

# Guidelines for Creating a Chemical Hygiene and Safety Plan for Your Laboratory Operations

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## A. Explanations

These guidelines are intended to help you create a plan relevant and helpful to your operation. The “TEMPLATE” is attached and you may fill it in by hand and attach SOP’s or other relevant instructions. Alternatively, you may use these guidelines and the TEMPLATE to help you develop your own CHP.

Each laboratory must have its own Chemical Hygiene Plan and Injury & Illness Prevention Program that describes its specific rules and procedures as a supplement to the full campus documents. The attached TEMPLATE of a Chemical Hygiene and Safety Plan fulfills both requirements and should be attached to the C.O.S.E. Chemical Hygiene Plan in each affected lab.

### 1. C.O.S.E. Chemical Hygiene Plan

All lab personnel should become familiar with the C.O.S.E. Chemical Hygiene Plan when they start work and it must be available to all lab personnel during working hours. For your information, below is a table of requirements for CHP’s specified in OSHA’s Lab Standard at 29 CFR 1910.1450 **(e)(3)** and the associated sections in the C.O.S.E. CHP.

CHP Reg. Reference*	Topics Required by OSHA’s Lab Standard	Clarification of Required Topics	Chapter in CHP
(e)(3)(i)	Standard operating procedures for handling toxic chemicals	Availability of Codes of Safe Work Practices (SOPs) for work with hazardous chemicals.	2.1 4.4
(e)(3)(ii)	Criteria to be used for implementing measures to reduce exposures	Criteria for using control measures, such as engineering controls, administrative controls, or personal protective equipment.	2.2-2.4 4.1-4.3
(e)(3)(iii)	Fume hood performance	Measures to ensure proper operation of fume hoods and other protective equipment.	4.1
(e)(3)(iv)	Employee information and training (including emergency procedures)	Employee understanding about the hazards of the work area, including how to detect their presence or release, work practices and how to use protective equipment, and emergency response procedures.	2.4 3.3 4.2 5.2-5.4
(e)(3)(v)	Requirements for prior approval of laboratory activities	Circumstances under which a particular laboratory operation requires prior approval from the employer.	2.2 5.3
(e)(3)(vi)	Medical consultation and medical examinations	Provisions made for medical consultations and exams.	3.3
(e)(3)(vii)	Chemical hygiene responsibilities	Designation of a Chemical Hygiene Officer.	3.1-3.3
(e)(3)(viii)	Special precautions for work with particularly hazardous substances	Provisions for additional protection for work with “select carcinogens”, reproductive toxins, or substances with a high degree of acute toxicity	2.2 5.2-5.3

Has everyone who works for you had some documented training?  
Do you have copies?

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## 2. Laboratory Instructors

Laboratory instructors are responsible for implementing the CHP in the classes they supervise and for

- Developing and/or implementing written procedures for every instructional experiment involving chemicals or biohazardous materials;
- Educating students in safe work practices, correct use of personal protective equipment, and proper waste disposal;
- Enforcing safe work practices and supervising student activities;
- Correctly labeling containers, filling out attached waste tags, and maintaining good storage practices.

## 3. Researchers

Faculty conducting research are responsible for implementing the CHP, Hazard Communication, Injury & Illness Prevention programs, and Hazardous Waste Management Program in their assigned laboratory space and for

- Making the written CHP and Standard Operation Procedures available to lab staff and students;
- Developing, monitoring and approving operating procedures for directed research involving chemicals or biohazardous materials;
- Maintaining a current chemical inventory and availability of MSDSs for each chemical.
- Purchasing only the amount of chemicals needed and the appropriate PPE for the hazards;
- Implementing and enforcing established safe work practices.
- Managing hazardous waste per campus policy.

## B. Planning and Training Tips

Before you start, consider the questions below to help you get into the pre-planning and hazard evaluation mode.

