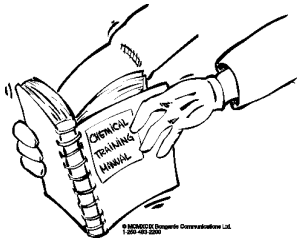
Safety, Health and Hazardous Materials @ C.O.S.E.

A Handbook for Faculty and Staff Supervisors



College of Science & Engineering
San Francisco State University
1600 Holloway Avenue
San Francisco, California 94132
Telephone: 415.338.1571
FAX: 415.338.6136
www.sfsu.edu/~safety

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☐ Why managers should read this handbook

So, why should you review this handbook? For one thing, it may save you from having to re-read all the written safety-related programs on campus all at once. This handbook reviews the major elements of the health and safety program at San Francisco State University (SFSU) as they apply to the College of Science and Engineering (COSE). **This document also serves as the COSE Injury and Illness Prevention Program which supplements the campus IIPP.**

The information herein not only explains what is expected of you in your role of Principal Investigator or Manager but is a useful tool for training the people who report to you. It can save you some time. By customizing this handbook for your specific work area, you can provide it to your new hires as part of their initial safety orientation.

As the manager of a laboratory or shop with potentially hazardous chemicals or equipment, it is your responsibility to evaluate and understand the hazards they pose to the people who use them. If you supervise employees or students, it is also your responsibility to conduct and document initial safety training for the specific hazards of your operation.

Initial safety orientations for new hires are due within 30 days of their hire date.

To this end, you, as the supervisor, must provide an initial safety orientation to all teaching associate (TA's), graduate teaching associates (GTA's), graduate assistants (GA's), work study, staff and other student employees to prepare them to work knowledgeably and safely in your work spaces. You are required to do this training within 30 days of each person's start date and submit the documentation to your department office or stockroom.

The crucial thing to remember is to DOCUMENT the training. From an auditor's perspective, "If the training isn't documented, it didn't happen."

1. What topics do I need to cover with the people I supervise?

Sometimes it is difficult to know exactly what to cover in a safety orientation. While OSHA regulations do provide a framework for training, they leave it up

Notes:

to the employer to decide how much training is enough. In other words, YOU are the "expert" and must decide how much detail and repetition are sufficient so people can safely work on your projects.

Using this handbook is not mandatory but can save you some time. It is intended to encourage all managers working with hazardous materials to cover the same basic material.

Become familiar with the safety and health programs in effect on campus and make sure you are aware of the requirements, hazards, and your responsibilities. Please review the following topics with all new hires:

- ☑ **Injury and Illness Program (IIPP)**
- ☑ **COSE Emergency Guidelines**
- ☑ **Understand which OSHA and EPA regulations apply to your operation.**
- ☑ **Hazard Communication Program**
- ☑ **Hazardous Waste Disposal***
- ☑ **Chemical Hygiene in Laboratories***
- ☑ **Biohazard Controls***
- ☑ **Laser and Radiation Safety***

*If applicable to your operation.

Supervisors are responsible for their equipment, work space, and people.

What am I responsible for, again?

Along with the ability to make decisions, managing people brings with it the responsibility for their safety.

Aside from project management and fund-raising, you are responsible for the following tasks that support a compliant and effective safety program.

1. Familiarize yourself with the written
   - Injury and Illness Prevention Program (IIPP);
   - Hazard Communication Program (HAZCOM);
   - Emergency Guidelines; and
   - Hazardous Waste Guidelines.

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2. Inspect your work area regularly – each quarter for areas with hazardous materials.

3. Complete the recommended corrective actions after a health and safety staff compliance audit.

4. Maintain a current list of hazardous chemicals in your work area. Make sure everyone know how to obtain a Materials Safety Data Sheet.

5. Evaluate the potential hazards of the chemicals and equipment you use and highlight high hazard equipment or processes. Use this evaluation to write standard operating procedures (*or Codes of Safe Work Practices*).

6. Understand the requirements of specific documents applying to your work such as the Chemical Hygiene Plan (for laboratories), Radiation Safety Manual, Biohazard Control Plan, and Laser Safety Plan.

7. Conduct a safety orientation for new hires within 30 days of their first day of work using one or both of the methods below.
   - Require new hires to read this handbook, with work-specific information filled in by you.
   - Hold a training session.

8. Document the safety orientation using a copy of the form in **APPENDIX A.**

How much instruction or how long it will take is entirely up to you. You are the expert.

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3. Safety Training Documentation

A. New hire is faculty or staff in a **"permanent"** tenure-track position.

If **YES**, contact the COSE Health and Safety Office to arrange a safety orientation meeting at x8-6892 or via email: lvadura@sfsu.edu

Handbook: **Safety, Health, and Hazardous Materials @ COSE**

If NO, new hire is in a temporary full-time or part-time position.

Note: Information for **Temporary Appointments** below this line

B. Faculty, staff, and student employees who primarily work with computers or in an office environment.

Handbook: **Safety Orientation for New Empoyees: Non-Hazardous Materials Version**

Form: **#1** Trainer: **Staff/Faculty Supervisor or Dept. Office Manager**

C. Faculty, lecturers, staff, student instructors (Lecture classes or "dry" teaching laboratories i.e., astronomy, meterology, computer labs)

Handbook: **Safety Orientation for New Employees: Non-Hazardous Materials Version**

Form: **#1** Trainer: **Lab/Class Coordinator**

D. Faculty, lecturers, staff, student instructors ("Wet" laboratories i.e., biology, chemistry, biochemistry)

Handbook: **Safety Orientation for New Employees: Handbook for Laboratory Lecturers and Teaching Assistants**

Form: **#2** Trainer: **Lab/Class Coordinator**

E. Visiting faculty, research staff, paid student researchers, post-docs, enrolled student researchers ("Wet" laboratories i.e., biology, chemistry, Thin Film, environmental, or biochemistry labs)

Handbook: **Safety, Health and Hazardous Materials @ COSE**

Form: **#3** Trainer: **Principal Investigator/Lab Manager**

COSE Safety Website http://www.sfsu.edu/~safety

Notes:

4. What's In It for Students and New Hires?

So, why should you read this handbook? Your faculty advisor or supervisor may use this as part of initial safety training. This handbook describes the health and safety program as implemented by the College of Science and Engineering (COSE). It covers everything from inspection procedures to handling hazardous waste. Many OSHA (Occupational Safety and Health Administration) and EPA (Environmental Protection Agency) regulations apply to University operations and it's important that everyone who works with hazardous materials knows the rules and ways to protect themselves.

Although every effort is made to prevent injuries and illnesses, following safety protocols and handling hazardous materials correctly is your responsibility. Hazardous materials are called "hazardous" for a reason so treat all chemicals, compressed gases, high-energy light sources, and electrical power with the respect they deserve.

After reading this handbook and discussing the health and safety aspects of your job with your faculty advisor or supervisor, you must fill out and complete a two-page safety orientation document to verify that you have received initial safety training. This form will be given to you by your supervisor or safety trainer.

Remember: If you don't know what to do next, ASK!

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☑ Emergency Guidelines

Follow campus emergency guidelines and establish procedures for your particular work areas covering such topics as equipment start-up and shut down, inspection after power failures, and operation stand-by. Regular campus services are available Monday – Friday from 8 AM to 5 PM unless otherwise specified.

See the College of Science and Engineering **"Emergency Guidelines Handbook"** for more detailed information on emergency response.

Highlights

- ☑ **Emergency contacts**
- ☑ **Building evacuation procedure**
- ☑ **Sudden illness**
- ☑ **Accidents and Injuries**
- ☑ **Power Outages and Flooding**
- ☑ **Night and weekend emergencies**

Campus police officers are trained in CPR and First Aid and some are certified Emergency Medical Technicians.

1. Campus Emergency Contacts

Department of Public Safety	338-7200 *(business line)*
CAMPUS POLICE	**911 or 338-7200**
Environmental, Health & Occupational Safety (EHOS)	338-1449
Facilities Work Control	338-1568

Notes:

2. C.O.S.E. Contacts

Executive Director of Operations Mike Blagoyevich	338-2385
Health & Safety Specialist Linda Vadura	338-6892
Dean's Office	338-1571
Chemistry Stockroom	8-2259
Biology Stockroom	8-1091 or 8-1092
Engineering Stockroom	5-2419 or 5-0956
Geoscience Stockroom	8-1755
Physics & Astronomy Stockroom	8-1673

3. Work Area Contacts

Principal Investigator
Lab Manager
Repair Service(s)

Call 911 to report emergencies from any campus telephone.

Notes:

4. Building Evacuation Procedures

When you hear the evacuation alarm, stop what you are doing and prepare to evacuate.

- ☑ Make sure everyone in your area leaves promptly and that the necessary equipment is turned off.
- ☑ Stay calm and leave the building through the nearest safe exit and wait there for instructions.
- ☑ Take the stairs. Elevators are programmed to go to the third floor and stay there until the system is reset.
- ☑ Assist persons with disabilities.
    - Instruct wheelchair users to wait by one of the outside stairwells
    - Inform them that you will give emergency personnel their exact location.
    - Ask for a volunteer to stay with the person until the building is cleared.
    - Let an evacuation team member know if there are any people that can't, or won't, leave the building so they can inform police using their radios.
- ☑ Wait outside and follow instructions.
- ☑ Do not re-enter the building until it has been cleared by police as safe– even if the alarm has been turned off.

Don't ask unhelpful questions such as "How long will this take?"

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5. Sudden Illness

If someone faints or appears seriously ill, or if you are not sure whether or not it is an emergency, **call Campus Police immediately at 911** from any campus phone. Campus Police personnel have first aid and CPR training and they can decide whether or not to call an ambulance.

- ☑ If the person is conscious, ask him or her how you can help.
- ☑ Keep the ill person quiet and comfortable until help arrives.
- ☑ Try to allow the person some privacy and ask those merely curious to stay back.

