University of California
Agriculture and Natural Resources

Section 1 - Site Safety Information and Employee Training Records

Review and training on site-specific safety plans is required before commencing work in the lab or research spaces. Refresher reviews should be conducted annually or with any significant changes to plans.

Site-Specific Safety Information

The location or laboratory safety representative for the _____ lab/facility is:

Name:
Office
Phone:

Illness and Injury Prevention Plan (IIPP)

Lab users are responsible for knowing and adhering to the location Injury and Illness Prevention Plan (IIPP) including the Heat Illness Protection Plan.

Written copies of the Heat Illness Protection Plan must be available to employees at all outdoor worksites including field work sites. A copy of the plan can be included in section four of this manual. Copies should be maintained in frequently used vehicles to assure that they will be available for field crews. Employees who work in high heat (over 80F) indoor or semi-confined locations such as greenhouses, animal housing areas, or other work areas lacking air conditioning must also receive heat illness training and observe all safety precautions.

The IIPP and Heat Illness Plan for my location can be accessed in the following location(s):

Emergency Action and Fire Prevention Plan

Lab users are responsible for knowing and adhering to the location Emergency Action and Fire Prevention Plan including evacuation routes and procedures for all work locations.

The emergency action and fire prevention plan be accessed in the following location(s):

Roster of active lab and research facility users

A roster of current lab users is maintained by the principal investigator or their delegate. The roster should be available upon request for emergency evacuation, hazard/exposure assessment, or training verification purposes. Lab user rosters should include employee names, supervisor, and the worksites the employees are authorized to routinely work in or access. Training records or any other well-maintained current list of employees that contains equivalent information can be considered the lab user roster.

See appendices 1a and 1b for templates and examples of lab user rosters.

Signage and postings

Requirements for entry door and facility hazard signage are based on who will need to read the sign. External entrances to buildings must have the NFPA placard to communicate hazards to emergency firefighting personnel. The general public may also need to know that there are chemicals in the facility that require posting under proposition 65. Employees entering work areas or buildings need to know about the hazards within so they can use the correct protective equipment when working in the building or room.

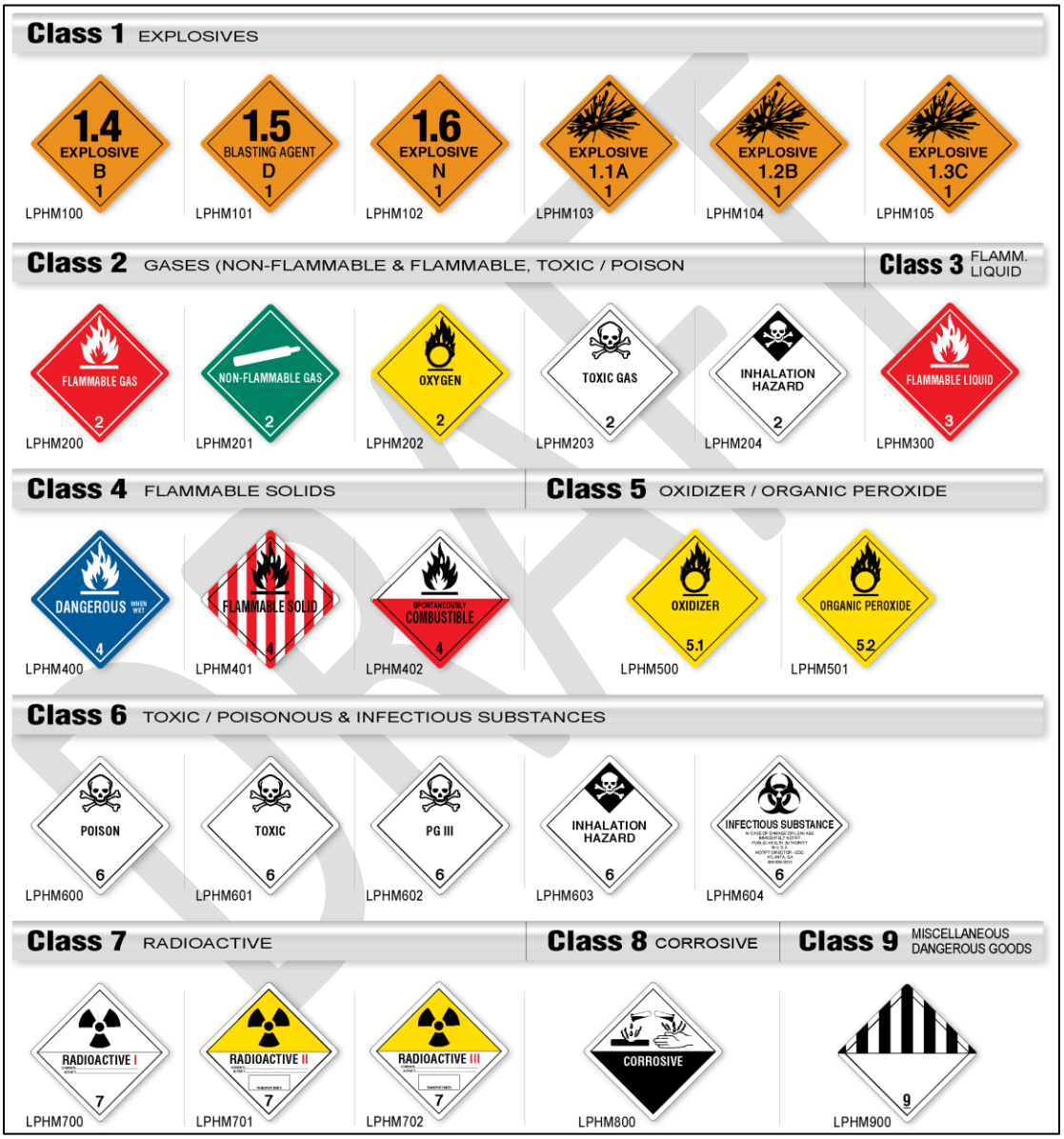
National Fire Protection Association (NFPA) hazard placard

