

Chemical Hygiene Plan



Cal/Osha (Title 8 CCR Sec. 5191) requires that all laboratories have a written Chemical Hygiene Plan (CHP) as a fundamental chemical safety plan that describes potential laboratory hazards and provides safety information. The CHP includes the Flip Chart provided here and an online component (<http://tinyurl.com/ucbchp>). The controls, requirements and guidelines of the CHP must be followed at all times by all lab personnel. Personnel must confirm their understanding of the content by signing the Training Documentation section of this Flip Chart. The Principal Investigator (PI) must ensure adherence to this.

This CHP Flip Chart must be filled in and posted in the laboratory. Fill in any grey areas with relevant information.

Additional requirements for this laboratory may also be found in the lab's Use Authorization documents (Radiation, Biological and/or Laser) if applicable and the Standard Operating Procedures.

This CHP covers the following laboratory space:

Erol Kepkep	<i>Erol Kepkep</i>	01/14/2022
Principal Investigator (print)	Principal Investigator (Signature)	Date
Molecular & Cell Biology	Valley Life Sciences Building	2095, 2097, 2113
Department	Building	Room(s)

Yearly Review

This Chemical Hygiene Plan Flip Chart must be reviewed annually by the Principal Investigator (or designate) and updated so that it is current and accurate. Update this CHP Flip Chart if any hazards change at any time. All reviews should be documented in the table below.

If the update includes new hazards, all personnel must initial the Training Documentation section of this CHP to confirm their understanding of the changes to the CHP:

Date	New Hazards?	List Hazard	Initials
01/31/2023	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		EKK
01/08/2024	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		EKK
	<input type="checkbox"/> Yes <input type="checkbox"/> No		

Date	New Hazards?	List Hazard	Initials
	<input type="checkbox"/> Yes <input type="checkbox"/> No		
	<input type="checkbox"/> Yes <input type="checkbox"/> No		
	<input type="checkbox"/> Yes <input type="checkbox"/> No		

Emergency Information and Spill Response

Responsibilities and Contacts

Hazardous Chemicals, Inventory & Storage Guidelines

Emergency Phone Numbers

Life Threatening Emergency.....911 or (510) 642-3333 from mobile

Non-Life Threatening Emergency.....(510) 642-6760

Hazardous Material Incident.....EH&S (510) 642-3073

Off-hours/weekends.....911 or (510) 642-3333

General Procedure for Handling Emergencies/Serious Incidents

- Alert people in the immediate area.
- Attend to injured/contaminated person.
- Evacuate/isolate the area if necessary.
- Be ready to provide your name, building, room number and incident details to dispatch, EH&S and/or UCPD.

Urgent Care for Non-Life-Threatening Workplace Injuries

UC Berkeley Employees
University Health Services
(510) 642-3188
Tang Center, 2222 Bancroft Way
Berkeley, CA

LBNL Employees
LBNL Health Services
(510) 486-6266
Building 26
Berkeley, CA

HHMI Employees
Concentra Urgent Care
(510) 845-5170
2850 7th St., Suite 100
Berkeley, CA

Note: For employees with joint appointments, the employer for whom work was being done (at the time the injury occurred) determines which urgent care facility to choose.



Fire Response

Small

Large

- Notify occupants of room.
- If comfortable, extinguish with a fire extinguisher (always have your back to an exit).
- Report an extinguished fire to (510) 642-6760.

- Notify occupants of room.
- Evacuate and close doors behind you to limit spread of smoke and fire.
- Activate fire alarm.
- Evacuate building.
- From a safe location, call Emergency Response at 911 or (510) 642-3333.

Location of fire extinguisher:

Near exit door

Available Trainings:

- EHS 506 Fire Extinguisher Training for Labs (online)
- Call EH&S (510) 642-3073 or email fireprevention@berkeley.edu to schedule in-person training.

Spill Response/Injury Response

General Spill Instructions

- Call 911 or (510) 642-3333 for emergency assistance or during off-hours.
- During off-hours, call (510) 642-6760 for non-emergencies.
- If you need assistance with a spill of any kind or the chemical has entered a sink or drain during business hours, call EH&S at (510) 642-3073.
- If possible to do so safely, contain the area of the spill with absorbent materials and prevent spills from entering drains.
- Post danger or warning signs to keep people from entering spill area.