After-hours, if you need off-site medical services, go to

St. Francis Memorial Hospital

Franciscan Treatment Room on
1150 Bush Street. Corner of Bush and Hyde

415-353-6305

Directions: **Take 19th Avenue NORTH toward Golden Gate Park**
Turn RIGHT on GEARY
Turn LEFT on HYDE
Turn RIGHT on BUSH

Cox Stadium the designated meeting place for serious extended emergencies where medical attention, food, and information will be available.

6. Accidents and Injuries

Clean up small spills promptly. If a chemical spill is too large or dangerous for you to handle, call Campus Police at 911. If it is safe to do so, try to prevent the spill from spreading by surrounding the spill zone with absorbent or blocking materials.

Take injured people to the Student Health Center. If they cannot be moved, call Campus Police at 911 for help with serious injuries. The Student Health Center or Campus Police will begin the initial injury report.

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7. Power Outages, Flooding, and Other Building Problems

The Science Building has battery-powered emergency lights in the halls and stairways that activate during power outages. Hensill and Thornton Halls have a back-up diesel generator that comes on-line when the buildings lose power. This generator runs interior hall and stairway lights to allow safe evacuation, but does not allow the continuation of normal business operations.

- ☑ Report localized outages to the stockroom. Stockroom staff will then notify Work Control to repair the problem.
- ☑ Relocate people in areas with no natural light, or other available light source, until power returns.
- ☑ Do not touch power switches to equipment unless you are familiar with their operation and avoid handling fuse boxes and electrical cabinets.
- ☑ Have a back-up plan to deal with long-term refrigerator, freezer, incubator, and other specialized storage area power outages.

Report flooding and other facility emergencies to Work Control at x8-1568 and inform the stockroom or department office. Campus Police will notify EHOS staff and COSE staff as necessary.

8. Night and Weekend Emergencies

Student Health Center is open Mon-Thu 8:30 AM to 5:45 PM and Fri from 8:45 AM to 4:45 PM.

Because the campus is not fully staffed after-hours, handling emergencies such as broken pipes, steam outages, security problems, and injuries pose special communication and response difficulties.

- ☑ Plant Operations has personnel on-call to deal with building emergencies. Call Campus Police at 911 and the dispatcher will contact the appropriate personnel.
- ☑ Campus Police has emergency medical technicians (EMT) on staff and all patrol officers have training in first aid and CPR.
- ☑ Clear communication with the Campus Police dispatcher concerning the emergency and the kind of assistance you need, will speed up the process.

Notes:

9. Earthquakes

During an earthquake, the campus Department of Public Safety (DPS) recommends the following actions:

- ☑ Keep calm.
- ☑ Look for cover. Get under a desk or table, protect your head with your arms, and stay clear of the windows.
- ☑ Do not exit the building. The greatest hazards come from falling objects so stay inside.
- ☑ Do not use the elevators.

After the shaking stops, remain calm. Check for potential hazards and think of a way out. Watch out for falling or unstable debris and equipment. When you think it is safe, DPS has the following recommendations:

- ☑ Evacuate to an open area away from windows, that could shatter.
- ☑ Take your personal belongings with you because you may not be able to re-enter the building.
- ☑ Assist persons with disabilities. Those on upper floors should wait for assistance at stairwells, which are reinforced and the most stable parts of the building. Only attempt to help disabled people evacuate if there is an immediate danger to their safety. Contact DPS at 911 to report people unable to evacuate.
- ☑ Assemble at Cox Stadium, where Campus Police will have instructions on exit routes for leaving campus and provide emergency information.

  The University Disaster Plan will become operational. Use the telephone only for true emergencies. Don't tie up 8-7200 and 911 lines.

- ☑ Expect aftershocks.

It may not be safe even after the shaking stops. The potential danger from damaged structures, unstable trees and power lines, aftershocks and fire is real.

Source: SFSU Campus Police Earthquake Emergency Information flyer

Notes:

☑ COSE Injury & Illness Prevention Program

Required by Cal-OSHA, an Injury and Illness Prevention Program (IIPP) is an employer's written health and safety compliance program. It describes workplace hazard evaluation and reporting, inspections, training, codes of safe work practices, recordkeeping and accident investigations.

Highlights

- ☑ Authority and responsibility for safety
- ☑ Location of written documents and safety/health information
- ☑ Communication and Training
- ☑ Identification of Workplace Hazards and Inspections
- ☑ Safe Work Practices

1. Authority & Responsibility for Safety

Department Chairs are responsible for supporting safety efforts and for implementing the IIPP.

A key element of the IIPP is the clear assignment of authority and responsibility to an individual who must implement the safety program. The University president is ultimately accountable for having an effective safety program at San Francisco State University (SFSU).

This authority and responsibility is shared by the College of Science and Engineering Dean. He has delegated the authority to maintain the safety program to the Director of Operations and Health and Safety Specialist.

Role of Individual Departments

Academic departments, being semi-autonomous, are responsible for implementing and enforcing the safety program. The Department Chair has the authority within the department to implement and enforce provisions of the IIPP and is the ultimate point-of-contact. The Chair may delegate some of the authority to the Department Safety Coordinator, who is designated by the Chair to facilitate IIPP compliance, collect the master department

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chemical inventory and inspection documents, and oversee hazardous waste compliance.

The COSE Health and Safety Specialist assists the departments with safety compliance, inspections, and training and serves as a liaison between University EHOS and Facilities.

Department Chair: _____

Department Safety Coordinator: _____

2. Written Safety & Health Documents

You can find copies of written safety programs such as the Injury and Illness Prevention Program, Chemical Hygiene Plan, Hazard Communication Plan, and Biohazard Control Plan in your department stockroom and/or office. Lab-specific documents like Codes of Safe Work Practices (Standard Operating Procedures, SOPs, etc.), hazard assessments, security measures, procedures for working alone, and list of lab chemicals should be available in your work area. Make sure the people who work for you know where these documents are.

Many OSHA regulations such as the Laboratory Standard and Hazard Communication, require employers to develop and implement written programs.

Medical surveillance, air monitoring, and other exposure records may be obtained through the University EHOS office by written request. You may request these records, if there area any on file, for the areas you worked in or otherwise associated with your work history.

3. Safety Communication

Information such as where to obtain MSDSs, contact numbers, emergency procedures, hazards and special precautions are frequently communicated with posted signs and labels. Emergency and contact information should be posted in every lab and work area.

A. Meetings

- Safety meetings to inform staff and faculty of new procedures, new hazards, or inspection results are held throughout the semester. Department meetings, safety committee meetings, and scheduled

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meetings to resolve a particular topic are vehicles for communicating campus issues affecting safety and health. The following safety and health committees meet at least once per semester.

- COSE Safety Committee
- SFSU Safety Committee
- Chemistry Safety Committee
- Radiation Safety Committee
- Non-Ionizing Radiation Committee
- Biosafety Committee

B. Safety Orientations

New hires should receive a safety orientation within 30 days of starting work as described at the beginning of this handbook. It is especially important that this training be appropriately documented with the trainer's name, date of training, topics discussed, and signature of trainees.

C. Continuing Training

Safety training is an on-going process. When new chemicals, techniques, or equipment are introduced that pose a new hazard, supervisors must provide training before personnel may work with the item(s). In addition, periodic refresher training is required for personnel who work with hazardous materials.

The C.O.S.E. Safety Committee is made up of both department safety coordinators and faculty members.

D. Building Problems

Report ventilation, leaks, loose tiles, and other building problems to the department stockroom or office. After-hours, dial 911 from any campus telephone to contact the Campus Police dispatcher. The dispatcher will then contact the appropriate people from an on-call list.

E. Anonymous Reporting

You may report safety problems anonymously to the EHOS department by telephone (x8-1449) or through campus mail. However, it is helpful to provide your name and contact information. All reports to the EHOS department are kept confidential

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4. Inspections

Regular inspections are extremely important in identifying hazards, compliance issues, and assessing effectiveness of the safety program.

- ☑ Each semester department staff, with assistance of the COSE Health and Safety Specialist, walk through work areas and document inspection findings. A portion of the rooms in the departments are checked each month.
- ☑ Each quarter, faculty and staff, who are responsible for rooms where hazardous materials are used or stored, perform a self-inspection using a checklist that complies with the University's Business Plan.
- ☑ The COSE Health and Safety Specialist provides inspection reports to Department Chairs and the EHOS department during the semesters.
- ☑ Corrective Action Procedure
  - Submit a summary sheet of the inspection to the dept. safety coordinator and post a Correction Notice in the room.
  - The Dept safety coordinator will notify the room contact of the problem and assist in its resolution.
  - If corrective action is not completed in a timely manner, the problem will be brought to the attention of the Dept. Chair.

OSHA and EPA inspectors routinely ask for employer inspection records when they visit work sites.

5. Safe Work Practices

Codes of Safe Work Practices, also known as Standard or Safe Operating Procedures (SOP) are written operating procedures that incorporate safety features based on job hazard assessments.

- ☑ Principal Investigator and Area Managers are uniquely qualified, through their experience and knowledge, to accurately assess job hazards in areas under their control.
- ☑ Managers and PIs must develop safe work practices and communicate, through training, what is expected of people working for them.
- ☑ The COSE Health and Safety Specialist can assist in developing job hazard assessments. See Section 9 for selected Codes of Safe Work Practices.

Notes:

☑ Hazard Communication and Employee Right-To-Know

OSHA's Hazard Communication Standard, also known as the Employee Right-To-Know Act, requires employers to compile a list of all hazardous chemicals used or stored in the workplace and to have a written program describing how chemical hazards will be identified and communicated to employees. Training employees in the chemical hazards of their workplace and how to protect themselves is the key component. All employees, even office workers, are subject to the Hazard Communication Standard (HAZCOM).

"Hazardous" chemicals include not only pure materials such as acetone and sulfuric acid, but products and mixtures with hazardous ingredients such as Windex, copier toner and WD-40. However, the Hazard Communication Standard does not cover foods, beverages, cosmetics, or "articles".

An "article" is a solid object, like a steel rod, that is used as manufactured. However, if the steel rod, for example, will be ground up, machined, or welded, (thus generating fumes or dust) then it would be subject to the HAZCOM Standard and an MSDS, label, and training would be required. Consumer products are covered by the standard if they are not used in a manner similar to that of normal use – resulting in a duration and frequency of exposure greater than consumers experience.