Based on the hazards, the placard may contain the familiar NFPA four color, 1-4 number rating symbol that quickly supplies the hazard information broken down into four hazard classes, with 1 indicating a low level of hazard and 4 indicating a high hazard level. The four chemical hazard types correspond to the four color areas: red indicates a flammability hazard, yellow indicates a reactive hazard, blue indicates a health hazard and the white area is reserved for special hazards that are identified by hazard symbols or labels to indicate hazards such as radioactivity, biohazard, water reactive chemicals, etc. Each of these hazards has a different set of safety precautions associated with them.

The NFPA hazard warning placard is most important for fire fighters and emergency personnel to see. This placard is required on large outdoor gas storage tanks and on exterior entrances to buildings where hazardous materials are stored and used. This signage is very important for fire fighters, but might not be clearly understood by employees.

Department of Transportation (DOT) hazard labels

Hazardous materials labels are required by the Department of Transportation (DOT) for hazardous materials that are shipped via road, air, or rail. The DOT hazard label should be left affixed to the hazardous materials while in storage to notify others of hazards that are present. A DOT label with warning language fulfills hazard communication requirements for chemical stored outside of labs.



Examples of DOT hazard labels

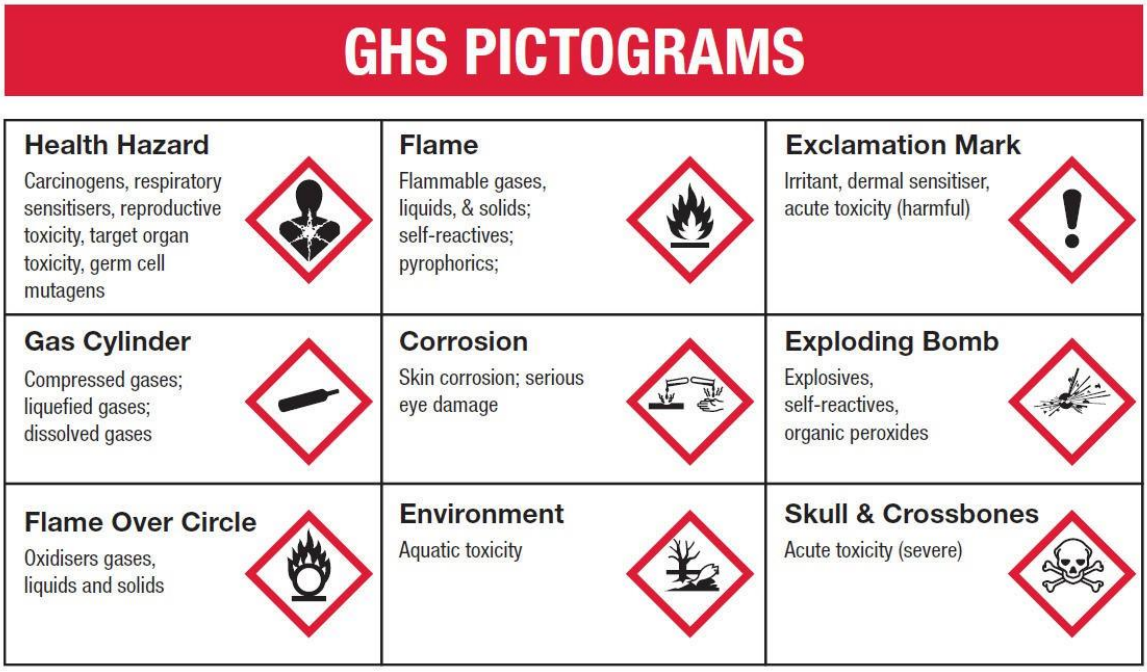
Globally Harmonized System (GHS) hazard pictograms

The GHS was developed to identify to the user of a material both the hazards and the risks associated with chemicals. The EPA, OSHA, and U.S. Department of Transportation have adopted the GHS for use in the United States. Lab users are expected to understand and use the GHS signal word, symbol, hazard statement, and precautionary statement. These items are appropriately placed on commercial labels found on chemical containers and in Safety Data Sheets (SDSs). The prudent practice would be to transfer the signal word and symbol to the labels on secondary containers.
GHS language includes:

- A signal word (such as “danger” or “warning”)
- A symbol or pictogram (such as a flame within a red-bordered diamond)
- A hazard statement (such as “causes serious eye damage”)
- Precautionary statements for safely using the chemical