General Exposure/Injury Instructions

- Immediately flush skin or eyes with water using an emergency shower or eyewash. Continue flushing for 15 min. or until medical help arrives.
- Escort injured person to medical services.
- Provide SDS to medical personnel.
- Supervisor completes Employer's First Report (EFR) found at: <http://app.riskandsafety.com>
- Notify EH&S immediately of any serious injury or hospitalization in order to fulfill Cal/OSHA reporting requirements.

What type of spill has occurred?



*Liquid/solid chemical
spill or gas release*



Radioactive



Biological

- Turn off nearby ignition or heat sources if it is safe to do so.
- If spilled material or gas is an imminent hazard, leave the room and call 911.
- If spilled material is volatile or airborne powder, leave the room.
- Clean spills only if they are minor and you have training and protective equipment.
- Additional spill information may be located in your lab's Standard Operating Procedures (SOPs).

- Treat medical problems first! Prompt medical treatment takes precedence over decontamination.
- Follow procedures outlined in the lab's Radiation Use Authorization (RUA).
- Remove contaminated clothes, if possible, and retain.
- Report spills to EH&S (510) 642-3073 and request radiation safety assistance.

- Follow procedures outlined in the lab's Biological Use Authorization (BUA).
- Spills must be reported immediately to EH&S at (510) 642-3073 or email bsa@berkeley.edu.

Emergency Information and Spill Response

Responsibilities and Contacts

Hazardous Chemicals, Inventory & Storage Guidelines

Responsibilities

Office of Environment, Health & Safety (EH&S): Mission statement: “We provide guidance and services to the campus community that promote health, safety and environmental stewardship.” EH&S is located on the 3rd floor of University Hall. <https://ehs.berkeley.edu>

Sample services provided by EH&S:

- Chemical exposure monitoring, laboratory safety consulting and hazard assessment
- Review and approval of use authorizations (e.g. biological, laser, radiation)
- Annual safety inspections (may include additional inspections for use authorizations)

To schedule these services or ask questions, please contact EH&S at (510) 642-3073 or ehs@berkeley.edu.

Business hours are 9am-12pm & 1pm-4pm

Campus Chemical Hygiene Officer (CHO): The CHO works at EH&S and serves as the primary authority on Cal/OSHA’s Chemical Hygiene regulation. They are available for consultation on completing and implementing this plan as well as lab safety issues. The name of the current CHO can be found on the Online CHP Component (<http://tinyurl.com/ucbchp>). Contact the CHO at (510) 642-3073 or ucbcho@berkeley.edu.

Principal Investigator (PI): The PI is ultimately responsible for safety in their laboratory and has the following responsibilities:

- Foster a positive safety culture, which should include mentoring and open discussion about lab practices.
- Ensure completion of their lab’s CHP as well as annually review and update.
- Complete and maintain a hazard assessment (<http://app.riskandsafety.com>).
- Ensure that all lab personnel completes all required training and that training is documented.
- Establish and maintain written Standard Operating Procedures (SOPs) for work involving hazardous chemicals or operations; ensure training is provided and documented.
- Provide appropriate Personal Protective Equipment (PPE) as per the University of California Office of the President (UCOP) PPE Policy.
- Contact EH&S for review of use authorizations (e.g. toxic gases, controlled substances, laser, radioactive, biological).

Laboratory Safety Contact (LSC): The PI may designate a LSC(s) to help ensure requirements of the CHP are met and that hazardous materials are handled, stored and disposed of properly. The LSCs frequently also help train new members and coordinate contact with EH&S.

Everyone: All lab members are responsible for taking an active role in promoting positive safety culture and good lab practices. If an imminent hazard is present, individuals should discuss with their supervisor or contact EH&S if necessary (EH&S: 510-642-3073; ehs@berkeley.edu). Such conditions or activities need to be halted immediately.

Laboratory Contacts

Please update names and phone numbers as relevant. Clearly cross out any outdated information.

Role (*Required)	Name	Phone Number(s)
Principal Investigator *	Erol Kepkep	510-664-4759
Lab Safety Contact / Lab Manager *	Erol Kepkep	510-664-4759
After Hours Emergency Contact *	Erol Kepkep	510-457-6638 (Mobile)
Other		

Department Safety Coordinator (DSC)

The DSC is designated by your department and helps coordinate annual inspections, resolution of health, safety, and environmental issues. They often act as a liaison with other campus departments and resources, such as EH&S, UC Police Department, University Health Services, etc.