The Hazard Communication Standard does not cover food, beverages, cosmetics, or articles.

Highlights

- ☑ Availability of written Hazard Communication program
- ☑ List or inventory of chemicals used or stored in the work area
- ☑ Availability of Material Safety Data Sheets for each listed chemical
- ☑ Container labeling requirements
- ☑ Training in health hazards and safety precautions before starting work with new chemicals

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1. Written Hazard Communication Program

This section summarizes the Hazard Communication Program (HAZCOM) and its major requirements. You can find the University's written HAZCOM program in its entirety in your department office or stockroom. If you can't find one, contact EHOS or COSE Health & Safety Specialist for a copy.

2. Chemical List or Inventory

List all the chemicals used or stored in your work area according to the name on the label. Include quantity, location and major hazards. Modify the list, as new chemicals are added and old ones discarded. By March 1 of each year submit an updated inventory to the EHOS Department.

3. Material Safety Data Sheets (MSDS)

Material Safety Data Sheets, or MSDSs as they are commonly called, contain information about chemicals. This information includes physical properties, physical and health effects, first aid and spill response, hazardous ingredient list, and storage recommendations. The manufacturer, importer or distributor is responsible for evaluating the hazards and writing an MSDS. The University relies on the initial hazard evaluation performed the by manufacturer, importer, or distributor.

Material Safety Data Sheets are updated periodically, and internet sources typically have the most recent revision.

- ☑ OSHA requires MSDSs to be available anytime upon request during working hours.
- ☑ Make sure MSDSs are available to your employees whenever they are working – including nights and weekends, if applicable.
  - Have hard copies available in a binder or file in the work area.
  - Bookmark MSDSs sites on a connected computer accessible to your employees while they are at work.
  - Inform new hires that MSDSs are also available from EHOS if they can't find what they need. In addition, check the department stockroom or office files.
- ☑ Practice finding an MSDS on line. For example, look for Windex and acetone using websites such as **www.hazard.com/msds** .

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4. Container Labels

Every container with a hazardous ingredient must be labeled with the chemical or product name and significant physical and health hazards. Since 1980, manufacturers have included the required information on their original product labels.

If you must transfer a chemical into a different container, make sure a legible label is securely affixed to it that identifies the contents and hazards. Preferably it will include the date transferred and the owner's name. Even squeeze bottles with water or soap solutions must have identifying labels – most people can't tell acetone, Alconox, or hydrochloric acid from water just by looking.

Avoid using food or beverage containers for chemical or sample storage to prevent potential confusion. If you must use a container previously containing another product, make sure the old label is completely covered or removed.

5. Chemical Hazards and Precautions

Everyone should be aware of the potential hazards of the chemicals they work with and the precautions they can take to minimize risk of exposure or injury. Precautions include appropriate storage by hazard class, personal protective equipment, housekeeping, personal hygiene, pre-planning, and safe work practices. The goal should be to minimize all chemical exposures.

Labels must be readable. Replace damaged or faded labels.

Signs, labels, and security measures are all appropriate methods for communicating this information. However, these methods cannot be substituted for training. The physical and health hazards of each chemical (or groups of similar chemicals) should be reviewed with everyone who works with you.

Notes:

6. Training in Hazard Identification and Control

Training is required for all new employees and whenever new chemicals are introduced. Although students (that are not 'official' volunteers or student employees) are not expressly covered by OSHA, they should have similar training. You may be asked to justify your training protocols to a regulatory inspector enforcing OSHA or EPA requirements.

See **Appendix A: Safety Training** for more information.

Work Specific Information

MSDS availability in your work area:

The purpose of the HAZCOM Standard is to ensure employers provide employees with the information they need to work safely and to make informed choices.

Notes:

☐ Chemical Hygiene in the Laboratory

OSHA's Laboratory Standard covers facilities "where the laboratory use of hazardous chemicals occurs." Laboratories are places "where relatively small quantities of hazardous chemicals are used on a non-production basis" and work with containers of reagents and other substances are "designed to be easily and safely manipulated by one person."

College of Science & Engineering labs affected by this Standard include:

- Thin Film Lab (Physics & Astronomy)
- Environmental Engineering Lab (Engineering)
- Hydrogeology Lab (Geosciences)
- Organic Chemistry Labs (Chemistry & Biochemistry)
- Microbiology Labs (Biology)

Highlights

☑ **Chemical Hygiene Plan**

☑ **Campus Chemical Hygiene Officer**

☑ **Examples of Exposure Controls**

☑ **Health Hazard Information**

☑ **Employee Training**

☑ **Hazardous Materials Storage**

Computer labs, offices, machine shops, electrical and mechanical labs are not covered by the Laboratory Standard – or this section.

1. Chemical Hygiene Plan

OSHA's laboratory standard applies to laboratories and requires a written Chemical Hygiene Plan (CHP) that describes the controls and policies the employer has in place to protect the health of laboratory personnel. This subsection summarizes CHP provisions – see TABLE 6.1 for an overview.

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To obtain a copy of the department CHP, see your department safety coordinator.

The University Chemical Hygiene Officer (CHO) is **Dr. Robert Shearer, Director of Environmental, Health, and Occupational Safety (EHOS)**. He and his staff have developed a generic campus Chemical Hygiene Plan (CHP) as a guide to assist administrative units covered by OSHA's Lab Standard. There should be a copy in your lab (in a white binder).

The COSE has developed a college-specific CHP that both addresses OSHA Lab Standard requirements and complies with the University's generic CHP. Each laboratory must have a CHP that applies to its operations. **APPENDIX G** in the College of Science and Engineering (COSE) CHP includes a template intended to simplify the process. The CHP must be reviewed annually and updated as necessary to keep the information current.

2. Exposure Controls

Implementing effective exposure controls is one of the chief responsibilities of laboratory managers. Controls can be grouped into three general categories:

1. Engineering Controls: e.g., fume hoods, glove boxes, separation

2. Administrative Policies: e.g., visitor policy, pre-approvals for high risk work and informative signs and labels

3. Personal Protective Equipment: Splash goggles, gloves, respirators

   Note: To use dust masks for comfort purposes in your work area, you must submit a written request to your stockroom manager. Dust masks must meet NIOSH 42 CFR 84 for Class 95 particulate respirators.

   Prior approval from health and safety staff is required before a respirator intended to protect the user from contaminants may be used or issued. For more information concerning respirators, see **Appendix D** for the COSE Filtering Face Respirator Program

OSHA's Laboratory Standard is concerned primarily with chemical hazards, so the CHP concentrates on control of toxic exposures and "chemical hygiene".

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TABLE 6.1 Chemical Hygiene Plan Requirements

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

* 29 CFR 1910.1450 **(e)(3)**

Notes:

3. Health Hazard Information

OSHA has defined "**hazardous chemical**" as "a chemical for which there is statistically significant evidence based on at least one study, conducted in accordance with established scientific principals, that acute or chronic health effects may occur in exposed employees".

Classifications of health hazards include **carcinogens**, **sensitizers, hepatotoxins** (liver), **nephrotoxins** (kidneys), **neurotoxins** (CNS), **hematopoietic toxins** (blood), **reproductive toxins** (mutagens, teratogens), **biohazards** and **radioactive** materials. Material Safety Data Sheets (MSDS) are a good source of information about chemicals and products.

All laboratory personnel should be familiar with both the health hazards of the chemicals they work with and the precautions they need to take to an prevent over-exposure. It is helpful to understand important terms such as "acute exposure", "chronic exposure", "target organs", and "incompatible chemicals". In addition, become familiar with the following common terms:

- **Permissible Exposure Limit**

The concentration of a chemical in air to which nearly all individuals can be exposed without adverse effects – in the workplace. The PEL value allows the lab worker to quickly determine the relative inhalation hazards of chemicals.

An "acute" exposure is a localized or systemic injury resulting from a single contact.

- **Permissible Exposure Limit-Time Weighted Average**

A PEL-TWA refers to the concentration considered safe for exposure during an entire 8-hour workday. Permissible Exposure Limits are most commonly expressed as time-weighted averages and are enforceable.

- **Irritant:**

Non-corrosive chemical that causes reversible inflammatory effects (like redness and swelling) on living tissue by chemical action at the site of contact.

- **Corrosive:**

Chemical that causes destruction of living tissue by chemical action at the site of contact. These can be solids, liquids, or gases.

Notes:

- **Asphyxiant:**
A chemical that interferes with the transport of oxygen to the vital organs of the body leading to rapid collapse and death.

- **Allergen:**
A chemical that causes an adverse reaction by the immune system to a chemical resulting from a previous sensitization to that chemical or a structurally similar chemical.

- **Neurotoxin:**
A chemical that adversely affects the structure or function of the central and/or peripheral nervous system.

- **Target Organ Toxin:**
Chemical that causes adverse effects to organs other than the reproductive or neurological systems. These organs typically include the liver, kidneys, blood producing organs, and lungs.

- **Highly Flammable Substance:**
A gas, liquid, or solid that readily catches fire and burns in air. A highly flammable substance has a flash point of room temperature or less.

An exposure occurs when a substance contacts or enters the body through one of the four exposure routes: inhalation, absorption, ingestion, or injection.

4. Training

The goal of employee training is awareness of both the hazards of their workplace and the precautions necessary to work safely. Safety training must be documented.

Lack of adequate training is one of the chief causes of safety compliance problems. People need to understand workplace hazards, which is especially critical in a laboratory environment where some of the chemicals may be particularly hazardous. Aside from potential chemical exposure, the spread of contamination is a vital concern which can be addressed by adequate training and reinforcement of good hygiene practices.

Listed in TABLE 6.2 are examples of weaknesses in the implementation of laboratory safety programs that have resulted in violation notices and even fines.