An important part of this hazard classification system is the set of criteria that describe a given class of hazard (e.g., flammable liquids) and the ratings (categories) of the hazards within each hazard class.

The hazard categories are numbered from 1 to 5. The LOWER the number, the GREATER the severity of the hazard. So, category 1 hazards are the most dangerous. Note: This GHS numbering system is the opposite of the NFPA rating system under the NFPA system, the most dangerous rating is 4 while 0 would pose a minimal hazard.



Entry door signage

When the external door is also the entry door to the lab room, or inside of buildings that contain multiple lab rooms, door signage must be more descriptive to provide instructions for all who may enter or need to contact room owners in case of emergency. Entry door signage should include signal words and symbols that are clearly understood by all who work in that area. Whenever applicable, the Global Harmonized System (GHS) hazard pictograms should be used on entry door signage to designate hazards within the lab. If words are used, multiple languages may be needed for wording on signage.

Entry door sign templates are available for download at
http://safety.ucanr.edu/Training/Lab_Safety_Training/

Lab door signage should communicate the following information, at a minimum:

- The name of the PI, lab director, or other party responsible for the lab.
- Building and room number
- Emergency contact information
- Personal protective equipment (PPE) requirements
- Hazard warning information for any physical chemical, biological, radiological hazards that require PPE (GHS symbol and/or words)
- Lab-specific restrictions and prohibitions (no food or drink, plant materials, insects, soil)
- Any other special requirements for entry or exit (e.g., permit requirements, use of foot bath, clothes change)

Training

Effective training is critical to facilitate a safe and healthy work environment and prevent laboratory accidents. Principal investigators must participate in formal safety training and ensure that all their employees have appropriate safety training before working in a laboratory. Training must be in the appropriate language, educational level, and vocabulary for the personnel. Employees must be given the opportunity to ask questions. Any questions can be directed to UC ANR EH&S department (ehs@ucanr.edu; 530-750-1264).