Name of DSC:

Phone Number:

Office Location:

Derek Apodaca

510-292-9031 (Mobile)

3072 VLSB

Responsibilities and Contacts

Hazardous Chemicals, Inventory & Storage Guidelines

Hazardous Chemicals / Materials

Hazardous chemical means any chemical which is classified as a health hazard, a simple asphyxiant, combustible dust, flammable gas, or hazard not otherwise classified. The Globally Harmonized System (GHS) defines such chemicals using 9 pictograms and a series of hazard statements. GHS information can be found in the Safety Data Sheets (SDS).



May catch fire if exposed to ignition sources, sparks, heat. May emit flammable gas.

Flammables
Pyrophorics
Self-Heating
Self-Reactives
Organic Peroxides



May cause life threatening effects even in small amounts and short exposure.

Acute toxicity
(inhalation, dermal, oral)



May cause less serious toxicity.

Irritant
(skin, respiratory tract, and eye)
Skin Sensitizer
Narcotic Effects
Hazardous to Ozone Layer



May cause serious and prolonged health effects upon short or long term exposure.

Carcinogen
Reproductive Toxin
Respiratory Sensitizer
Target Organ Toxicity
Aspiration Toxicity



May explode if exposed to fire, heat, shock, friction.

Explosives
Self-Reactives
Organic Peroxides



May cause skin burns and permanent eye damage.

Corrosives



Can burn without air or intensify fire in combustible materials.

Oxidizers



May cause long lasting effects in the environment.

Aquatic Toxicity



May explode in a fire, cause cryogenic burns, or cause asphyxiation.

Gases Under Pressure
Cryogenics

Before purchasing controlled substances, complete the appropriate Use Authorization Form (<https://tinyurl.com/ucbsua>).

Contact csuse@berkeley.edu for questions.

Before purchasing or using Toxic Gases, a procedure review must be completed and a SOP written. Contact toxicgas@berkeley.edu for questions.

Inventory Guidelines

Chemical inventories must be reported to the City of Berkeley on an annual basis. Labs must keep track of their inventory via the *Chemicals* application (available online at <http://app.riskandsafety.com>). Door signs help inform first responders of hazards before entering a space.

Each lab is responsible for completing the following:

- Maintain an accurate inventory by updating regularly (e.g., entering chemicals as you receive them).
- Complete an annual reconciliation by verifying each container's location and certifying the inventory as accurate.
- Post current door signs (include LSC as emergency contact).

Safety Data Sheets (SDSs)

A Safety Data Sheet (SDS) is an informational document provided by the manufacturer to describe the physical, chemical and hazardous properties of a chemical. Laboratories are required to provide researchers access to SDSs. If a SDS is not available, contact the manufacturer to obtain a copy of the SDS.

SDSs are available online at <http://ehs.ucop.edu/sds> or through the *Chemicals* application (available at <http://app.riskandsafety.com>).

Chemical Storage Guidelines

Chemicals should be stored according to best practices which includes proper segregation from incompatible chemicals. This can be achieved by separating chemicals by hazard class. Containers should not be stacked and caps should be intact. Always check a chemical's SDS for storage recommendations. Below is a representative list with examples; it is not exhaustive. Each category and subsequent bullets represent the need for separate secondary containers. These are recommended guidelines and other storage options may be possible.

Please contact the CHO to discuss specific storage needs (ucbcho@berkeley.edu).

- | | | |
|--|--|---|
| <ul style="list-style-type: none">• Acids:<ul style="list-style-type: none">◦ Inorganic- hydrochloric acid, phosphoric acid, sulfuric acid◦ Oxidizing- nitric acid, chromic acid◦ Organic- formic acid | <ul style="list-style-type: none">• Flammable materials:<ul style="list-style-type: none">◦ General- hexanes, ethanol, diethyl ether, acetone, ethyl acetate◦ Organic acids- glacial acetic acid◦ Organic bases (typically flammable)- triethylamine, piperidine | <ul style="list-style-type: none">• General chemicals- non-reactive metal salts, inorganic salts, buffers |
| <ul style="list-style-type: none">• Inorganic bases- sodium hydroxide, ammonium hydroxide | <ul style="list-style-type: none">• Oxidizers- potassium permanganate, hydrogen peroxide, potassium nitrate | <ul style="list-style-type: none">• Pyrophorics + water reactives- t-butyllithium, sodium hydride |
| | | <ul style="list-style-type: none">• Incompatible with ALL other chemicals require an individual secondary container per chemical- bromine, sodium azide |