### 1. Planning Questions

See if you can answer “YES” to these questions:

- ✓ Have I thought about what can go wrong?
- ✓ Is there an alternate way to do the experiment(s) that’s safer yet still teaches the same concept or produces the same result?
- ✓ What personal protective equipment should be available. Do I have it on hand?
- ✓ When do I expect my lab workers to wear the items? Is this written down anywhere?
- ✓ Are my lab workers aware of the dangers of **every** chemical they will use?
- ✓ Do they know what NOT to mix together?
- ✓ Do they know which tasks or materials **MUST** always be done in a fume hood?
- ✓ Do they know about major hazards from others’ research in a shared lab?
- ✓ Do they know what to do if something spills, reacts or splashes on them?
- ✓ Do they know how to shut down an experiment or equipment in an emergency?
- ✓ Do they know what to do with the waste they generate?

This is the kind of information everyone should know.  
What other information is important in your lab?

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## 2. Checking Lab Personnel Training

For example, how would your staff and students answer the following questions?

- |  |                                |
|--|--------------------------------|
| 1. Do you wash your hands before leaving the laboratory  | YES NO or SOMETIMES            |
| 2. Do you wear appropriate gloves, lab coat and splash goggles whenever you work with chemicals in the lab?  | YES NO or SOMETIMES            |
| 3. Are the appropriate hazard signs posted on cabinet doors and designated areas and are emergency numbers posted on the laboratory door?                        | YES NO or NOT SURE             |
| 4. Are all containers in your lab legibly labeled with identity and hazard warnings? ( <i>Do you know how to interpret the labels?</i> )                         | YES NO or SOME OF THEM         |
| 5. Do you know where to find Material Safety Data Sheets for all chemicals in your lab? ( <i>Have you ever looked at any of them?</i> )                          | YES NO or NOT SURE             |
| 6. Are the chemicals stored in your lab sorted by hazard class in appropriate shelves or cabinets? ( <i>Do you know what the different hazard classes are?</i> ) | YES NO or SOME OF THEM         |
| 7. Have you been instructed in the use and handling of the chemicals and equipment in your lab?  | YES NO or SOME OF THEM         |
| 8. Have you been instructed in the location and use of safety devices such as eyewashes, safety showers and fire extinguishers?                                  | YES NO or SOME OF THEM         |
| 9. Are you aware of emergency procedures in the event of a spill, uncontrolled chemical reaction, or building evacuation?  | YES NO or SOME OF THEM         |
| 10. Do you know how to collect your waste, where the accumulation areas are, storage limits, and where to take full waste containers?                            | YES NO or SOMEONE ELSE DOES IT |

## 3. Checking Effectiveness of Safety Efforts

For example, how are you ensuring that these compliance weaknesses are not occurring in your lab?

- |  |   |
|--|---|
| 1. Unlabeled or improperly labeled containers  | 8 CCR 5194 (f)(4); (f)(8)<br>8 CCR 5191 (h)(1)(A)<br>8 CCR 5164 (a)                     |
| 2. Incompatibles stored together.  | 8 CCR 5164 (a)  |
| 3. Improper use or lack of gloves, safety glasses, splash goggles, protective clothing, lab coats.                               | 8 CCR 3380 (c)  |
| 4. Respirator violations including lack of fit testing, training, medical, protocol  | 8 CCR 5194 (i)<br>8 CCR 5144 (c)(1)   |
| 5. Lack of available MSDSs or knowledge of where the MSDSs are kept.   | 8 CCR 5194 (g)(1)<br>8 CCR 5194 (h)(1)(B)   |
| 6. Eating and drinking in the laboratories or food/beverages in chemical/sample refrigerators.                                   | 8 CCR 5194 (f)(4)(A)(3)   |
| 7. Defective or lack of guards such as the one on drive belts for vacuum pumps, overridden interlocks, coverings, or indicators. | 8 CCR 3320<br>8 CCR 3328 (c)  |
| 8. Damaged electrical outlets and power cords ( <i>e.g., frayed insulation by plug</i> )   | 8 CCR 2510.4  |
| 9. Expired or untagged hazardous waste   | 22 CCR 66262.34 (e)(1)(c); (f)  |
| 10. Inadequate or inconsistent training program  | 8 CCR 5191 (f)(1)<br>8 CCR 5194 (h)(1)<br>8 CCR 3203 (a)(7)<br>22 CCR 66265.16 (d); (e) |

How do you think your lab personnel will answer these questions?  
Consider doing some refresher training on safe work practices.