All employees (including Faculty (PI's) and other Supervisors) must take the Laboratory Safety Orientation on-line training class prior to starting work in the laboratory.

Types of training

All laboratory personnel must complete general laboratory safety training before:

1. Beginning work in the laboratory;
2. Prior to new exposure situations; and
3. As work conditions change.

Annual refresher training is also required for all laboratory personnel. EH&S offers online training, plus resource materials to assist laboratories in implementing laboratory-specific training.

Documentation of training

Accurate recordkeeping is a critical component of health and safety training. Per OSHA regulations, departments or laboratories are responsible for documenting health and safety training, including safety meetings, one-on-one training, and classroom and online training. Documentation should be maintained in the laboratory safety manual. Additional information on recordkeeping can be found in Compliance and Enforcement section

A summary of trainings which have been completed online is available for all laboratory employees is available to supervisors upon request from the UC Learning Center Administrator. This document can serve as an official record of laboratory safety training conducted by EH&S and others. Contact UC ANR EH&S to request documentation from UC-sponsored online training systems.

A record safety training and PPE hazard assessments for lab users must be available for review in the lab. A summary spreadsheet of training dates can be maintained in the lab with individual training records on file and available for review upon request. Employee training records should be maintained for at least the past year of work in the lab. Training record older than one year or for employee who have separated employment need not be available in the lab and may be retained in archive files as part of employee exposure records.

Hazard assessment and personal protective equipment (PPE) training

It is essential that all laboratory workers understand the types of hazards, recognize the routes of exposure, and are familiar with the major hazard classes of chemical and biological hazards that can affect one's health. In many cases, the specific hazards associated with new compounds and mixtures or unidentified microorganisms will not be known, so it is recommended that all chemical compounds and biological materials be treated as if they may be potentially harmful and to use appropriate eye, inhalation, and skin protection equipment.

California regulation and UC policy require that supervisors document and certify a hazard assessment for each lab user who is required to use personal protective equipment. If employees who enter the lab to perform housekeeping and maintenance duties must also use PPE, they must be included the hazard assessment. Each employee who is required to use PPE in their job must also review train in the use of that PPE including limitations and potential hazards posed by misuse of the PPE.

Attire when occupying a Laboratory/Technical Area: Full length pants (or equivalent) and closed toe/heel shoe attire must be worn at all times by all workers who are occupying or entering a laboratory/technical area. The area of skin between the pants and shoe should not be exposed.

PPE when working with, or adjacent to, hazardous material use areas within a Laboratory/Technical Area: Laboratory coats (or equivalent protective garments) and protective eyewear are required to be worn by all workers working with hazardous materials. In addition, laboratory personnel occupying the adjacent area, who have the potential to be exposed to chemical splashes or other hazards as determined by SOP requirements and/or the laboratory hazard assessment, are required to wear laboratory coats (or equivalent protective garments) and protective eyewear.

General laboratory safety training

All lab users are required to complete UC Laboratory safety fundamentals course prior to starting work in a lab. This course can be accessed through UC campus EH&S Departments and on the UC ANR EH&S department website here: http://safety.ucanr.edu/Training/Lab_Safety_Training/

General laboratory safety training topics

Anyone working in a laboratory is required to complete General Laboratory Safety training, which includes:

- Review of laboratory rules and regulations, including the Chemical Hygiene Plan
- Recognition of laboratory hazards
- Use of engineering controls, administrative controls and personal protective equipment to mitigate hazards
- Exposure limits for hazardous chemicals
- Signs and symptoms associated with exposures to hazardous chemicals
- Chemical exposure monitoring
- Review of reference materials (e.g., SDS) on hazards, handling, storage and disposal of hazardous chemicals
- Procedures for disposing of hazardous chemical waste
- Fire safety and emergency procedures
- Information required by 8CCR3204 regarding access to employee exposure and medical records (annually required) (www.dir.ca.gov/Title8/3204.html).

