

LABORATORY SAFETY MANUAL

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Chemistry

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Overview

Introduction

The risks associated with laboratory research hazards are greatly reduced or eliminated when proper precautions and practices are observed. This Laboratory Safety Manual is intended to be the cornerstone of your safety program and is designed to aid faculty, staff, and students to better manage the risk and mitigate the hazard to maintain a safe environment to teach and conduct research.

Each laboratory using hazardous materials is required to have a copy of this manual readily available to all laboratory personnel. Each laboratory worker must be familiar with the contents of the manual and the procedures for obtaining additional safety information needed to perform their duties safely.

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Laboratory Safety Manual Sections

Injury & Illness Prevention Program (IIPP)

A well-integrated IIPP provides the information required to monitor activities and resources to reduce the risk of workplace injury and illness to maintain a safe work environment.

Title 8, of the California Code of Regulations (CCR), requires every California employer to have an effective written IIPP in accordance with CCR Section [3203](#) of the General Industry Safety Orders. The Laboratory Safety Manual includes the purpose and components of the IIPP; procedures related to “assignment of responsibilities,” “hazard identification,” “hazard mitigation,” “incident reporting,” and “training” are included the Laboratory Safety Manual.

The development and implementation of a laboratory specific Injury and Illness Prevention Plan is a key step in strengthening the safety culture in laboratories. The UCR Injury and Illness Prevention Plan (IIPP) is a guide that is available to assist Faculty/Other Laboratory Supervisors to develop laboratory specific safety programs for employees. An IIPP provides a framework for laboratories to provide their employees with equipment and information necessary to work safely. It assigns responsibility for safety to specific individuals and outlines procedures to assure compliance with safety practices. This program addresses identification, communication, and correction of hazards, as well as accident investigations, training and recordkeeping.

Chemical Hygiene Plan

The Chemical Hygiene Plan (CHP) establishes a formal written program for protecting laboratory personnel against adverse health hazards associated with exposure to hazardous chemicals and must be made available to all employees working with hazardous chemicals as required in the California Code of Regulations (8 CCR 5191) Occupational Exposures to Hazardous Chemicals in Laboratories (<http://dir.ca.gov/title8/5191.html>). The CHP describes the proper use, handling practices and procedures to be followed by faculty, staff, students, visiting scholars, and all other personnel working with hazardous chemicals in laboratory settings.

Laboratory-Specific

Standard Operating Procedures

Standard Operating Procedures (SOPs) are written instructions that detail the steps that will be performed during a given experimental procedure and include information about hazards and how these hazards will be mitigated. SOPs must be written by laboratory personnel who are most knowledgeable and involved with the experimental process. The development and implementation of SOPs is a core component of promoting a strong safety culture in the laboratory and helps ensure a safe work environment. Faculty/Other Laboratory Supervisors are required to develop and implement laboratory-specific SOPs for certain hazardous chemicals and “particularly hazardous substances” (PHS) that are used in their laboratories. These SOPs must be submitted and reviewed by a qualified person after the Faculty in charge,) prior to implementation. For certain hazardous chemicals, PHS, or specialized practices, consideration must be given to whether additional consultation with safety professionals is warranted or required. Circumstances requiring prior approval from the Faculty/Other Laboratory Supervisors must also be addressed in laboratory-specific SOPs. The CHP provides more detailed information on SOPs (refer to the “**Resource and Reference Documents**” section below). Specific SOPs used in

the lab should be kept in the Laboratory Safety Manual under the appropriate tab.

Laboratory-Specific

Training Records

Effective training is a critical component to facilitating a safe environment and for the prevention of laboratory accidents. All employees must be trained in general safe work practices and be given specific instructions on hazards unique to their job. Meeting safety training requirements is a cooperative effort between departments, Principal Investigators and Laboratory Supervisors, laboratory staff and EH&S.

An effective health and safety training program must include appropriate oversight, proper recordkeeping, instruction on the proper use of PPE (e.g., eye protection, gloves, laboratory coats, respirators, etc.), and extensive outreach. Accurate recordkeeping of training activities demonstrates a commitment to the safety and health of the UCR community, integrity of research and protection of the environment. The UC Learning Management System (LMS) is responsible for maintaining records of training conducted. Departments and/or laboratories are required to document and maintain records of all health and safety training, including safety meetings, one-on-one training, and classroom and online training. Safety training records can be kept in the Laboratory Safety Manual under the appropriate tab.