Hazardous Chemicals, Inventory & Storage Guidelines

Hazard Assessment, Training & Standard Operating Procedures

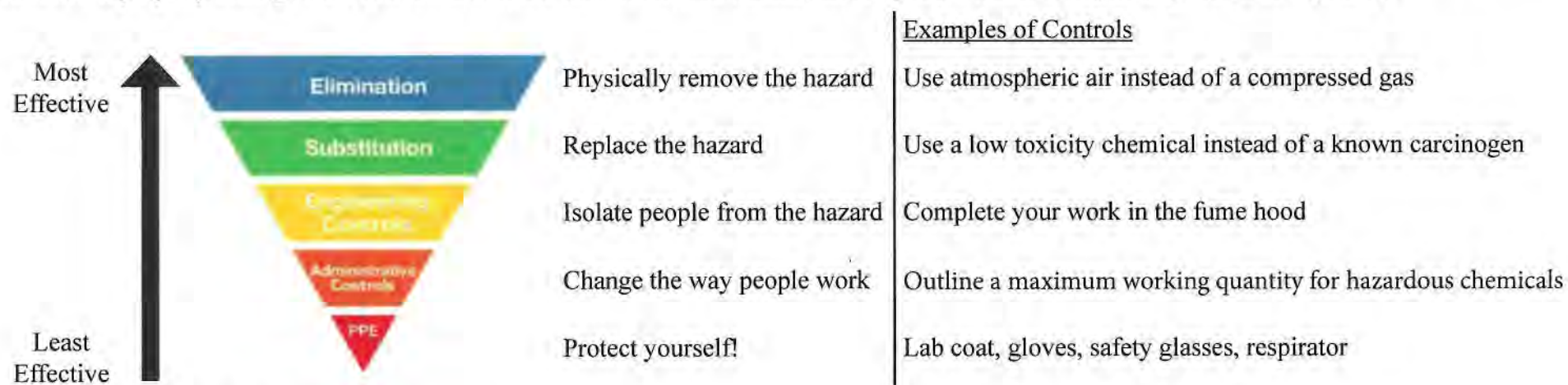
Hazard Assessment

Each PI will complete an assessment (available online at <http://app.riskandsafety.com>) regarding the possible chemical, physical, biological, radiological, laser and non-ionizing radiation hazards. Researchers must read through the hazard assessment answers and PPE list then select the “acknowledge” button. The list reflects minimum PPE requirements to work in the lab based on the hazards outlined in the assessment. A list of additional recommended PPE will also be provided.

Assessments must be certified annually by the PI. Amend the assessment if any hazards change at any time.

Hierarchy of Controls

Controlling chemical and physical hazards in the lab is necessary to prevent injury and illness. Identify the hazards and apply the hierarchy of controls to properly manage the risks. Some of these controls will be outlined in the group’s Standard Operating Procedures (SOPs).



Chemical Spills or Releases

Uncontrolled releases of hazardous chemicals can cause health effects, injury or property damage. Some chemical spills are obvious; others less so. Researchers should be alert to indications of a release such as unusual odors, eye irritation, other exposure symptoms, or monitoring device alarms.

General Spill Kits

Spill kits are recommended to be in the lab or readily accessible. Labs should use these materials to clean up spills themselves or contain a spill while they wait for help (call EH&S at 510-642-3073 for spill cleanup during business hours). If the spill is an imminent danger, leave the room immediately and call 911. *Basic components may include but are not limited to:*

- Absorbent pads or socks
- Absorbent material (such as vermiculite)
- Dust pan and brush
- Gallon ziplock bags
- Warning signs or caution tape
- pH paper

General Lab Training

All researchers are required to complete the minimum training as outlined below. Additional trainings may be required depending on the type of research being pursued (e.g. radiation training).

Below is a representative list, for a current guideline on trainings please see <https://ehs.berkeley.edu/training>.

Required minimum training:

- Chemical Hygiene Plan and a laboratory walk-through (including Online CHP Component <http://tinyurl.com/ucbchp>)
- Online trainings available through the UC Learning Center (Lab Safety Fundamentals, Spill Response, Workplace Safety, Hazardous Waste Program, Fire Extinguisher Training)
- Standard Operating Procedures
- PPE training
- Hands-on training

Use authorization training (if applicable):

- Radiation
- Biological
- Laser

Examples of additional trainings:

- Cryogen safety
- Compressed gases
- Pressurized systems

Standard Operating Procedures

Written Standard Operating Procedures (SOPs) are required for all hazardous operations/activities. Chemical class SOPs outline control measures for categories such as flammable liquids and solids, carcinogens, and oxidizers. Templates are available from EH&S at:

<https://jwas.ehs.berkeley.edu/lab>. You must include lab specific practices in the template (e.g., designated work areas, storage locations, decontamination procedures, reaction scale limits) and are recommended to include step-by-step procedures when relevant. The SOPs must also include engineering controls (e.g., fume hoods or glove boxes) and procedures for safe removal of contaminated waste.