General lab safety training resources

A summary matrix of UC ANR training requirements is available on the UC ANR EH&S website: http://safety.ucanr.edu/files/2860.pdf

A new employee safety checklist is also available on the UC ANR EH&S website: http://safety.ucanr.edu/files/235594.pdf

UC ANR EH&S lab safety training: http://safety.ucanr.edu/Training/Lab_Safety_Training/

Each UC campus also has lab safety and chemical safety training available online through the respective EH&S department:

- UC Berkeley EH&S lab safety training: https://rac.berkeley.edu/training.html
- UC Davis EH&S chemical safety training: http://safetyservices.ucdavis.edu/training?f%5B0%5D=field_categories%3A5
- UC Riverside EH&S lab safety training: www.ehs.ucr.edu/training/index.html
- UC Merced EH&S chemical safety training: https://ehs.ucmerced.edu/researchers-labs/chemical-safety/training

UC Riverside has published a helpful training needs assessment form which may be helpful is determining which trainings are necessary for individual employees based upon hazard exposures and job tasks. This needs assessment can be found on the EH&S website at: http://ehs.ucr.edu/training/assessment.html

UC ANR Laboratory Safety Rules (Safety Note #127 General Lab Safety)

Pre-laboratory activities

- Employees must be familiar with safety information including the Injury and Illness Prevention Program (IIPP), Building Evacuation Plan, the Chemical Hygiene Plan (CHP), and Biosafety & Containment Plans.
- Employees must be trained to use and know the location of emergency equipment including, spill equipment, fire extinguishers, emergency eyewash/shower units, first aid kits and fire alarms. Employees must be trained to use all personal protective equipment (PPE) including eye/face protection, protective gloves, protective clothing, respiratory protection and any other PPE required in the laboratory. All required PPE must be provided to the laboratory employees by the employer. Employees must be trained about proper chemical storage and compatibility and use, including waste and container labeling, and Safety Data Sheets (SDS). Training must also include the hazards of flammable, corrosive and oxidizing chemicals, carcinogens, water reactive chemicals, and peroxide forming chemicals.
- Employees must be trained in the proper use of lab equipment including fume hoods, ultraviolet sources, compressed gas cylinders, ovens, centrifuges, and all other equipment which has a potential for injury.
- Employees who will be working with bio-hazardous materials, radiation, lasers, and x-ray equipment must be properly trained and authorized. Safety programs must be implemented prior to such activities being performed in the laboratory. Contact EH&S to assure appropriate protocols, permits, or licenses are in place prior to starting this type of work.

Operating precautions

- Dress properly during laboratory activities. Long hair, jewelry, and loose or baggy clothing can be a hazard. Shoes must completely cover the foot. No open toed shoes are allowed in the laboratory.
- Report any accident (spill, breakage, etc.) or injury (cut, burn, etc.) to the principal investigator or immediate supervisor immediately, no matter how trivial it may appear.
- Food and drink are not allowed in areas where hazardous chemicals or biological materials are present. Refrigerators and microwave ovens must be labeled either "Food Only", or "Lab Use Only". Only explosion proof refrigerators and freezers can be used for flammable or explosive chemicals. Laboratory sinks cannot be used for washing of both lab glassware and food utensils.
- Practice good housekeeping. Keep work areas uncluttered and walkways and exits clear. Do not obstruct emergency equipment including fire extinguishers, eyewash/shower units, and fire alarms.
- Follow all Standard Operating Procedures (SOPs) and recommended work practices.
- Perform activities in a sanitary manner. Do not eat or drink while working. Wash hands after performing work. Clean, rinse and dry all work surfaces and equipment, including glassware.
- All electrical systems must be installed according to building codes and Cal-OSHA regulations. Extension cords are not to be used as substitutes for permanent wiring. Unplug hot plates before leaving the laboratory.

If you are in doubt about directions for an experiment, or about use or disposal of materials, ask your supervisor first before acting.

Laboratory-specific training

In addition to basic laboratory safety training, training may be required for specific subject areas such as biosafety, chemical safety, hazards such as chemicals or biological agents or task such as animal handling, sharps handling, culture of microorganisms, or use of autoclaves.