Hazard Assessment

The UCR Laboratory Hazard Assessment helps to categorize activities according to risk based on the hazards present in the laboratory. The Laboratory Hazard Assessment assists in identifying the laboratory activities involving chemical and other types of hazards, and the proper PPE that should be used by laboratory personnel to protect themselves from these hazards, and provides guidance once the appropriate PPE is identified. The laboratory must provide the required PPE to laboratory personnel and conduct and document training for them on the proper storage and use of

the PPE. Laboratories are required to provide information to EH&S concerning the laboratory location, identify the Faculty/Other Laboratory Supervisor, and certify that the assessment and training were completed. The Laboratory Hazard Assessment must be completed at least annually and updated whenever new hazards in the laboratory are introduced or change. The laboratory's most recent Laboratory Hazard Assessment should be kept in the Laboratory Safety Manual under the appropriate tab

Resources and References

In view of the wide variety of research that is conducted in research laboratories, we have included links that will enable faculty, staff, and students to access program areas pertinent to their particular research area. Additionally, Faculty/Other Laboratory Supervisors should include supplemental information pertinent to their specific areas in this manual.

Radiation Safety Manual

<http://ehs.ucr.edu/radiation>

Manual for Radiation Producing Machines

<http://ehs.ucr.edu/radiation>

Laser Safety Manual

<http://ehs.ucr.edu/radiation>

Laboratory Relocation Document

<http://ehs.ucr.edu/laboratory>

Biosafety Manual

<http://ehs.ucr.edu/biosafety>

Controlled Substance Use Authorization

<http://ehs.ucr.edu/controlledsubstances>

Biological Use Authorization, Animal Use Authorization, Human Use, Stem Cell Use

<http://or.ucr.edu>

Fire Prevention Plan

<http://ehs.ucr.edu/fire>

Emergency Action Plan

<http://ehs.ucr.edu/emergency>

Hazardous Materials:

<http://ehs.ucr.edu/hazardousmaterials>

Title 8 California Code of Regulations Section 5164, "Storage of Hazardous Substances"

<http://dir.ca.gov/title8/5164.html>

Title 8, California Code of Regulations, Section 5191, "Occupational Exposures to Hazardous Chemicals in Laboratories"

<http://dir.ca.gov/title8/5191.html>

Title 8, California Code of Regulations Section 5194, "Hazard Communication"

<http://dir.ca.gov/title8/5194.html>

Title 8, California Code of Regulations Section 3203, Injury and Illness Prevention Program

<http://dir.ca.gov/title8/3203.html>

Title 8, California Code of Regulations Section 3380-3387, PPE requirements

<http://dir.ca.gov/Title8/sb7g2a10.html>

Title 8, California Code of Regulations, Article 110, "Regulated Carcinogens"

<http://dir.ca.gov/Title8/sb7g16a110.html>

Title 8, California Code of Regulations, Section 5154.1, "Ventilation Requirements for Laboratory-Type Hood Operations"

http://dir.ca.gov/title8/5154_1.html

NFPA 45-Standard Fire Protection for Laboratories Using Chemicals

Uniform Fire Code

Other

Applicable regulations include those promulgated by the U.S. Department of Labor including 29 CFR 1910.1450 "Occupational Exposure to Hazardous Chemicals in Laboratories" (the "Laboratory Standard"). These regulations require that the CHP be readily available wherever potentially hazardous chemicals are used, handled or stored.

<http://www.osha.gov/SLTC/laboratories>

How to use this Laboratory Safety Manual

Faculty / Other Laboratory Supervisors

- Insert your department's Injury and Illness Prevention Plan (IIPP)** behind the appropriate tab. Familiarize yourself with your department contacts and any special communication channels.
- Review the Chemical Hygiene Plan (CHP) annually.** Specifically review your responsibilities (pp. 1-4), Training (Chapter 7), Employee Training, Site-Specific Training, and Standard Operating Procedures.
- Insert your laboratory-specific SOPs** behind the appropriate tab.
- Insert laboratory-specific and all required training documentation** behind the appropriate tab.
- Insert a copy of your current Hazard Assessment & Control Selection tool (HACS).** If it has been over 12 months since your HACS has been updated, a new assessment must be completed.
- Review any new information** with your laboratory workers.

Laboratory Personnel

- Review your department's Injury and Illness Prevention Plan.** Familiarize yourself with your department contacts, how to report a hazard in your laboratory and how to report injuries.
- Review the Chemical Hygiene Plan:** Specifically your responsibilities (pp. 1-4).
- Refresh your knowledge on **how to identify hazardous chemicals** (*Chemical Hygiene Plan*, Chapter 2).
- Understand how to **reduce your potential for exposure** to hazardous chemicals (engineering controls, administrative controls and personal protective equipment) (*Chemical Hygiene Plan*, Chapter 4).
- With your PI to ensure you know what to do to prepare for and **respond to an emergency** (*Chemical Hygiene Plan*, Chapter 10).
- Review PPE requirements** with your PI and ensure you know how to acquire additional or replacement PPE.
- Review the laboratory-specific SOPs** with your PI and document your training. All training, whether formal or on-the-job, should be documented and placed behind the appropriate tab.
- Ask for clarification** if there are any questions related to your laboratory work before you begin a new task.