Notes:

A. Questions all laboratory personnel should be able to answer…correctly

Everyone who works in a laboratory should know the safe work and chemical storage practices to keep them healthy and prevent accidents. The questions below represent just a few of the important ones:

1. Do you wash your hands before leaving the laboratory?

2. Do you wear appropriate gloves, lab coat and splash goggles whenever you work with chemicals in the lab?

3. Are the appropriate hazard signs posted on cabinet doors and designated areas and are emergency numbers posted?

4. Are all containers in your lab legibly labeled with identity and hazard warnings? *(Do you know how to interpret the labels?)*

5. Do you know where to find Material Safety Data Sheets for all chemicals in your lab? *(Have you ever looked at any of them?)*

6. Are the chemicals stored in your lab sorted by hazard class in appropriate shelves or cabinets?
   (Do you know what the different hazard classes are?)

7. Have you been instructed in the use and handling of the chemicals and equipment in your lab?

8. Have you been instructed in the location and use of safety devices such as eyewashes, safety showers and fire extinguishers?

9. Are you aware of emergency procedures in the event of a spill, uncontrolled chemical reaction, or building evacuation?

10. Do you know how to collect your waste, where the accumulation areas are, storage limits, and where to take full waste containers?

Containers of ethyl ether must have a date received written on them.

Notes:

TABLE 6.2 Common Laboratory Safety Weaknesses

Compliance Weakness	Regulatory References*
1. Unlabeled or improperly labeled containers	**8 CCR 5194 (f)(4); (f)(8)** **8 CCR 5191 (h)(1)(A)** **8 CCR 5164 (a)** **(Viol.M501) SFHC1117** **(Viol.M501) SFFC8001.7; 8**
2. Incompatibles stored together.	**8 CCR 5164 (a)** **(Viol M401) SFHC1116** **(Viol M401) SFFC8001.11.8**
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)** **8 CCR 5144 (c)(1)**
5. Lack of available MSDSs or knowledge of where the MSDSs are kept.	**8 CCR 5194 (g)(1)** **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** **8 CCR 3328 (c)**
8. Damaged electrical outlets and power cords *(e.g., frayed insulation near plug).*	**8 CCR 2510.4**
9. Expired or untagged hazardous waste	**22 CCR 66262.34 (e)(1)(c); (f)** **(Viol G501) SFHC1117** **(Viol G501) SFFC8001.7**
10. Inadequate or inconsistent training program	**8 CCR 5191 (f)(1)** **8 CCR 5194 (h)(1)** **8 CCR 3203 (a)(7)** **22 CCR 66265.16 (d); (e)**

* **CCR:** **C**ode of **C**alifornia **R**egulations
Title 8. Industrial Relations
Title 22. Social Security

SFHC: **S**an **F**rancisco **H**ealth **C**ode
SFFC: **S**an **F**rancisco **F**ire **C**ode

Notes:

B. Topics to cover with new employees

Everyone in a laboratory should know the physical and health hazards associated with chemicals in a particular work area before starting work. Also consider the consequences of losing electrical power or water pressure. What needs to happen to save research, equipment, and protect worker safety?

Educating inexperienced laboratory personnel is an ongoing process, however, new hires must receive sufficient basic training for them to begin their work knowledgeably and safely. The laboratory supervisor or principal investigator must cover the material with the level of detail he or she believes is necessary for this to happen. See **Appendix A: Safety Training** for more information.

- ☑ Location and availability of the Chemical Hygiene Plan and OSHA Lab Standard
- ☑ Definition and availability of Permissible Exposure Limits and reference materials
- ☑ Signs and symptoms associated with exposures to the chemicals used in your laboratory
- ☑ Methods and observations used to detect the presence or release of chemicals in the laboratory
- ☑ Physical and health hazards of chemicals you are using
- ☑ General and specific laboratory protocols and work practices
- ☑ Measures lab workers can take to protect themselves from exposure
- ☑ Disposal protocols for hazardous waste

Observing off-gasing, spilled material, and odors as well as monitoring air with colorimetric tubes are examples of available methods for detecting chemical releases.

5. Hazardous Materials Storage

Storing hazardous materials appropriately is an effective way of reducing the risks of working with such materials. The laboratory supervisor must provide the lab-specific details. In general, incompatible chemicals must not be stored together. Table 6.3 lists examples of incompatible materials that must be stored in separate cabinets or in separate secondary containers.

Notes:

TABLE 6.3 Common Incompatible Chemical Groups

Mineral Acids	**Do NOT Store with…**		
Hydrochloric acid	Hydrogen peroxide	Acetone	
Sulfuric Acid	Sodium hydroxide	Methanol	
PhosphoricAcid	Calcium hydroxide	Nitric Acid *(keep separate)*	
Nitric Acid[2]	Chloroform	Acetic Acid	
Strong Organic Acids	**Do NOT Store with…**		
Acetic Acid[3, 4]	Hydrogen peroxide	Acetone	Acetonitrile
Formic Acid	Sodium hydroxide	Methanol	Benzene
	Sulfuric Acid	Chloroform	
Special Notes:	1. Organic acids are varied and may be incompatible with each other. Check MSDSs for specifics 2. Store nitric acid separately in its own secondary container. It is a strong oxidizer. 3. Store acetic acid away from oxidizing agents — especially nitric acid. 4. Acetic acid *may* be stored with some inorganic acids and most flammable solvents but keep in a separate secondary container. (>70% acetic acid is combustible).		
Weak Organic Acids	These are typically not corrosive and not strongly reactive and can be stored with general liquid lab chemicals. Examples include butyric, maleic, and benzoic acids.		
Non-Flammable Chlorinated Solvents	**Do NOT Store with…**		
Methylene chloride	Acetone	Hexane	
Chloroform	Methanol	Nitric Acid	
Trichloroethane	Ethanol	Hydrogen Peroxide	
Carbon tetrachloride			
Organic Solvents	**Do NOT Store with…**		
Acetone	Hydrogen peroxide	Nitric Acid	
Methanol	Sodium hydroxide	Chromic Acid	
Phenol	Calcium hydroxide	Sulfuric Acid	
Xylene	Trichlorfluoromethane	Hydrochloric Acid	
Oxidizers	**Do NOT Store with…**		
Nitric Acid	Sodium metal	Paper and oily rags	
Hydrogen peroxide	Isopropyl Alcohol	Xylene	
Chromic Acid	Acetone	Sodium nitrate	
Perchloric Acid	Ethyl ether	Bromate salts	

Notes:

Organizing and Labeling Chemical Storage

Storage cabinets must be labeled with the hazard class or contents. SFSU had developed standardized storage cabinet labels for materials stored inside that are CORROSIVE, FLAMMABLE, OXIDIZER, TOXIC. Cabinets or containers that store radioactive or biohazardous materials must also be labeled appropriately.

It is also a good idea to label secondary containers as well because it makes it easier to keep chemicals organized. Avoid storing chemicals on the floor or on counters and keep incompatibles segregated. Maintaining organized storage is much more difficult than organizing it in the first place so check storage cabinets regularly.

6. General Safe Work Practices in Labs

Good laboratory procedure is also safe laboratory procedure. The lab instructor will discuss any special concerns before each experiment. There are, however, general operating practices for all laboratory work:

A. Precautions

1. Wear appropriate splash goggles or safety glasses when working in the lab.
2. Keep long hair pulled back or tightly secured. Hair will burn if it contacts the Bunsen flame. Also take off or secure necklaces, loose bracelets, etc. before starting work.
3. Avoid inadvertent contact with chemicals by not eating, drinking or applying makeup. Don't taste any chemicals or place your nose directly into a beaker, tube or flask.
4. Don't sit or lean on lab benches. You don't know if residues of spilled materials are still there.
5. Use appropriate carts or chemical carriers when going to and from the stockroom.

It is all too easy for something to go wrong. Know what to do when the unexpected happens.

B. The Unexpected

6. Know where the exits, safety shower, eyewash and fire extinguisher are.
7. If the evacuation alarm sounds, turn off all apparatus and leave the room for the nearest safe exit.

Notes:

8. Note that spills could cause exposure problems and that many chemicals burn right through clothing. Unless instructed otherwise, wear a lab coat or apron and shoes that cover your feet completely. Avoid shorts and short skirts in the lab – wear long pants)

9. If you have a chemical spill, alert your instructor right away. He or she will either help you clean it up or show you how to clean it up safely. Wash off spilled materials promptly and thoroughly.

C. Housekeeping and Hygiene

10. Check glassware for cracks or damage. Do not throw broken glassware into trash but rather in a sharps container or marked box.
11. Note that hot and cool glassware look the same. Make sure your glassware is cool before you touch it or hand it to someone else.
12. Keep flammable liquids and ignition sources well separated. Many chemicals will burn and flammable vapors tend to flow across table and counter tops.
13. Place a clear and readable label identifying your reagents, products, etc. on each container.
14. Put unused reagents or products of reactions into appropriate labeled containers as directed.
15. Wash your hands immediately after leaving the laboratory and after possible chemical contact.
16. Take off gloves and lab coat when leaving the lab (especially to use restrooms or elevators).
17. Store food and beverages in a snack room or designated area -- they don't belong in the same area with hazardous materials.
18. Put signs on refrigerators and freezers that designate them as intended either for storing food or for storing chemicals or biological materials.
19. Return assigned equipment to the stockroom when finished. You will be charged a replacement fee for all lost or damaged items.
20. Choose, use and store personal protective equipment, such as reusable gloves, goggles, and respirators appropriately and as required by applicable regulations and policies. Keep PPE in a clean container away from contaminants.

Signs and symptoms of exposure include dizziness, nausea, eye or throat irritation, red or itchy skin, and marked skin color changes.

Notes:

Work Specific Information

(e.g., List work that must be performed in a fume hood)

Notes:

☐ Hazardous Waste

When improperly managed, hazardous wastes pose potential harm to human health and the environment. Every student, faculty and staff member is responsible for handling, labeling, and storing waste according to campus guidelines. Infractions put the campus at risk of civil fines and possibly even criminal prosecution.