Email ucbcho@berkeley.edu for guidance or to generate chemical class templates from your inventory.

Requirements for SOPs:

- SOP templates must be customized by lab members or PI.
- The SOPs must be reviewed and approved by the PI.
- The PI and all personnel are responsible for implementation and adherence to their contents.
- Document the training of lab members and maintain records.
- For extremely hazardous operations, working alone restrictions may need to be established (e.g. pyrophorics, large scale reactions, acutely toxics).

Regular review of SOPs should be done when either:

- Significant changes occur to the process that could adversely affect its safe implementation (e.g. increase in scale of reaction, change in equipment, variations in conditions).
- Chemical inventory changes significantly.
- It has been three years since the last review. SOPs should be reviewed every three years.

Types of SOPs:

- Chemical class (e.g. Carcinogens, Flammable Liquids and Solids)
- Chemical specific (e.g. Hydrofluoric acid)
- Process (e.g. Flame Sterilization)
- Physical (e.g. Centrifuges, Cryogenics)

How to record SOP review:

- Best practice is to keep a record of significant changes.
- Person responsible for review should initial the front page.
- PI must approve any new versions of the SOPs.

Laboratory Walk-Through Checklist

A laboratory walk-through will be provided to each lab member on the first day they are granted access to or assigned work activities in the laboratory. Fill in the shaded areas with lab-specific information and train all personnel on the items below. Please review the topics below and demonstrate how to use equipment and follow procedures.

Emergency Procedures

☒ Fire alarm pull station

Nearest Location:

In hallway near door to room 2098

☒ Eye wash/safety showers

Nearest Location:

In hallway between 2095 and 2097 main doors
Inside 2113 near main door

☒ First-aid kits

Nearest Location:

In each room near main door

☒ Phone and how to dial 911

Nearest Location:

Inside rooms 2083, 2088, and 2098

☒ Campus Emergency Notification System (Warn Me) and
Shelter-in-Place

☒ Emergency assembly area

☒ Primary and secondary routes of egress

Engineering Controls

☒ Chemical fume hoods

☐ Biological safety cabinets

☐ Other engineering controls (e.g., glove boxes, gas cabinets)

List other engineering controls the lab has:

Chemical Storage and Waste

☒ Chemical storage locations and segregation guidelines

☒ Hazardous waste disposal and accumulation area

Location(s):

Collection containers vary based upon lab exercise and will
indicated with each specific training

Required Personal Protective Equipment (PPE)

Cal/OSHA requires researchers to have access to PPE in order to perform work safely. PIs must complete a lab hazard assessment discussed in the “Hazard Assessment, Training & Standard Operating Procedures” tab and ensure that all researchers wear PPE appropriate for their work. The completed hazard assessment will include a list of required and recommended PPE. EH&S is available for consult on additional lab activities and can make PPE recommendations.

See online CHP Component for the full PPE policy: <http://tinyurl.com/ucbchp>

General Requirements:

- PIs must complete a hazard assessment.
- Designates may submit a draft assessment to the PI.
- All PPE requirements must be included in lab SOPs.
- Researchers must follow PPE requirements.
- Lab coats must be laundered through the campus PPE program.

Respiratory Protection Program:

- Control measures (e.g. administrative and engineering) should be evaluated before considering a respirator.
- Respirators are used when additional protection is needed for the researcher.
- Contact EH&S for evaluation (510-642-3073, ehs@berkeley.edu).

If EH&S determines a respirator is needed, the researcher must complete a:

- Respirator fit test and training
- Medical evaluation with University Health Services

If EH&S determines a respirator is not needed, researchers may use one on a voluntary basis but must complete a waiver.

Other Laboratory-specific Hazard Information:

Please describe any additional equipment or hazards that may be found in your lab. This may include such hazards as UV light, laser, high voltage equipment, confined space, toxic gases, etc.

What to wear when...

Entering a lab:

- Shirt and full length pants or equivalent
- Closed toed/heeled shoes
(top of foot can not be exposed)

Performing lab work:

- Lab coat and safety glasses
- Protective gloves (chosen based on activity)

Near someone else performing lab work:

- Lab coat and safety glasses

Examples of activities that may require PPE beyond the basic guidelines described on this page:

- Working with pyrophoric materials
- Handling large volumes of acids
- Transferring cryogens