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### **C. Chemical Hygiene and Safety Plan Template**

It is important to provide your lab personnel with the information below so they can find what they need. The attached TEMPLATE is intended to simplify the development of a CHP for YOUR lab. Called a Chemical Hygiene and Safety Plan, it serves as both a CHP and IIPP for your lab. If you have any questions, please contact the C.O.S.E. Health and Safety Specialist at x8-6892.

#### **1. CHP Administration and Information**

1. Name of Department Safety Coordinator: i.e. Stockroom manager or Office manager
2. Contact person for reporting equipment failures:
3. Contact person for reporting injuries or hazards?
4. Contact number(s) for emergencies:
5. Location of emergency poster or documents:
6. Location of chemical inventory and MSDS's:
7. Location of written CHP, IIPP, and Hazard Communication Program.
8. Location of written standard operating procedures:

#### **II. Chemical Storage and Handling**

1. Location of extra secondary containers and labels. Describe labeling system:
2. Describe where materials such as acids, solvents, gels, and equipment are stored.  
Show how incompatible chemicals are arranged by hazard class on shelves before arranging them alphabetically.
3. Discuss how spilled materials should be cleaned up.
4. Discuss chemical hygiene and housekeeping.:

#### **III. Very Toxic or Dangerous Materials**

1. Show the area(s) set aside and "DESIGNATED" for dangerous materials or tasks:
2. Describe the special precautions and the protocol for obtaining prior approval.

#### **IV. Work Practices**

1. Describe how to use and care for personal protective equipment:
2. Indicate for which tasks specific equipment is required and recommended clothing:
3. Describe how to correctly use fume hoods: (See Fume Hood Code of Safe Work Practice)
4. Which tasks **MUST** be done in a fume hood, glove box, or other ventilated space?
5. Discuss how to control exposure and inadvertent releases. For example by keeping containers closed:
6. What carriers/carts are available for transporting chemicals?
  - b. Describe how to correctly transport chemicals. .
7. Review written operating procedures for common or hazardous tasks or equipment use

#### **VI. Hazardous Waste**

1.
  - a. Show location of Satellite Accumulation Areas and note the designated waste area sign
  - b. Show how waste types are segregated using secondary containment and labeled cabinets.
  - c. Indicate how containers are kept closed when not in use
2. Show where can new tags be obtained and how to fill out waste ID tags
3. Note the 60 days storage limit and show where to take waste containers that are full or nearing expiration dates
4. Describe the waste streams you generate and any special hazards associated with them:

# Chemical Hygiene and Safety Plan

\_\_\_\_\_ **Laboratory;** **Room** \_\_\_\_\_, **Bldg:** \_\_\_\_\_

**Prepared by:** \_\_\_\_\_ **Revision Date:** \_\_\_\_\_  
Principal Investigator/Responsible Individual

## A. SCOPE

This chemical hygiene and safety plan applies to room \_\_\_\_\_ in \_\_\_\_\_ Building  
 at San Francisco State University, College of Science and Engineering.

## B. NATURE OF RESEARCH

The responsible individual's research focuses on the \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## C. RESPONSIBLE INDIVIDUALS

\_\_\_\_\_ has primary responsibility for this area. If this person is not in his or her office or lab, contact the stockroom manager or the department office. Telephone numbers for these and other pertinent individuals are listed below:

<b>Name</b>	<b>Title</b>	<b>Room</b>	<b>Extension</b>
_____	<small>Title of Principal Investigator or Responsible Individual</small>	_____	_____
_____	<small>Title of Laboratory Supervisor or TA, GA, GTA (if any)</small>	_____	_____
_____	Manager, Stockroom	_____	_____
_____	Chair, Department of	_____	_____
Linda Vadura.....	Health & Safety Specialist, College of Science & Engineering.....		x8-6892
Danny Ho .....	Hazardous Materials Coordinator, ..... Dept. of Environmental Health & Occupational Safety		x8-1449
Dr. Robert Shearer.....	SFSU CHO/Director of Dept of Environmental Health & Occupational Safety		x8-1449
University Police .....	Dept of Public Safety ..... (emergency) 911 or (bus)		x8-7200

## D. OPERATING RESPONSIBILITIES

The responsible individual will oversee general lab operations, ensure that the work area is safe and complies with applicable regulations, and correct deficiencies in a timely manner. This individual is also responsible for making certain that all personnel using this work area have read, understand, and follow appropriate safety procedures. This plan must be reviewed each year and updated as necessary.

## E. PERSONNEL ACCESS

The lab may be accessed during normal business hours by all personnel associated with the responsible individual's research. During non-business hours (evenings and weekends), prior authorization from the department chair along with a signature from the COSE Director of Operations on a building pass is required.

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## F. MEDICAL TREATMENT

Personnel injured in the lab during normal business hours must be taken to the Student Health Center (SHC) for evaluation or treatment. The SHC will fill out an incident report and notify EHOS. If an injury or illness may be serious or an emergency after-hours, call University Police at **911** or x8-2222.

## G. LOCATION OF IMPORTANT SAFETY ITEMS

Item	Location
Department Chemical Hygiene Plan	_____
Safety glasses and/or goggles	_____
Lab coats, aprons, gloves	_____
First Aid Kit or Spill Cleanup Kit	_____
Hazardous Waste Satellite Accumulation Area(s)	_____
<b>Material Safety Data Sheets</b> (MSDS)	_____
<a href="http://www.hazard.com/msds2">www.hazard.com/msds2</a>	
<a href="http://www.ilpi.com/msds/index.html">www.ilpi.com/msds/index.html</a>	

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(For example: where antidotes are stored or location of " Designated" areas for particularly toxic chemicals i.e., select carcinogens)

## H. GENERAL SAFETY

### Hygiene

Eating, drinking, and smoking are not permitted in the lab or anywhere hazardous materials are used or stored. Wash hands before leaving the lab and after contact with hazardous materials. Store glasses, goggles, dust masks, and gloves in a clean secure location to prevent soiling or contamination.

### Apparel

A lab coat and eye protection must be worn whenever chemicals or harmful light sources are being used in the lab, regardless of whether there is direct involvement with hazardous materials. **Shorts and sandals are not acceptable apparel in the lab** but may be permitted under special circumstances by the responsible individual. Guidelines for choosing gloves: <http://www.safety.fsu.edu/chp.html#appendix6>

### Hazardous Materials

Chemicals must be carried in a secure container to prevent spills or dropping onto counters or floors. Compressed gas cylinders must be secured with straps or chains to the wall or heavy counters or furniture. Screw caps on cylinders being stored or moved. Keep containers closed when not in use. Segregate hazardous materials by class in appropriate LABELED secondary containers and cabinets.

### Defective Equipment

Equipment that is broken or with damaged electrical cords must be taken out of service and not used. Cracked glassware and missing or inoperable guards, interlocks, and covers on equipment must be replaced. Vacuum pumps with missing belt guards, lasers set-ups with inadequate beam stops, corroded or leaking containers, and poorly functioning fume hoods must not be used until the problem is corrected. Report problems with equipment to the stockroom or department office promptly.

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### I. TRAINING

All personnel working in this lab are required to receive training from the responsible individual about standard laboratory practices, must demonstrate competence before performing a new procedure or operating an instrument with which they are unfamiliar, show they know the correct procedures for handling, labeling and disposing of chemicals, and know how to review MSDSs for chemicals before using them.

The responsible individual will require all lab personnel to read the C.O.S.E. Chemical Hygiene Plan and will emphasize the sections on compressed gas cylinders, materials storage, and waste disposal. Newly hired personnel must have an initial safety orientation as soon as possible but at least within 30 days of starting work. In addition, the following information will be provided to all lab personnel:

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### J. LAB EQUIPMENT

The equipment used in this lab includes \_\_\_\_\_

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**All users will be trained and authorized by the responsible individual before using this equipment.** Repair or maintenance of this equipment will be made by the responsible individual, his/her designee, or the manufacturer. Operation manuals and/or operating procedures are located in \_\_\_\_\_

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Additional instructions or comments: \_\_\_\_\_

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### K. HAZARDOUS MATERIALS

Lab personnel will be informed of the chemical hazards during their initial assignment and as new exposure situations arise. An inventory of chemicals used in the lab is available for review.

**Type**

**Main Hazards**

- |  |       |
|--|-------|
| <input type="checkbox"/> Organic solvents        | ----- |
| <input type="checkbox"/> Alcohols                | ----- |
| <input type="checkbox"/> Mineral acids           | ----- |
| <input type="checkbox"/> Organic acids           | ----- |
| <input type="checkbox"/> Nitric acid             | ----- |
| <input type="checkbox"/> Oxidizers               | ----- |
| <input type="checkbox"/> Carcinogens             | ----- |
| <input type="checkbox"/> Extremely toxic         | ----- |
| <input type="checkbox"/> Compressed gases        | ----- |
| <input type="checkbox"/> Cryogenic materials     | ----- |
| <input type="checkbox"/> High Voltage/Electrical | ----- |
| <input type="checkbox"/>                         | ----- |
| <input type="checkbox"/>                         | ----- |

## L. SPECIAL HAZARDS OR PRECAUTIONS

Task	Is a fume hood required?	Type of gloves required for task	Type of eye protection required
	YES	NO	

**Other Information or Reference to Codes of Safe Work Practices (SOP's)**

## L. EMERGENCY PROCEDURES

In a life-threatening emergency, first call University Police at x8-2222 or 911 then a department representative (either the responsible individual, stockroom staff, or a professor) If an evacuation is necessary, lab personnel should turn off all instruments and lights (if circumstances permit), close the door, and exit the building in an orderly manner. See Appendix C in the Dept Chemical Hygiene Plan for detailed information on emergency procedures. Listed below, are select emergencies and associated recommended actions excerpted from the C.O.S.E. Chemical Hygiene Plan (Chapter 2, page 8&9).

Nature of Emergency	Recommended Action
Small (Incipient) Fire	For small fires in the incipient stage, use a fire extinguisher to put it out. Break the small plastic seal on the handle. Remember to point the nozzle at the base of the fire and sweep back and forth. <b>Don't put yourself in danger!</b> For information on fighting fires in a laboratory, check this web site: <a href="http://www.ilpi.com/safety/extinguishers.html">http://www.ilpi.com/safety/extinguishers.html</a>
Spreading Fire	Evacuate the room and close the door Pull the fire alarm or call 911
Evacuation Alarm Sounds	Leave the building using the nearest safe stairwell and wait outside until the building is cleared for re-entry by police or evacuation team.
Minor Chemical Spill	If the spill is small and you know how to clean it up, do so promptly. If unsure contact the PI or Stockroom. Wear protective equipment (i.e. gloves) and avoid breathing vapors from spill. Use appropriate kit to neutralize and absorb inorganic bases and acids or other chemicals. Collect residue into a container and dispose as chemical waste.
Spill Is Larger Than You Are Comfortable Handling	Isolate the spill area Remove ignition sources and shut down equipment Open windows (if safe to do so) Evacuate the room and close the door Call 911 and alert the stockroom and nearby labs
Uncontrolled Chemical Reactions	Leave the area promptly and close the door Call 911. Alert the stockroom and nearby labs If you believe there is a serious and immediate danger to others, pull the fire alarm in the main hallway to evacuate the building.
Chemical Splash on Face	Take person(s) from spill area to nearest emergency eyewash. Hold eye lids open. Flood affected area for at least 15 minutes or longer if pain persists. (Don't worry about making a mess.) Take person to Student Health Center AFTER flushing the affected area. Call 911 if the injury is too serious to move the victim. Ask someone to alert the stockroom and EHOS.