Highlights

- ☑ Waste accumulation area
- ☑ Identification tags
- ☑ Waste collection protocols
- ☑ Non-hazardous waste disposal

1. Waste "accumulation" area

- ☑ Assign a hazardous waste collection area in or near the laboratory or shop.
- ☑ Post a sign designating this area as the "Satellite Accumulation Area" (SAA) for your hazardous waste.
- ☑ Store waste separately from stock or "non-waste" chemicals and other waste types. Chemically hazardous waste must be segregated from other types of contaminated waste.
- ☑ Inform lab or shop personnel that an SSA is a discrete portion of the laboratory where special EPA regulations apply. Government inspectors look at these areas very closely to make sure they are in compliance.
- ☑ Ensure that the amount of lab waste accumulated is appropriate for the space limitations. You must be able to safely manage the containers and separate incompatible laboratory hazardous wastes.

The date on the hazardous waste identification tag is the date the container received its first drop of waste.

Notes:

2. Waste identification tags

☑ Make it clear that the person who generates the waste is responsible for identifying, labeling and tagging the container. The PI or Lab Supervisor is responsible for enforcing the practice.

☑ The PI or Lab Supervisor must ensure that waste is correctly segregated and labeled according to campus policy.

☑ Note that the stockroom is NOT responsible for identifying wastes or filling out waste ID tags for others.

San Francisco State University
1600 Holloway Avenue
San Francisco, CA 94132

HAZARDOUS WASTE

State and Federal law prohibits improper disposal of hazardous waste.
If found, please contact University Police Department at (415) 338-2222, the U.S. Environmental Protection Agency or the California Department of Toxic Substance Control.

ACCUMULATION START DATE 12 / 5 / 2002

1. Waste Generator:

Generator Name Dr. J. Livingston

Department Chemistry & Biochemistry Ext. 8-1449

Generation Location:

Building Hensill Hall Room 123

Cabinet ____ Hood X Shelf ____ (check one)

2. Type of Waste:

a. Discarded (unmixed) chemical ____

or

b. Mixed chemical waste – List component(s)/% of mixture

1. Water / 60%
2. Ethanol / 20%
3. Methanol / 10%
4. Acetone / 10%
5. ____ / ____

3. Physical State (circle one):

Solid (Liquid) Gas Sludge Slurry

4. Weight or Volume: __ gm __ kg __ mL 3 liter __ gal

5. Waste Properties: (circle all that apply)

(Flammable)	Oxidizer	(Toxic)	Corrosive	Irritant
Explosive	Acid	Base	Carcinogen	Mutagen
Pyrophoric	Reactive	Heavy metals	Bio-Hazard	Peroxide forn

Other hazard information ____

pH ____

6. Preparer's Signature *Dr. Jordan Livingston*

EH&OS SECTION ONLY

1. Date received at Hazardous Waste Shed: __ / ____ / __
2. Waste Contractor: This waste was:

____ Lab Packed or ____ Bulk into Drum # ____

Removed AS IS on ____ / ____ / ____

HAZARDOUS WASTE

Hazardous waste may stay in the Satellite Accumulation Area for up to 60 days.

Notes:

2. Waste Collection Protocols

- ☑ Obtain a waste disposal bottle from the stockroom
- ☑ Affix a COMPLETED hazardous waste ID tag to the bottle
- ☑ **Separate wastes** according to chemical compatibility and waste type. Waste types to store in separate areas or secondary containers include: biohazards; radioactive, broken glass; solid waste; and chemical hazardous waste.
- ☑ Keep waste containers closed when not adding waste. When finished, do not leave funnels in containers.
- ☑ Wipe off spilled materials on the outside of containers to minimize inadvertent exposure to the material.
- ☑ When waste containers are full OR it has been **60 days** since the first drop of waste was added, take them to the stockroom for collection and disposal.
- ☑ Do not mix wastes unless directed to do so by the lab supervisor.
- ☑ Collect waste in appropriate containers. Do not pour into sinks or trash.

Label your containers. Lab costs for identifying unknowns can cost thousands of dollars!

4. Non-Hazardous Wastestreams

- ☑ Justify and document the reasoning for declaring a lab waste as "non-hazardous". Non-hazardous means it is not flammable, corrosive, water or air reactive, explosive, or toxic to people or fish nor is it on one of the lists of hazardous waste ("listed waste") in state or Federal regulations.
- ☑ If you think a waste stream you generate isn't hazardous, obtain a **"Waste Analysis Worksheet"** from the COSE Health & Safety Specialist, fill it out and have it reviewed by campus EHOS. See Figure 3 for an example.

Notes:

Petition for Non-Hazardous Waste Status

Principal Investigator(s): _____
Please print

Date Submitted to EHOS: _____ Room(s) Affected: _____
Building & Room no.

To the best of your knowledge, list the make up of your wastestream below.

Chemical/Product/Material Name	Approx. %	Comment

Explain why you believe the waste is not hazardous and can be emptied in the sink or discarded in regular household trash.

_____

Please check one.

☐ The waste was tested and did not have the "characteristics" of hazardous waste AND it is not prohibited by SFSU's wastewater discharge permit AND is not listed in Cal-EPA regulations found in *22 CCR 66261.100 RCRA* *22 CCR 66261.101.Non RCRA*
Attach test results.

- ◆ Not Flammable
- ◆ Not Corrosive
- ◆ Not Reactive
- ◆ Not Explosive
- ◆ Not Toxic to Humans
- ◆ Not Toxic to Fish

☐ Through my personal knowledge and experience, I have determined that this wastestream is not hazardous by its "characteristics" AND is not prohibited by SFSU's wastewater discharge permit AND is not listed in Cal-EPA regulations as hazardous waste.

_____
Signature of Principal Investigator

For Office Use Only

The SFSU Director of Environmental, Health, & Occupational Safety has reviewed this petition.

Based on the information presented, this petition is ☐ **Approved** ☐ **Not-Approved**

Reason: _____

Signature: _____ Date: _____

Work Specific Information

List the waste generated by your work area.

_____

_____

_____

Notes:

_____

_____

_____

_____

_____

☐ Biohazard Controls

Biohazardous materials and waste are regulated by the State of California through the California Medical Waste Management Act and by Cal-OSHA's Bloodborne Pathogen Prevention Standard. All laboratory personnel must understand both the hazards of biological materials they handle and how to protect themselves from those hazards.

Highlights

☑ **Biohazard Control Plan**

☑ **Bloodborne pathogens**

☑ **Biohazardous materials**

☑ **Autoclaved waste**

1. Biohazard Control Plan

The COSE has established a Biohazard Control Plan to provide guidance and consistency in handling and disposing of materials that are potentially biohazardous. This subsection is a brief overview of that plan. Contact your department safety coordinator, before using biosafety level 2 or 3 organisms, and to obtain a "Biological Use Authorization" form and a copy of the Biohazard Control Plan.

The term "Universal Precautions" means treating all biological materials as if they were pathogenic or otherwise harmful.

☑ **Hygiene and Housekeeping:** Keeping work areas clean and uncluttered reduces the chance for cross-contamination and inadvertent exposure to biohazards.

- Wash hands after removing gloves, before leaving the lab, and after handling contaminated materials.
- Perform procedures in a manner that minimizes the creation of aerosols.

☑ **Personal Protective Equipment:** Gloves and protective eyewear must be worn for all procedures that might involve direct skin or eye contact with toxins, bodily fluids, infectious materials, or infectious animals.

Notes:

- Wear the right glove for the hazard. Usually a type of latex glove is recommended for biohazardous materials.
- Remove gloves before leaving the lab, touching the face, keyboards, or control panels.

☑ **Security and Access:** It is good practice to keep an accurate inventory and limit access to trained and authorized people to areas containing Class 2 and higher hazard organisms.

- Post a hazard warning sign indicating the risk level of the organism(s) being used outside each entrance.
- Advise pregnant women or immuno-compromised people who enter the laboratory of the associated risks.

2. Bloodborne Pathogens

The presence of bloodborne pathogens in the workplace is regulated by Title 8 CCR 5193, Bloodborne Pathogens. The targeted pathogens specifically include, but are not limited to, human immunodeficiency virus (HIV) and hepatitis B virus (HBV). For more information, ask your department safety coordinator for a copy of the Bloodborne Pathogen Exposure Control Plan.

Wear gloves and eye protection every time you handle potentially contaminated material.

☑ Report known or suspected contact with human bodily fluids, pathogens, and other biohazardous materials to the EHOS Office or Student Health Center as soon as possible.

☑ Understand that medical and emergency personnel, and others with exposure to human blood or bodily fluids, may opt to be immunized for HBV. The HBV vaccine is also available post-exposure following a medical evaluation. Contact the campus EHOS office at x8-1449.

☑ Use **Universal Precautions**. Treat all bodily fluids, animal parts and other potentially hazardous materials as if you know they are contaminated with a pathogen.

Notes:

3. Biohazardous Materials

Treat biological materials with caution and respect. While most are not pathogenic, many can cause environmental problems if not handled and disposed of properly. With the exceptions noted below, all microbiological and biohazardous material must be autoclaved before disposal.

☑ **Autoclavable materials include**

- cultures and stocks of microorganisms from research or instructional labs;
- culture dishes, and devices used to transfer, inoculate and/or mix cultures;
- waste containing microbiological specimens or cultures; and
- waste from the production of bacteria, viruses, or spores.

☑ **The materials listed below may NOT be autoclaved:**

- Sharps containers: Separate broken glassware, syringes, and blades according to type of contamination and take to the Media Kitchen, stockroom, or SCI 213 for collection.
- Animal parts: Contact the Facility Animal Care Coordinator at x8-6336 for disposal of animal waste, carcasses, tissues or fluids.
- Human waste: Contact the Media Kitchen, stockroom, or campus EHOS for disposal of liquid blood, urine, tissues, and organs.
- Cadavers: The Anatomy Lab Coordinator and Biology Stockroom staff coordinate appropriate disposal of bodies.

Medical waste is ultimately taken to the Student Health Center for collection and taken away for disposal by a certified contractor.

Notes:

4. Autoclave Waste Disposal

Autoclaved waste has been sterilized with a combination of heat and pressure and rendered "clean". Become familiar with the protocol. Autoclaves are located in SCI 213E, TH 629, TH814, TH 815, HH 530, HH 617, HH632, and Trailer P-1 *(Media Kitchen)*. Procedures for using the autoclaves should be posted or otherwise available nearby.