Principal investigators must also provide laboratory-specific training. Topics that require specific training include:

- Location and use of the Chemical Hygiene Plan, IIPP, SDS(s) and other regulatory information
- Review of IIPP and Emergency Management Plan, including location of emergency equipment and exit routes
- Specialized equipment
- Standard Operating Procedures
- Personal Protective Equipment
- Specialized procedures and protocols
- Particularly Hazardous Substances including physical and health hazards, potential exposure, medical surveillance, and emergency procedures
- Requirements for regulated or quarantined biological materials (use of disinfectant chemicals, biocides, and chemical preservatives)

Accidents and emergencies

Laboratory emergencies may result from a variety of factors, including serious injuries, fires and explosions, spills and exposures, and natural disasters. All laboratory employees should be familiar with and aware of the location of their laboratory's emergency response plans and safety manuals. Before beginning any laboratory task, know what to do in the event of an emergency situation. Identify the location of safety equipment, including first aid kits, eye washes, safety showers, fire extinguishers, fire alarm pull stations, and spill kits. Plan ahead and know the location of the closest fire alarms, exits, and telephones in your laboratory.

Serious occupational injuries, illnesses, and exposures to hazardous substances must be reported to the EH&S Director, Brian Oatman, within 8 hours (office: 530-750-1264, cell phone: 530-304-2054). EH&S will report the event to Cal/OSHA, investigate the accident, and complete exposure monitoring if necessary. Serious injuries include those that result in permanent impairment or disfigurement, or require hospitalization. Examples include amputations, lacerations with severe bleeding, burns, concussions, fractures and crush injuries. Instructions on reporting injuries to EH&S should be posted at all work sites to ensure that all serious injuries are reported to Cal/OHSA within 8 hours. For all incidents requiring emergency response, call 911 and follow your site specific emergency action plan.

Accidents

Supervisors are responsible for ensuring that their employees receive appropriate medical attention in the event of an occupational injury or illness. All accidents and near misses must be reported to UC ANR EH&S. EH&S will conduct an accident investigation and develop recommendations and corrective actions to prevent future accidents.

At a minimum, each laboratory must have the following preparations in place:

- Fully stocked first aid kit
- Posting of emergency telephone numbers and locations of emergency treatment facilities
- Training of staff to accompany injured personnel to medical treatment site and to provide medical personnel with copies of SDS(s) for the chemical(s) involved in the incident

Reporting an injury or incident in a UC ANR lab:

- Ensure that the employee gets first aid or professional medical care as needed.
- Within 24 hours, report the injury using one of the following methods:
    - Online Report: Preferred Reporting Method. Injuries may be reported using the Online Employer First Report form. The employee or other staff member may access the form at: http://ehs.ucop.edu/efr. Note: a UC Davis kerberos login is required to access the form. Once the report is submitted, the supervisor will be prompted to complete additional information. Notification of the report will also go to Staff Personnel Unit.
    - Paper form: Injuries may be reported to the Staff Personnel Unit (including Academic personnel). Use the UC Davis Employers Report of Occupational Injury or Illness form to report injuries (Link to download paper form: http://safety.ucanr.edu/files/204622.doc). E-mail the completed from to: anrstaffpersonnel@ucanr.edu or fax to: (530) 756-1180.
- Additional information on reporting injuries and incidents is available on the UC ANR EH&S website here: http://safety.ucanr.edu/Guidelines/Reporting_an_Injury/

Fire-related emergencies

If you encounter a fire, or a fire-related emergency (e.g., abnormal heating, smoke, burning odor), immediately follow these instructions:

1. Pull the fire alarm pull station and call 911 to notify the Fire Department and close the fume hood sash
2. Evacuate and isolate the area
   - Use portable fire extinguishers to facilitate evacuation and/or control a small fire (i.e., size of a small trash can), if safe to do so.
   - If possible, shut off equipment before leaving
3. Close doors;
4. Remain safely outside the affected area to provide details to emergency responders; and
5. Evacuate the building when the alarm sounds. It is against state law to remain in the building when the alarm is sounding. If the alarm sounds due to a false alarm or drill, you will be allowed to re-enter the building as soon as the Fire Department determines that it is safe to do so. Do not go back in the building until the alarm stops and you are cleared to reenter.
6. If your clothing catches on fire, go to the nearest emergency shower immediately. If a shower is not immediately available, then stop, drop, and roll. A fire extinguisher may be used to extinguish a fire on someone's person. Report any burn injuries to the supervisor immediately and seek medical treatment. Report to your local safety coordinator within 8 hours every time a fire extinguisher is discharged.

