obligations and providing recommendations for resources to laboratory PIs to
provide accountability and to achieve safety and environmental compliance in the laboratory.

f. Communicating with faculty, deans, Provost, and the Vice Chancellor for Research on the status of Campus Safety and Environmental Compliance obligations and the existence of acute or chronic unsafe and/or noncompliant practices per the procedures outlined in section V. of this policy.

The EH&S Director has the authority to shut down a laboratory if there is an imminent danger to people or the facility.

2. Compliance Committees

Compliance committees shall have the duty and authority, as outlined in their by-laws, to review and approve research protocols under their auspices and, as need be, take effective steps to impose restrictions including revocation of authorized uses in response to chronic issues of noncompliance and/or safety infractions. These compliance committees have the duty and authority to revoke for cause, as warranted, any special use authorization.

Compliance committees, include but are not limited to:

   a. Chemical Safety Committee  
   b. Laboratory Safety Committee  
   c. Institutional Review Board  
   d. Institutional Biosafety Committee  
   e. Institutional Animal Care and Use Committee

3. Department Chairs

Department Chairs are responsible for ensuring all PIs and other supervisors establish and maintain effective lab safety programs in their units and hold PIs and other supervisors accountable for their responsibilities in ensuring a safe laboratory environment, safe work practices of their research group members, completion of requisite safety training and other requirements, and timely correction of non-compliance and/or safety issues. Critical deficiencies (major) are required to be corrected within 48-hours; non-critical deficiencies (minor) must be corrected within 30-days. In the absence of department chairs, we rely on by-law unit chairs to fulfill this responsibility.

4. Deans

Deans are responsible for ensuring that all Department Chairs, PIs and other supervisors establish and maintain effective lab safety programs. Deans will hold Department Chairs, PIs and other supervisors accountable for their responsibilities in ensuring a safe laboratory environment, safe work practices of their research group members, completion of requisite safety training and other requirements, and timely correction of non-compliance and/or safety issues. Critical deficiencies (major) are required to be corrected within 48-hours; non-critical deficiencies (minor) must be corrected within 30-days.

The Deans shall collaborate with the Vice Chancellor for Research and the Director of Environmental Health and Safety to provide recognition to specific faculty and their respective research groups for exemplary lab safety practices.
5. **Provost and Vice Chancellor for Research**

The Provost and Vice Chancellor for Research, in collaboration with the Director of Environmental Health and Safety, shall ensure that Deans support effective lab safety programs and hold individuals within their respective schools accountable for correcting unsafe behavior and/or conditions of noncompliance. The Vice Chancellor for Research shall support effective means to recognize exemplary safety performance by specific faculty and their respective research groups.

Restriction/revocation of laboratory access, restriction of chemical purchases, as well as any other effective administrative actions shall be considered in addressing non-compliance with this policy in accordance with the procedures outlined in section V. of this policy.

**B. Laboratory Roles and Responsibilities**

1. **Faculty / PIs and other Supervisors**

   Faculty, PIs and other Supervisors are responsible for following this policy and ensuring each worker receives required training and personal protective equipment (PPE), and is familiar with the procedures for effective and safe work practices. Additional information and resources can be found in the Laboratory Safety Plan.

   Prior to commencing work in a lab the following must be completed:

   a. Ensure that all supervisors and workers complete safety training, commensurate with the hazards present in the lab, prior to commencing work in the lab.

      i. Conduct a laboratory safety training needs assessment to determine which safety training is commensurate with the hazards present in the lab.

      ii. All training must include completion of “Laboratory Safety Fundamentals”.

      iii. Training Records that are not maintained in campus-wide systems (ie. LHAT) must be maintained in the laboratory.

   b. For each worker, perform a “Hazard Assessment” in LHAT to determine if hazards are present that require the use of hazard controls; starting with engineering controls (e.g., fume hoods), work practices, administrative controls (e.g., policies and procedures) and PPE.

   c. Based on the hazard assessment, ensure that the proper controls including engineering controls, work practices, administrative controls, and PPE have been identified for each worker, the worker has been properly fitted, and the worker has been trained on its use.

   d. Conduct a lab site safety orientation prior to any worker starting any procedure in a lab.

On an ongoing basis the following must be maintained:
a. Certain chemicals require standard operating procedures (SOPs) to be written prior to workers using them in the lab. It is the PI/supervisor’s responsibility to determine if a SOP is required for a particular chemical. If necessary, Environmental Health & Safety (EH&S) will assist with this determination.

SOPs must be:

i. Written in the current UC systemwide program; a link is available on the EHS website

ii. Signed by the person who has written the SOP

iii. Reviewed and Signed by a reviewer

iv. Signed by each person in the lab prior to using the chemical or procedure covered in the SOP

Note: An SOP can be written for a “Process” covering all chemicals used in that process or for a “Control Band” which is a family or group of chemicals having similar characteristics or hazards.

b. Maintain an up-to-date “Lab Safety Plan Supplement”.

c. Maintain an up-to-date chemical inventory in the current UC systemwide program; a link is available on the EHS website.

d. Ensure the timely correction of hazards, unsafe conditions or work practices, and non-compliance brought to their attention by EH&S or by any other means. It is the responsibility of the PI/supervisor to take prompt, effective means to address any cases of non-compliance by lab personnel. Critical deficiencies (major) are required to be corrected within 48-hours; non-critical deficiencies (minor) must be corrected within 30-days.

2. Workers

Workers are responsible for knowing and following the training, PPE, and other requirements for areas in which they work or enter and for carrying out all operations in a safe manner. They are responsible for informing others in the area of these requirements and reporting unsafe conditions to the supervisor or EH&S.

Specific responsibilities include, but are not limited to the following:

a. Properly wearing and maintaining required PPE as identified in the Hazard Assessment.

b. Completing the required training prior to working in the lab.

c. Being familiar with the UC Merced Lab Safety Plan for their lab prior to starting work.
d. For those chemicals requiring SOPs, reading and signing the SOP stating that they have read and understood the contents of the SOP prior to starting work with the chemical.

e. Reporting any hazard, unsafe condition or practice to their PI/supervisor. This includes broken safety equipment (e.g., fume hood).

3. **Accountability**

The University has an ethical obligation to ensure that employees adhere to safe work practices. It is the responsibility of campus administration and management to, in a timely manner, inform departments, PIs, or other supervisors of any unsafe conditions or issues of non-compliance that come to the attention of administration or management. It is the responsibility of Deans, By-Law Chairs, PIs and other supervisors to hold employees under their direction accountable for their safety practices. This includes providing proper recognition of consistent safe work practices as well as effectively addressing negligence in complying with safe work practices and regulatory compliance procedures.

**C. Policies for Non-Compliance**

Noncompliance with this policy is handled in accordance with Personnel Policies for Staff Members (PPSM) policies 62-65 pertaining to disciplinary actions and Academic Personnel Manual (APM) policies 015-016 pertaining to the Faculty Code of Conduct and administration of discipline; and APM 140 and 150 pertaining to Non-Senate Academic Appointees.

**V. PROCEDURES**

The following procedures will be followed to ensure proper monitoring, assessment and assurance of laboratory safety compliance.

**A. Monitoring and Laboratory Inspections**

EH&S will monitor, analyze and document laboratory safety compliance including but not limited to:

1. Laboratory safety inspections on at least an annual basis.
2. Analysis of laboratory safety training records for assessment of compliance.
3. Review of SOP compliance.
4. Review and analysis of incident/accident/injury reports.
5. Monitoring and reporting findings, deficiencies, and trends, to compliance committees, Deans, and Department Chairs as necessary.

PIs/Supervisors must monitor their research staff for adherence to safe work practices on an ongoing basis in the lab. PIs/Supervisors must take appropriate and effective corrective action in a timely manner. Critical deficiencies (major) are required to be
corrected within 48-hours; non-critical deficiencies (minor) must be corrected within 30-days.

B. Recognition of Safe Practices

Positive reinforcement of consistent safe work practices by lab personnel is essential for fostering a laboratory safety culture. Special recognition of exemplary safe laboratory procedures and best management practices is likewise an effective means to demonstrate the University’s commitment to safety and to show that safety is an integral part of research excellence. The following incentives and positive reinforcement for safe lab practices may be considered:

1. Recognition in employee performance evaluations.

2. Creation and issuance of an annual Lab Safety Award to a research group demonstrating exemplary lab safety practices.

3. ‘Safe Lab Certification’ program shall certify those labs, which demonstrate timely correction of hazards, training of employees, and consistent safe lab practices.

4. Vice Chancellor for Research-sponsored recognition activities.

C. Assurance of Compliance (Escalation Procedure)

The following administrative and personnel action procedures are to be employed to effectively address cases of serious and/or chronic unsafe or noncompliant practices by PIs/supervisors or workers. Procedures should be applied in a progressive manner commensurate with the risk posed by the unsafe practices, recognizing that truly egregious, serious unsafe acts require immediate effective intervention.

Resolution of issues should be addressed at the local level as expediently as possible.

- PIs/Supervisors must monitor their laboratory and workers to ensure adherence to safe work practices on an ongoing basis.
- PIs/Supervisors should regularly review lab inspection reports and other information to ensure timely correction of findings and prevent languishing issues that require escalation. EH&S can assist with obtaining specifics of lab inspection results.
- PIs/Supervisors must take appropriate and effective corrective action in a timely manner. Critical deficiencies (major) are required to be corrected within 48-hours; non-critical deficiencies (minor) must be corrected within 30-days.
- EH&S will host monthly Check Meetings to review inspections and confirm compliance with PIs/Supervisors and Deans.
- Department Chairs will be advised of lab inspection findings in a regular communication to ensure awareness and invite participation in process improvement.
- Deans will receive dashboards on lab safety inspection results and attend monthly Check meetings to be advised of languishing lab inspection findings.
- Provost and Vice Chancellor for Research will receive dashboards on lab safety inspection results and potential egregious and languishing issues.
• Chancellor will be provided dashboards on lab safety inspection results on at least a quarterly basis.

• Academic Senate will be provided dashboards on lab safety inspection results on a quarterly basis.

1. Communication of Unsafe Actions and Noncompliant Situations to Responsible Parties:

   a. All workers have a responsibility to report hazards in the workplace. Workers should communicate the presence of these hazards to their immediate supervisor or PI who shall consult with EH&S, as appropriate. Hazards may also be reported to EH&S via their website: [http://ehs.ucmerced.edu/form/report-incident-or-concern](http://ehs.ucmerced.edu/form/report-incident-or-concern) or by calling (209) 228-4234.

   b. For hazards identified during routine lab inspections, EH&S will communicate the hazard to the responsible PI/supervisor. In response to serious, imminent hazards posing an immediate and unacceptable risk to lab occupants, EH&S will “red tag” unsafe equipment or direct employees to cease the serious unsafe activity and, as warranted, vacate the lab until corrections are made. EH&S will then immediately notify the PI/supervisor.

   c. If unsafe practices or situations of noncompliance persist despite EH&S having made communication of such situations known to the responsible PI/supervisor, EH&S will notify the respective Dean, Department Chair, and the Vice Chancellor for Research.

2. Handling of Worker Unsafe Practices:

   a. The PI/supervisor shall communicate to the worker the nature of the unacceptable work practices and/or noncompliant condition in a timely manner.

   b. The communication can be oral and/or written and must be specific in terms of the unacceptable acts or condition, the associated hazards or potential consequences, and what corrective actions must be taken.

   c. If the supervisor determines that repeated oral and/or written communication to a given worker about repeated violations of safe laboratory practices is ineffective in influencing a change in behavior, then the supervisor must pursue effective consequences, including discipline per the procedures below.

3. Consequences for Egregious or Persistent Unsafe Lab Safety Procedures:

   The University is required by Cal OSHA regulations to ensure that employees adhere to safe work practices and, thus, must impose effective consequences for unsafe behavior. The options below may be used either singularly, or in combination, to ensure employee compliance:

   a. Refresher training as warranted

   b. Oral directive

   c. Written warning or directive as appropriate
d. Written notation on annual performance review

e. Restricted/prohibited lab access

f. Restriction of funds

g. Suspension

h. Termination

Disciplinary actions, including written warnings, notation on performance evaluations, suspension and termination will be taken in accordance with the applicable personnel policies and collective bargaining agreements in the case of represented employees. Human Resources and/or Academic Personnel can provide the necessary consultation in these cases.

4. **Documentation of Assurance of Compliance:**

   It is critical that documentation be generated and maintained in order to demonstrate both compliance with regulatory requirements and risk reduction efforts. A supervisor must be able to produce documentation indicating an escalating chain of actions in a case of chronic unsafe behavior or noncompliance. This documentation includes, but is not limited to:

   a. Training records for all required lab safety training.

   b. Laboratory safety inspection reports and other documentation of hazard identification.

   c. Documentation of the correction of hazards.

   d. Supervisor’s written records of actions taken, administrative or disciplinary, against an employee for failure to adhere to safe work practices.

   e. A performance evaluation wherein recognition of good work practices, as well as negligence with respect to following safe work practices, is addressed.

**VI. Revision History**

<table>
<thead>
<tr>
<th>Date</th>
<th>Action/Summary of Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 7, 2018</td>
<td>Issued interim Procedure on Assurance of Laboratory Safety Compliance.</td>
</tr>
</tbody>
</table>

**VII. Appendix**
Frequently Asked Questions

Q: What is the role of EH&S in helping faculty PIs meet their responsibilities? Does EH&S play a central role in supporting the implementation of safety training review?
A: The roles and responsibilities of both PIs and EH&S are outlined in the UC Merced Laboratory Safety Plan. Faculty, PIs and other Supervisors are responsible for the safety of laboratory personnel working in their laboratories including adherence to the Laboratory Safety Plan and Safety Plan Supplements as well as adhering to this policy and ensuring their staff receive required training, personal protective equipment (PPE), and that they are familiar with procedures for effective and safe work practices. EH&S is responsible for supporting the PIs in all EH&S areas.

Q: Where can PIs find the training and information to determine whether hazards exist? Does EH&S have a checklist or guide to help faculty members identify appropriate PPE for their supervised workers?
A: All PIs can access the EH&S Laboratory Hazard Analysis Tool (LHAT) program for help in completing the hazard analysis associated with laboratory operations. EH&S is available to assist the PI in using the tool to complete the assessment and to review the assessment for completeness.

Q: Who is responsible for determining whether the PPE is properly fitted?
A: EH&S will help to fit lab personnel with required PPE as determined by the LHAT hazard analysis. It is the PI’s role to ensure each lab worker has been properly outfitted and trained prior to initiating work in the lab. The PIs have a primary safety and health compliance role for laboratory personnel working under their charge.

Q: Who is responsible for managing chemicals used in labs? Are there procedures in place?
A: It is critical that the PI determines, for the purpose of operational use, how to safely work with a particular chemical and protect lab personnel from the hazards associated with the chemical (e.g., toxicity, flammability, corrosivity, etc.). EH&S provides support and assistance with this process, but it is imperative that the PI understand the hazards associated with a particular chemical during use in the laboratory in order to protect both human health and the environment.

Q: How can a lab keep track of chemicals? Is there a chemical inventory database?
A: There is an online chemical inventory database, specific to each lab. It is important that this database be updated regularly. Contact EH&S to learn more about the procedures for ordering and adding chemicals to the inventory.

Q: How often does a Lab Safety Plan need to be updated?
A: Laboratories are required to update their LSPS annually, or more frequently if operations change significantly. In addition, each laboratory member must review the LSP and associated LSPS and complete a new training sheet annually. Finally, each PI should notify EH&S if his or her laboratory moves or if his or her contact information changes.

Q: What kind of training is required before beginning work in a lab?
A: Under the Laboratory Safety Plan, Section 7. Chemical Safety, the subsection, Training, each laboratory worker is required to take laboratory specific safety training prior to beginning lab work and also as conditions change, e.g., new exposure hazards or change in work conditions; refresher training is also required to ensure lab workers remain up to date in
their knowledge of lab hazards and controls. Training certificates are provided to each individual lab worker who completes the class room training and a record of lab safety training for each worker is maintained in the UC Learning Center.

**Q: How does EH&S support Department Chairs and/or By-Law Unit Chairs with their compliance responsibilities?**

**A:** EH&S provides record keeping resources for lab training as outlined in the “Documentation of Training” section of the University Lab Safety Plan (page 53) and this includes an individual employee template (Appendix K of LSP) and a training roster with site specific template (Appendix L of LSP). In addition, EH&S has online training modules for specific lab hazards and mitigative measures along with a monthly “Lab Safety Tips” to help and assist the labs with meeting safety compliance obligations.

**Q: Is lab safety training available online?**

**A:** Yes. EH&S offers online training modules for laboratory personnel. Available modules include lab safety fundamentals, hazmat spill response and DOT awareness, radiation safety, respiratory protection, laser safety, shipping with dry ice, and compressed gases. EH&S also provides in person lab specific safety training upon PI/laboratory request.

**Q: Are all Labs subject to safety inspections by EH&S?**

**A:** Periodic safety inspections apply to all laboratories subject to the UC Merced Laboratory Safety Plan.

**Q: Does EH&S assist with the development of SOPs? How does EH&S assure that SOPs are followed in each lab?**

**A:** Upon request, EH&S assists PIs in the development of SOPs. EH&S reviews the SOPs for each lab to specifically demonstrate that the procedures developed to protect the health and safety of lab personnel are being followed.

**Q: Is there an electronic tool for tracking training information?**

**A:** Lab Safety Training is recorded in the UC Learning Center. Individuals can directly access their training transcript to show proof of training. Reports by Lab can be obtained through EH&S.

**Q: Where can I find a laboratory safety training needs assessment?**

**A:** The “EH&S Safety Training Matrix for Laboratory Personnel” can be found in the Laboratory Safety Plan. It provides guidance by matching potential hazards with available training.

**Q: What is the “Laboratory Safety Fundamentals” course?**

**A:** Per the UC Policy on Laboratory Safety Training, laboratory workers subject to the Cal/OSHA standard entitled: Occupational Exposure to Hazardous Chemicals in Laboratories: (Title 8, California Code of Regulations, Section 5191) shall complete a Laboratory Safety Fundamentals Training. This training generally includes, but is not limited to, the following topics:

- A Culture of Safety
- Chemical Hygiene Plan
- Analyze Hazards--Laboratory Physical Hazards
- Analyze Hazards--Chemical Hazards
- Analyze Hazards--Biological Hazards
- Analyze Hazards--Radiological Hazards
- Develop Controls--Administrative
• Develop Controls--Engineering
• Develop Controls--Personal Protective Equipment (PPE)
• Perform Work—Prudent Practices
• Perform Work—Recognition of Exposure
• Perform Work--Emergencies
• Rights and Responsibilities

Based on local campus conditions, additional campus training topics may be added as appropriate.