- ☑ Use biohazard bags that are red or orange, and only put biohazardous or potentially contaminated materials into them.
- ☑ Make sure the bags have a label or tag identifying the PI or lab manager, the date the container was full, and the room number.
- ☑ Remember to record the sterilization in the log book.
- ☑ Allow the bags to cool after sterilization.
- ☑ Confirm sterilization before disposing into the trash.

  To confirm sterilization, use either a heat-sensitive indicator-type bag that reads "autoclaved" after sterilization or a bag with a strip of heat-sensitive tape.

- ☑ After sterilization, place the red bags into an opaque and sturdy trash bag. Make sure the bag is "rendered unrecognizable: i.e., no red/orange is showing.
- ☑ Tie bags securely closed before disposing in trash.
  Do not overfill the trash bag.

The generator of the waste is responsible for labeling and securing containers.

Work Specific Information

List the biological materials used and where waste is accumulated and/or disposed of:

_____ _____

_____ _____

_____ _____

Notes:

_____

_____

_____

_____

_____

☐ Lasers and Radioisotopes

At SFSU, radioisotopes are used primarily in biology and biochemistry research. A campus Radiation Safety Program is managed by the SFSU Radiation Safety Officer and monitored by the Radiation Safety Committee. Prior approval of this committee is required before any radioisotope is brought onto campus. Contact the RSO at x8-6892 for information and training.

While the use of radioisotopes is waning at SFSU, lasers have become increasingly popular in research and in classrooms. The College of Science and Engineering (COSE) has a written Laser Safety Plan that covers the use of lasers and is overseen by the Non-Ionizing Radiation Committee.

Highlights

- ☑ Radiation and Laser Safety Plans
- ☑ Radiation and Laser Safety Committees each meet at least once during the semester
- ☑ Prior approval is required to use radioisotopes and high energy lasers
- ☑ Hazards of Laser Pointers

The campus program and use of radioactive materials is reviewed annually by a state inspector.

1. Written Radiation and Laser Plans

The written Radiation Safety Program and Laser Safety Plan both require an application process, training prior to use, and annual inspections by Committee members or third parties. In addition, both require a designated Radiation Safety Officer (RSO) and Laser Safety Officer (LSO), respectively. For more details, ask your Department Safety Coordinator , the RSO (x8-6892), or the LSO(x8-6892) for a copy of the particular plan you need.

2. Ionizing Radiation at SFSU

If you are planning to use radioisotopes of any kind, you must notify the SFSU RSO BEFORE bringing the material onto campus .An approved

Notes:

Radiation Use Authorization is required before starting work. In addition, a training session in radiation safety is required to be an authorized user. X-ray machines and other radiation-producing machines must be approved by the RSO before they are permitted on campus.

For more information, contact the SFSU Radiation Safety Officer at x86164.

3. Class 3B and Class 4 Lasers

The COSE Laser Safety Plan applies to the purchase and use of Class 3B and 4 lasers. These are considered high energy lasers and can cause eye damage if not used correctly. Documented laser training, purchase of correct protective eye wear and implementation of effective controls are the responsibility of the Principal Investigator or Lab Manager.

Wherever class 3B or class 4 lasers are used the PI or lab supervisor must implement the following minimum protocols:

- Post a applicable DANGER sign prominently at each entrance to the laser area.
- Establish and enforce a visitor policy to control access.
- Arrange the operation so that no stray beams can leave the table or other designated laser area.
- Choose eye wear approved by ANSI (American National Standards Institute) for the particular wavelength(s) of the laser.
- Establish rules for when eye protection, power lockouts, and maintenance are required.
- Train all lab personnel who work with or around the laser(s) in the relevant safe work practices. The video entitled "Introduction to Laser Safety and Laser Hazards" is available for orientations. Contact the COSE Laser Safety Officer at x8-6892 for training materials or to schedule an orientation session.

If you are planning to use a high energy laser, you must obtain an approved Laser Use Registration form along with a review of COSE laser protocols BEFORE you are permitted to use the device.

Class 3B lasers have a power output in the range of 5-500mW ($\leq$ 10J/cm^2 if pulsed). Class 4 lasers are any type above this.

Notes:

For more information or a copy of the Laser Use Plan, contact the COSE Health and Safety Specialist at 8-6892, who also serves as the LSO.

4. Laser Pointers (from the LBNL laser training manual)

Originally used as tools by educators in the classroom and by business people at meetings, laser pointers are now cheap and widely available to the general public. Currently, there are no federal restrictions to purchasing laser pointers but FDA has issued a warning urging such pointers to be used only as intended by adults.

A. Background

A laser pointer contains a small diode laser that emits an intense beam of light. Most laser pointers contain low to moderate powered lasers that do not pose a serious risk of eye injury unless intentionally misused. However, some of the newer imported laser pointers, especially those with green beams, present a significantly increased risk of eye injury.

B. Hazards

Direct viewing of the laser beam may cause temporary flashblindness (temporary vision impairment after viewing a bright light), headaches, afterimages (perception of spots in field of vision) or glare (reduction or loss of visibility in field of vision). Besides the risk of injury from the beam, loss of concentration or retaliation by angry people may promote other hazards.

Observe your surroundings when using laser pointers and don't treat them as toys. Never point beams into eyes.

Notes:

C. Safety Considerations With Laser Pointers

- Never look directly into the laser beam
- Never point a laser beam at a person
- Don't aim the laser at a highly reflective surface
- Don't allow children to use laser pointers without adult supervision
- Only use laser pointers meeting the following criteria:
  - Classified as Class 2 or 3A, no higher
  - Power output less than 5 mW
  - Wavelength between 630 nm and 680 nm

Use of Class 3b or Class 4 lasers requires a Laser Use Registration application approved by the COSE Non-Ionizing Radiation Committee.

Notes:

☐ Codes of Safe Work Practices

Supervisors and Principal Investigators will review relevant safe work practices and procedures with you.

1. Using Fume Hoods

☑ Keep fume hood exhaust fan on at all times. Don't turn it off!

WHY? Fume hoods are a part of the room's ventilation system.

☑ Close the sash when hood is not being used.

WHY? Prevents contents inside hood from off-gasing to the rest of the room and maximizes ventilation inside to prevent build-up inside hood area.

☑ Position the sash so that your arms can extend under or around the sash keeping the glass between you and the chemical source.

WHY? Protects your breathing zone and face from unexpected reactions or splashes.

☑ When working with hazardous chemicals, the bottom of the sash should be lower than the user's chin, ideally between 12-18 inches.

WHY? Laboratory studies show that this height allows maximum draw while preserving space to work and ability of sash to serve as splash protection.

☑ Place chemical sources & apparatus at least 6 inches behind the sash face.

WHY? Quantitative containment tests reveal that the concentration of contaminant in the breathing zone can be 300 times higher from a source located right in front than from a source farther back -- due to turbulence.

☑ Place equipment as far to the back of the hood as practical without blocking the baffle(s).

WHY? This allows you to maximize your space but note that baffles are essential to maintaining proper airflow .

Fume hoods undergo an annual function check by campus EHOS.

Make sure air is moving through a hood before using it.

☑ Elevate instruments and storage containers on blocks.

WHY? This allows air to flow more easily around apparatus and through the baffles.

☑ Avoid storing large equipment or a lot of chemicals inside the hood.

WHY? This practice can cause dead spaces in the airflow and reduce efficiency.

☑ Avoid opening and closing the fume hood sash rapidly or making swift arm and body movement in front of or inside the hood.

WHY? These actions can increase turbulence and reduce effectiveness of containment.

Notes:

☑ Don't modify the fume hood in any way, including adding or removing the sash, baffle, airfoil, and exhaust connections.

WHY? Unauthorized changes to the design can adversely affect hood performance & user's potential exposure.

☑ Report malfunctioning fume hoods right away.

(Call your stockroom, safety coordinator or EHOS Fume Hood Coordinator- x8-1449).

2. Handling Compressed Gas Cylinders

Compressed gas cylinders can be extremely hazardous if mishandled. Call the Chemistry Department stockroom at x8-2259 for assistance with gas cylinders. The contents in a cylinder are under pressure and many compressed gases are hazardous. Hazards include

☑ mixing of incompatible gases;

☑ asphyxiation;

☑ explosion from leaking valves; and

☑ sudden release of pressure (the torpedo effect).

A. Cylinder and Valve Protection

A cylinder's cap protects the valve on top. It should be screwed all the way down on the cylinder's neck ring and should fit securely.

Use a cylinder cart to move gas cylinders and check that safety caps are on tight.

- Always secure cylinders individually in an upright position to a wall, cylinder rack or post with two straps or chains (at top and bottom thirds of the cylinder).
- Secure safety caps on gas cylinders when storing or moving them
- Do not use cylinders for any purpose other than the transportation and supply of gas.
- Do not lift a gas cylinder by its safety cap.
- Do not transport a cylinder without its safety cap.
- Do not drop cylinders or permit them to strike anything violently.
- Do not attempt to repair cylinder valves or their relief devices while a cylinder contains gas pressure.

Notes:

B. Using a Gas Cylinder

Before attaching cylinders to a connection, be sure that the threads on the cylinder and the connection mate are of a type intended for the particular gas you are using. Don't try to force it. The vendor is responsible for labeling each cylinder, but if there is any doubt, contact the chemistry stockroom manager at x8-2259.

- Always use the proper regulator for the gas in the cylinder.
- Check the regulator before attaching it to a cylinder. If the connections do not fit together readily, a wrong or inadequate regulator is being used.
- Clean the threads and mating surfaces of the regulator and hose connections before attaching them.
- Always use a cylinder wrench or another tightly fitting wrench to tighten the regulator nut and hose connections.
- Attach the regulator securely before opening the valve.
- Stand to the side of the regulator when opening the cylinder valve.
- Open cylinder valves SLOWLY. Do not use a wrench to open or close a hand wheel type cylinder valve. If it cannot be operated by hand, the valve should be repaired by the vendor.
- Do not "crack" (open and close quickly before attaching regulator) hydrogen, fuel-gas, pyrophoric or toxic gas cylinder valves - just wipe out the outlet connections with a clean, dry, lint-free cloth.