Audits and Compliance

Laboratory safety audits

Laboratory safety audits provide an opportunity for departments, faculty, students, and staff to reemphasize safety by focusing on safety topics specific to each research laboratory. Annual audits are conducted at each Research and Extension Center (REC) by EH&S specialists. The audit assesses the overall safety of the laboratory. This program evaluates the labs conformance to UC ANR's Chemical Hygiene Plan, federal and state regulations, standards, and codes. They are also vital to identifying and addressing potential hazards and unsafe conditions in the laboratory.

While audits are a snapshot in time and cannot identify every accident-causing mistake, they do provide important information on the overall operation of a particular laboratory. They can also help to identify weaknesses that may require more systematic action across a broader spectrum of laboratories, and strengths that should be fostered in other laboratories.

Inspection audit categories include:

- Documentation and Training;
- Emergency and Safety Information;
- Fire Safety;
- General Safety;
- Use of personal protective equipment (PPE);
- Housekeeping;
- Chemical Storage;
- Fume Hoods;
- Chemical Waste Disposal and Transport;
- Seismic Safety; and
- Mechanical and Electrical Safety.

Inspection results are communicated to the location safety coordinator, with a requirement that any deficiencies be corrected within a specific time frame (30 days, 60 days, or optional recommendation). A follow-up inspection might also be done after receipt of the inspection results.

In addition to lab safety audits conducted by EH&S specialists, lab supervisors and safety contacts are encouraged to perform periodic self-audits of their lab operations and may be required to do so by their home campus (e.g., UC Riverside). Checklists for use in self-audits are available for download from UC ANR and UC campus EH&S websites.

- UC ANR lab safety self-audit checklist: http://safety.ucanr.edu/files/276367.doc
- UC Riverside lab safety self-audit checklist: http://www.ehs.ucr.edu/laboratory/audits/self-audit%20checklist.pdf
- UC Davis lab safety audit checklist: http://safetyservices.ucdavis.edu/sites/default/files/documents/LaboratorySafetyReviewChecklist.pdf

Notification and accountability

The audit program requires that principal investigators and other responsible parties take appropriate and effective corrective action upon receipt of inspection findings. Failure to take corrective actions within the required timeframe will result in an escalation of the notification to the Department Chair, Dean and Provost. Depending on the severity of the deficiency, the EH&S Director, in consultation with the Department Chair, Dean, and Provost, may temporarily suspend research activities until the violation is corrected. In some cases, the PI may be required to provide a corrective action plan to the EH&S Director prior to resumption of research activities.

Recordkeeping requirements

Accurate recordkeeping demonstrates a commitment to the safety and health of the UC ANR community, integrity of research, and protection of the environment. EH&S is responsible for maintaining records of inspections, accident investigations, equipment calibration. Documentation of completion of online training can be accessed via the Learning Management System (LMS). Per OSHA regulations, departments or laboratories must document health and safety training, including safety meetings, one-on-one training, and classroom and online training. Additionally, the following records must be retained in accordance with the requirements of state and federal regulations:

- Accident records; (Department, Location)
- Measurements taken to monitor employee exposures; (Department, Location)
- Chemical Hygiene Plan records should document that the facilities and precautions were compatible with current knowledge and regulations; (Laboratory)
- Inventory and usage records for high-risk substances should be kept; (Laboratory)
- Any medical consultation and examinations, including tests or written opinions required by CCR, Title 8, Section 5191; and
- Medical records must be retained in accordance with the requirements of state and federal regulations. (Department, Location)
- Personal Protective Equipment(PPE) used in the lab(Laboratory)

Appendices and SOPs

Appendices

Appendix 1a – Lab User Training / Lab User Roster

Appendix 1b – Laboratory Hazard Assessment for PPE use (paper form)

Appendix 1c – PPE Selection Guide (UC Davis resource)

Appendix 1d – UC Policy for Minors in labs (October 2013)

Appendix 1e – UC Policy for Personal Protective Equipment (PPE) (March 2014)

Appendix 1f – UC Policy on Laboratory Safety Training (October 2013)

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