Do not store cylinders on a cart, instead, secure them to a fixed object or heavy furniture with two straps or chains.

C. Storage and Handling

Gas cylinders are stored in designated areas on the loading dock behind Hensill and Thornton Halls. Contact the stockroom if you need gas.

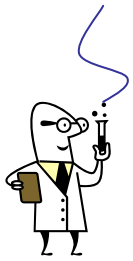
- Store cylinders in a well-ventilated area away from open flames, sparks or electrical circuits and any source of heat or ignition. Never store cylinders at temperature above 130 degrees F.
- Disassemble set-ups on gas cylinders that are not currently "in use" and place them in storage until they are needed again. Do not store gas cylinders with regulators attached, instead replace safety caps.
- Secure gas cylinders in two places at approximately the top and bottom thirds.

Notes:

- Protect cylinders stored outdoors from the ground to prevent bottom corrosion. They should also be protected from direct sunlight, continuous dampness, salt or other corrosive chemicals or fumes.
- Remove leaking cylinders or cylinders with stuck valves to a safe, well-ventilated location (such as a walk-in hood or secure outdoor area), and call x8-1449 (EHOS Dept) for assistance/advice immediately.
- Store oxygen and nitrous oxide cylinders (empty or full) away from flammable or fuel-gas cylinders and combustible materials by a minimum distance of 20 feet or by a barrier at least 5 feet high having a fire-resistance rating of at least one-half hour.
- Separate full and empty cylinders of all gases and identify the storage areas by signs to prevent confusion.
- Do not let oil or grease contact cylinders or their valves.
- Do not charge, ship, accept delivery of or use any cylinder that is not provided with a legible decal that identifies its contents.

3. Electrical Power

When performing maintenance or repairs on equipment, you must turn off the power and lock-out the power source .



Arrange to have permanent installations properly wired with a legal outlet. Extension cords are only a *temporary* solution to powering new equipment.

- If you must use an extension cord, protect it from damage by not wedging it against furniture, pinching it in a doorway, or allowing it to lie exposed in a walkway.
- Use heavy duty extension cords for computers, analytical instruments, and other high wattage equipment that are approved by Underwriters Laboratory (UL) or Factory Mutual (FM).
- Avoid using multiple outlets (like splitters) that don't have ground fault circuit interrupters (GFCIs).
- Make sure high wattage appliances (i.e., computers, laser printers, copiers) don't overload circuits.
- Replace frayed or damaged cords and plugs. The COSE has an electronic service technician that may be able to replace or repair it. (You are only charged for parts.)

Notes:

- Place broken outlets and equipment with broken power interlocks and guards out of service. Arrange for repair or disposal.
- Don't modify or 'jury rig" electrical equipment.
- Leave electrical and circuit breaker cabinets alone and leave a 3 foot space in front of them, if possible. At the very least, make sure they are freely accessible in an emergency.
- Inappropriate Use of Extension Cords
    1. Using as permanent wiring
    2. Overloading power capabilities during temporary use
    3. Daisy chaining, plugging one extension cord into another, then another, or using one power strip to power another.

4. Slips, Trips, Falls

- Pick up or move food or other clutter on stairs and in hallways so no one will slip or fall.
- Clean up spilled liquids promptly or try to mark it in some way to alert others.
- Barricade openings or damaged areas on the floor if you can. Report such problems to your department safety coordinator as soon as possible.
- Securely tape or cover extension cords that lie across aisles or doorways.

Avoid storing heavy items or chemicals on high shelves.

5. Using Fire Extinguishers

Unless you have been trained in using fire extinguishers, report a fire or pull the alarm right away and close the door. Non-fire department personnel, who have had training, may put out fires in the "incipient" stage.

For fire to continue burning, it must have oxygen, fuel, and heat. Removing any one of these will eventually cause the fire to burn itself out. Fire extinguishers work by either smothering (removing oxygen) or cooling (removing heat) the fire source (fuel).

Notes:

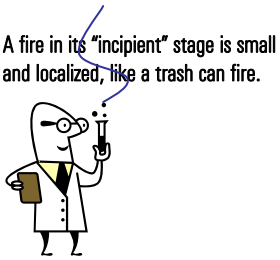
If it is safe to do so, try to remove possible fuel around the fire, such as papers, trash, and flammable liquids.

- ☑ Fire extinguishers are usually mounted by exits on a peg or in a cabinet.
- ☑ To use an extinguisher in a cabinet, break the glass with your shoe or other implement. It's okay. If you need it….do it.
- ☑ An ABC dry chemical type agent is good for the following fuels:
  - Type A: Wood, paper, cloth
  - Type B: Flammable gas/liquids
  - Type C: Electrical Fires
- ☑ Halon and CO2 extinguishing agents work well on electrical fires and minimize cleanup and equipment damage.

Use Instructions

You must break the plastic seal on the extinguisher before you can use it.

- ☑ Point the nozzle toward the **base** of the fire – where it burns the hottest and where the unburned fuel is located.
- ☑ Spray the agent back and forth along the base of the fire.
- ☑ Make sure you have a clear way out of the area if the fire gets too big or out of control.
- ☑ Leave the area if your safety is in danger and pull the lever on the fire "pull-station". Inform others working nearby and begin evacuating.



More detailed instructions are available in the COSE Emergency Guidelines and the COSE Chemical Hygiene Plan. A short video entitled: "Fire Extinguishers"(run time: 5min, 40 sec), available from the COSE Health and Safety Specialist, discusses types of fires and demonstrates how to use a fire extinguisher.

Notes:

Appendix A: Training Information for Supervisors

Safety Orientation Topics	Example/Tip
1. Location and availability of the Chemical Hygiene Plan, IIPP, & other written safety/health plans.	Where documents are posted or stored. Which room, drawer, wall or shelf?
2. Evacuation procedures and work-specific emergency response.	Location of emergency equipment, like the eye wash. Discuss building evacuation procedures. Provide instruction on what to do if the power, steam or water goes out and which equipment must be shut down in emergencies.
3. Fire hazards and instruction in using fire extinguishers	Location of fire extinguisher. Discuss flammable and combustible materials and processes that have the potential for starting a fire.
4. Common work place hazards and how to prevent injury.	Ergonomic issues with computers and microscopes, slips and falls, electrical and fire hazards.
6. Definition and availability of Permissible Exposure Limits (PEL). Demonstrate how to obtain an MSDS.	Permissible Exposure Limits for chemicals you commonly use in your work. See the MSDSs for PELs and other health information..
7. Physical and health hazards of chemicals you are using	Methanol is highly flammable and reactive to strong mineral acids and oxidizers. Can absorb through skin, prolonged contact causes skin to dry out. Exposures above PEL can cause irritation to eyes and central nervous system effects.
8. Signs and symptoms associated with exposures to the chemicals used in your laboratory	Exposure to escaped corrosive vapors include irritated throat and stinging eyes. Exposure to methanol above the PEL can cause eye irritation, headaches, blurred vision and drowsiness while lengthy contact with skin can cause dryness.
9. Methods and observations used to detect the presence or release of chemicals in the laboratory	Examples include fume hoods with alarms or other function indicators such as a tape strip as well as spilled materials on surfaces, crystals formed on lids, pungent odors, indicator strips or monitors.
10. Measures lab workers can take to protect themselves from exposure	Demonstrate the correct use of safety goggles, gloves, and fume hoods.
11. Standard operating procedures and work practices.	Review basic hygiene, operating techniques and task-specific SOP's.
12. Disposal protocols for the waste you generate.	Show your accumulation areas and demonstrate how to obtain and fill-out waste tags.

Notes:

Appendix A: Safety Training for Principal Investigators & Supervisors

To help you cover the material necessary for a newly hired person to work safely, consider whether he or she will use, or be in the proximity of, the following hazards:

Chemicals? (including oil, buffers, cleaners, fuels, solvents)	**YES**	**NO**
Biohazardous or microbiological materials?	**YES**	**NO**
Human bodily fluids of tissues?	**YES**	**NO**
Live animals for research?	**YES**	**NO**
Radioisotopes or X-rays?	**YES**	**NO**
Lasers or ultraviolet light?	**YES**	**NO**
Power tools, machine tools, or welding rigs?	**YES**	**NO**
Compressed gas cylinders?	**YES**	**NO**
Cryogenic materials?	**YES**	**NO**
High voltage (660Vor greater) equipment?	**YES**	**NO**
Registered Cal-OSHA carcinogens?	**YES**	**NO**
Field work or driving on University business?	**YES**	**NO**
SCUBA diving?	**YES**	**NO**
Other hazardous operation? Describe:	**YES**	**NO**

***Will the new hire supervise other people?** (i.e., part-time research lab managers, teaching lab instructors, research assistants)	**YES**	**NO**
Will the people supervised by this person work with any of the listed hazards?	**YES**	**NO**

* People who supervise others must have extra training to be sure they are familiar enough with the hazards and safety protocols to enforce them.

Notes:

Appendix B:

Access to Medical and Exposure Records

By Cal/OSHA regulation,
General Industry Safety Order 3204,
you have the right to see and copy these records:

- Your medical records and records of exposure to toxic substances or harmful physical agents.
- Records of exposure to toxic substances or harmful physical agents or other employees with conditions similar to yours.
- Material Safety Data Sheets or other information that exists for chemicals or substances used in the workplace, or to which employees may be exposed.

These records are available at or may be requested from

SFSU Office of
Environmental, Health, and Occupational Safety (EHOS)

Location: **Science 107** Telephone: **415-338-1449**

A copy of the General Industry Safety Order (GISO) 3204 is available from

(1) **Cal/OSHA's Website at**
http://www.dir.ca.gov/DOSHPol/P&PC-38.HTM

(2) **Linda Vadura, COSE Health & Safety Specialist**

TH216 **338-6892**

Email: lvadura@sfsu.edu

http://www.sfsu.edu/~safety/

The above information satisfies the requirements of GISO 3204 (g), which may be done by posting this placard in the workplace or any similar method the employer chooses.

Notes:

Appendix C: SFSU Risk Management

1. California's Workers' Compensation Insurance Benefits

(Excerpted from the following documents: "If you are hurt on the job" brochure from Office of Risk Management and "Notice to Employees" poster)

Medical Care

When a job injury occurs, first aid and medical treatment are provided immediately, as required by the nature of the injury, at no cost to you. During the first 30 days following the injury, you will be seen by a doctor designated by the Office of Risk Management.

If you still need care 30 days after reporting the injury, you may be treated by a physician of your own choice. If you prefer, you may pre-designate your personal medical provider in writing to Human Resources.

Death Benefits

Should a work injury cause death, a benefit will be paid to your dependents.

Disability Income

If hospitalized, or unable to work for more than three days, you will receive income equal to two-thirds of your average weekly pay, up to a legal maximum per week. If the injury results in permanent disability, decreasing your ability to work, additional payments will be provided.

If injured on the job, University employees are eligible for these benefits. Employees include lecturers, student teaching associates, work study, faculty, staff, and "official volunteers".

Vocational Rehabilitation

If the injury or illness prevents you from returning to your same job, you may be eligible for vocational rehabilitation and retraining.

When seeing a medical provider following a work injury,

- ✓ Tell the doctor or healthcare provider that you are a SFSU employee and that you were hurt on the job
- ✓ Get a Workers' Compensation Claim form (SCIF 3301) from your supervisor, Office of Risk Management or Student Health Services.
- ✓ Complete and return the Workers' Compensation Claim form to your supervisor or send the claim form directly to the Office of Risk Management.

Notes:

Website: **http://www.sfsu.edu/~riskmgmt/wc/welcome.html**

Off-Duty Recreational, Social, or Athletic Activity

Your employer or its insurance carrier may not be liable for the payment of workers' compensation benefits for an injury arising out of voluntary participation in off-duty recreational, social, or athletic activity not a part of the employee's work-related duties.

Warning: *Worker's compensation fraud laws make it a felony for anyone to file a false or fraudulent statement or to submit a false report or any other document for the purpose of obtaining workers' compensation benefits. Anyone caught performing these illegal acts will be prosecuted. If convicted, the penalty is up to 5 years in prison and/or up to a $50,000 fine.*

Claims Administrator:

Octagon Risk Services
"CSU Unit"
2101 Webster Street, Suite 900
Oakland, CA 94612
Phone: (888) 777-0012
FAX: (510) 452-1479

2. State Vehicles

All drivers of state vehicles are required to complete a Defensive Drivers course and have their driving records checked in order to become "approved" drivers. Contact the Office of Risk Management for details.

Website: **http://www.sfsu.edu/~riskmgmt/sv/welcome.html**

The COSE has additional requirements that must be met before being placed on the approved drivers list for college vehicles. Contact the Dean's Office x8-1571 for details.

3. Student Field Trips

- Only the faculty member(s) in charge and individuals enrolled in a course may participate in the field trips for that course. Individuals such as visiting faculty and assistants must have prior approval from the faculty member in charge.
- Before leaving for the trip, all participants must complete and submit a Field Trip Registration form with their relevant medical and emergency information. A signed Consent and Release form is also required.
- For travel to the site, students must make their own transportation arrangements – just as if class were on campus.
- Make sure trip hazards, such as heat stress, poisonous bugs and snakes, rough terrain, and other safety concerns are communicated to all trip participants.

Notes:

Appendix D: Respirator Program

1. COSE Filtering Facepiece Respirator Program

This program has been established by the College of Science and Engineering (COSE) in accordance with California Code of Regulations Title 8 Section 5144, Respirator Protection.

This program does NOT apply to the use of respirators[1] worn to protect employees from exposures to airborne contaminants above the Permissible Exposure Limits or otherwise necessary to protect employee health. Such "air purifying" respirators should only be issued when it is impractical to remove airborne contaminants through the use of engineering or administrative controls (i.e, fume hoods, glove boxes, housekeeping, special techniques).

A. COSE Policy

Departments in the COSE, may allow filtering facepiece[2] respirators (i.e., dust masks) to be worn on a voluntary basis, only if they are intended merely for the comfort of the employee while performing a particular task.

B. COSE Guidelines

1. Filtering facepiece dust masks must be certified to meet NIOSH standards for Class 95[3] particulate respirators.
2. Dust masks may only be worn by an employee on a voluntary basis for the purpose of comfort against nuisance-level particulates or aerosols.
3. Dust masks must be stored in a bag or box or otherwise protected from dirt or contamination.
4. Recipients are required to read the information sheet entitled, "Information for Employees Using Filtering Facepiece Respirators When Not Required" and sign it before being issued a filtering facepiece respirator (dust mask). There must be one on file for each wearer.
5. Employees must inform the COSE Health & Safety Specialist or University EHOS staff (x81449) if they are experiencing physical difficulty while wearing the mask or if they are concerned about overexposure to hazardous substances.

[1] dual or single cartridge, air purifying type

[2] negative pressure particulate filtering facepiece respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium. Note: "surgical masks" are not dust masks and are neither permitted nor suitable for non-medical purposes

[3] respirators that meet NIOSH 42 CFR 84 N95, R95, or P95 requirements

Notes:

Example of Comfort-Use Filtering Facepiece Respirator Acknowledgement Form.

Information For Employees Using Filtering Facepiece Respirators When Not Required

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers.

However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by Cal/OSHA standards.

If your employer provides filtering facepiece respirators for your voluntary use, or if you provide your own, you need to take certain precautions to be sure that the filtering facepiece respirator (hereinafter referred to as "dust mask") itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the dust masks's limitations.
2. Choose dust masks certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health, certifies respirators (not OSHA). A label or statement of certification should appear on the dust mask or packaging. It will tell you what the dust mask is designed for and how much it can protect you.

   *Note: COSE requires a **NIOSH 95 Series**[4] certification for all filtering facepiece respirators. A dust mask with this certification can provide some filtration of fumes and aerosols, however it cannot filter gases or vapors – you need an air purifying respirator with charcoal filter cartridges for that.*
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.
5. All respirators should be replaced whenever they are damaged, soiled, or causing noticeable increased breathing resistance.

I, _____ have read and understand the information contained within this information statement and agree to abide by its recommendations. I understand that if I use a filtering facepiece respirator (i.e., dust mask), it is voluntary and for comfort use only.

_____ _____

Signature *Date*

SFSU Respirator Program

If engineering, administrative, and work practice controls fail to maintain exposures below Permissible Exposure Limits (PELs), workers must use respirators to achieve that end. Employers must provide appropriate respiratory protection at no cost to workers, provide appropriate training and education regarding its use, and ensure that workers use it properly. *

*(source: OSHA Fact Sheet: Hazardous Chemicals in Labs, 2002)

The use of respirators for employee protection is governed under the University's filtering Respirator Program and only campus EHOS may issue such equipment after a thorough evaluation. An exposure evaluation, training, medical clearance, and fit testing are required before a respirator may be issued.

For more information or to obtain an (air purifying type) respirator, contact campus EHOS, at 338-1449.

Notes:

Appendix E: Heat Stress Outdoors

The Heat Illness Prevention Standard provides a solid foundation for employers to follow in protecting outdoor workers from heat-related illnesses and fatalities. But with the hot temperatures expected for the summer months, Cal/OSHA encourages employers to go beyond the basics in worker safety and take the initiative to provide a healthier work. For more tips and details, please go to Cal/OSHA's web site at **http://www.dir.ca.gov/DOSH/HeatIllnessInfo.html**.

In the College of Science and Engineering, the employees and students at risk of heat illness are those that go on field trips – either for a class or for research.

1. Heat illness types and symptoms

Heat stroke, the most serious health problem for workers in hot environments, is caused by the failure of the body's internal mechanism to regulate its core temperature. Sweating stops and the body can no longer rid itself of excess heat. See the attached "OSHA Quick Card" for more tips.

A. Heat Stroke

Victims of heat stroke will die unless treated promptly. Signs include:

- Mental confusion, delirium, loss of consciousness, convulsions or coma;
- A body temperature of 106 degrees Farenheit or higher; and
- Hot, dry skin which may be red, mottled, or bluish.

B. Heat Exhaustion

Heat exhaustion results from loss of fluid through sweating when a worker has failed to drink enough fluids or take in enough salt, or both. The worker with heat exhaustion still sweats, but experiences extreme weakness or fatigue, giddiness, nausea, or headache. The skin is clammy and moist, the complexion pale or flushed, and the body temperature normal or slightly higher.

C. Heat Cramps

Heat cramps, painful spasms of the muscles, are caused when workers drink large quantities of water but fail to replace their bodies' salt loss. Tired muscles used for performing the work are usually the ones most susceptible to cramps.

D. Heat Syncope

Fainting (heat syncope) may be a problem when a worker who is not acclimated to a hot environment simply stands still in the heat.

Notes:

E. Heat Rash

Heat rash, also known as prickly heat, may occur in hot, humid environments where sweat is not easily removed from the surface of the skin by evaporation. Heat rash that is extensive or infected can be so uncomfortable that it inhibits sleep and impedes a worker's performance, or even results in temporary or permanent disability.

Preventing Heat Illness

A. Four Main Considerations

1. Training
   Train all employees and supervisors about heat illness prevention.
2. Water
   Provide enough fresh water so that each employee can drink at least 1 quart per hour, and encourage them to do so.
3. Shade
   Provide access to shade for at least 5 minutes of rest when an employee believes he or she needs a preventative recovery period. They should not wait until they feel sick to do so.
4. Planning
   Develop and implement written procedures for complying with the heat illness prevention standard.

B. Other Considerations

1. Check the weather
   Develop a habit of checking the heat index; by anticipating heat waves you can be prepared for your next field trip.
   www.nws.noaa.gov/om/heat/index.shtml
2. Have pre-trip "tailgate" meetings
   Consider a short meeting to discuss heat illness issues and other relevant safety concerns before you start work.
3. Establish a buddy system
   People working together can monitor each other for heat stress symptoms and can get help if an injury, bite, or problem occurs.
3. Encourage adequate clothing and sunscreen use
   Wearing loose fitting, light-colored clothing and a wide-brimmed hat provides some protection from sun and heat. Remember sunscreen!

Notes: