

# CALIFORNIA STATE UNIVERSITY, FRESNO

## CHEMICAL HYGIENE PLAN



Office of  
Environmental Health and Safety

November 2014

## UNIVERSITY SAFETY POLICY STATEMENT

It is the policy of the California State University, Fresno to maintain, insofar as it is reasonably within its control to do so, campus laboratory environments for faculty, staff, students and the public that will not adversely affect their health and safety nor subject them to avoidable risks of accidental injury or illness. No employee or student shall be required to perform any task which is determined to be unsafe or unreasonably hazardous.

To accomplish this, departments shall provide facilities and equipment that meet all federal, state and local safety laws and regulations, and shall promulgate appropriate policies, standards and procedures for governing laboratory health and safety programs.

In addition to the overall responsibility for campus health and safety which rests with the President, the responsibility for taking corrective action rests with the College/School Deans, Directors, Department Chairs and Heads. The immediate responsibility for laboratory workplace health and safety belongs to each campus employee who performs a supervisory role. In addition, individual employees are responsible for preventing laboratory accidents. Accordingly, all faculty and staff are expected to take whatever actions are necessary to ensure that safe and healthful conditions and practices are provided and followed within the areas under their jurisdiction. I ask all members of the campus community to cooperate fully with all aspects of the various campus health and safety programs so that we may become a model for others to follow.

---

Joseph I. Castro  
President

---

Lynnette Zelezny  
Provost and Vice President for Academic Affairs

## TABLE OF CONTENTS

	Page
1.0 AUTHORITY .....	1
2.0 REGULATORY AGENCY.....	1
3.0 BACKGROUND .....	1
4.0 SCOPE.....	1
5.0 POLICY .....	1
6.0 OBJECTIVES .....	2
7.0 RESPONSIBILITIES .....	2
7.1 University Administration .....	2
7.2 Environmental Health and Safety, Risk Management & Sustainability.....	3
7.3 Chemical Hygiene Officer .....	3
7.4 Deans, Directors, Department Chairs, Department Heads .....	3
7.5 Principal Investigators and Supervisors.....	4
7.6 Laboratory Workers .....	4
7.7 Students.....	5
8.0 ELEMENTS OF THE PLAN .....	5
9.0 STANDARD OPERATING PROCEDURES .....	6
10.0 CRITERIA USED TO DETERMINE AND IMPLEMENT CONTROL MEASURES.....	6
10.1 Recognition of Potential Hazards .....	6
10.2 Hazard Identification .....	6
10.3 Evaluation of Potential Hazards.....	7
10.4 Exposure Control .....	7
10.5 Types of Control Measures .....	7
10.6 Selection.....	8
10.7 Review and Updating.....	8
11.0 CONTROL MEASURES .....	8
11.1 General Laboratory Ventilation .....	8
11.2 Local Exhaust Ventilation.....	9
11.3 Exhaust Hoods .....	9
11.4 Flammable Liquid Hazard Control .....	9
11.5 Emergency Eyewashes and Safety Showers.....	10

12.0 SPECIAL CONTROL MEASURES FOR PARTICULARLY HAZARDOUS CHEMICALS .....10

13.0 HAZARDOUS OPERATION APPROVAL PROCEDURES .....11

    13.1 Prior Approval and Review by the Chemical Hygiene Officer .....11

    13.2 Approval Procedure .....12

14.0 ENVIRONMENTAL MONITORING AND EMPLOYEE EXPOSURE DETERMINATION .....12

    14.1 Environmental Monitoring.....12

    14.2 Employee Exposure Determination .....12

15.0 EMPLOYEE INFORMATION AND TRAINING. ....13

    15.1 Frequency of Training.....13

    15.2 Employee Information .....13

    15.3 Employee Training.....14

16.0 MEDICAL MONITORING.....14

17.0 RECORDKEEPING .....14

18.0 EMPLOYEE ACCESS TO EXPOSURE AND MEDICAL RECORDS .....15

APPENDICES

- AA. Jordan Research Center
- A. Glossary of Common Toxic Agents
- B. Recommendations Concerning Chemical Hygiene in Laboratories
- C. NIOSH Carcinogens List
- D1. Reproductive Hazards
- D2. Pregnant Women in Laboratories
- E. Acutely Toxic Chemicals
- F. Incompatible Chemicals
- G. Regulations and Standards (CCR Title 8 Section 5191)

# **CHEMICAL HYGIENE PLAN**

## 1.0 AUTHORITY

California Code of Regulations (CCR), Title 8, Section 5191; CSU Environmental Health and Safety Program Development and Administrative Guide, Section 4.0; California State University, Fresno Injury and Illness Prevention Program.

## 2.0 REGULATORY AGENCY

California Division of Occupational Safety and Health, Department of Industrial Relations (Cal/OSHA).

## 3.0 BACKGROUND

3.1 The California Code of Regulations, Title 8, Section 5191, "Occupational Exposure To Hazardous Chemicals In Laboratories," adopted April 26, 1991, requires employers to develop and implement a written Chemical Hygiene Plan (CHP). The plan should be capable of protecting employees from health hazards associated with hazardous chemicals in laboratory environments and keeping employee exposures below permissible limits.

3.2 The procedures and methods outlined in the CHP shall be regular, continuing efforts, not merely standby or short-term activities.

3.3 Colleges and universities have also had to assume the additional challenge of administering instructional laboratories, where relatively inexperienced students must be introduced to the safety precautions necessary to conduct various laboratory operations.

## 4.0 SCOPE

4.1 The provisions of this regulation apply to all personnel who work in laboratory-type environments, including but not limited to: faculty; principal investigators; laboratory and stockroom technicians and supervisors; student assistants and technical assistants; building service engineers; and building trades and maintenance staff.

## 5.0 POLICY

5.1 It is the policy of the University to maintain, insofar as it is reasonably within its control to do so, campus laboratory environments for faculty, staff, students and the visiting public that will not adversely affect their health and safety nor subject them to avoidable risks of accidental injury or illness. No student or employee shall be required to perform any task which is determined to be unsafe or unreasonably hazardous.

- 5.2 To accomplish this, departments shall provide facilities and equipment that meet all federal, state and local (where applicable) safety laws and regulations, and shall promulgate appropriate policies, standards and procedures for governing campus health and safety programs.
- 5.3 While the overall responsibility for campus health and safety rests with the President, the immediate responsibility for laboratory workplace health and safety belongs to each campus employee who performs a supervisory role. In addition, individual employees are responsible for preventing laboratory accidents. Accordingly, all faculty and staff are to ensure that safe and healthful conditions and practices are provided and followed within the areas under their control, and all members of the campus community are to cooperate fully with all aspects of the various campus health and safety programs.

## 6.0 OBJECTIVES

- 6.1 When properly designed and implemented, an effective Chemical Hygiene Plan (CHP) will assist management in determining what hazards exist in laboratories, how to correct hazards that may occur, and what steps to take to prevent them from recurring.
- 6.2 When the University has established an effective system for implementing the provisions of the written CHP, the following objectives can be achieved:
  - a. Employee exposure to hazardous materials is reduced.
  - b. Employee exposures to hazardous materials are below acceptable limits.
  - c. The CHP is readily available to all employees.
  - d. The CHP is reviewed annually and updated as appropriate.
  - e. Laboratory equipment is inspected regularly and maintained in safe working condition.
  - f. Provisions are made for additional controls and employee protection for work with particularly hazardous chemicals.
  - g. Provisions are made for medical consultation and medical examinations.
  - h. Provisions are made for employee information and training.

## 7.0 RESPONSIBILITIES

### 7.1 University Administration

- a. The University President has ultimate responsibility for establishing and maintaining effective policies regarding environmental health and safety within the institution and should, with other administrators, provide continuing support for institutional chemical hygiene. Policies which govern the activities and responsibilities of the Environmental Health and Safety (EH&S) program are thereby established under the final authority of the President.

- b. It is recognized that certain responsibilities and expressed procedures in this program cannot be equally applied because of the wide diversity of operations within the University and the necessary differences in organizational structure within various departments. There are, therefore, some details which might be impossible or impractical for one department chair or department head to implement as directed while another would have no difficulty in applying every one. Departments will, therefore, have some latitude in formulating and implementing alternative methods when necessary as long as the total Chemical Hygiene Plan objectives are not compromised.

## 7.2 Environmental Health and Safety, Risk Management & Sustainability (EHSRMS)

It is the responsibility of EHSRMS to develop, implement and maintain a campuswide Chemical Hygiene Plan. Further responsibilities are outlined below:

- a. Provide consultation to College/School Deans, Directors, Department Chairpersons and Coordinators regarding program compliance. Consult on issues of hazard identification and evaluation; procedures for correcting unsafe conditions; determining and implementing control measures; employee information and training programs; employee medical monitoring; and recordkeeping.
- b. Provide centralized monitoring of campuswide chemical hygiene activities on a consultative basis.
- c. Maintain centralized environmental and employee monitoring records, allowing employee access as directed by law.

## 7.3 Chemical Hygiene Officer (CHO)

To assist in the implementation of the CHP, the Colleges/Schools may appoint one or more Chemical Hygiene Officers. It is the responsibility of the CHO, in conjunction with EHSRMS, to do the following:

- a. Work with administrators and other employees to develop and implement appropriate chemical hygiene policies and practices.
- b. Provide technical guidance to departments.
- c. Coordinate assessment of employee exposure to hazardous chemicals.
- d. Maintain currency on legal requirements concerning regulated substances.
- e. Seek ways to improve the chemical hygiene program.
- f. Ensure that appropriate audits are conducted. Review and evaluate the effectiveness of the CHP and update if necessary.
- g. Review all purchases, requisitions, grants and contracts involving the use of hazardous chemicals.

## 7.4 Deans, Directors, Department Chairs, Department Heads

It is the responsibility of Deans, Directors, Department Chairs and Department Heads to develop departmental procedures to ensure effective compliance with the Chemical

Hygiene Plan and other university health and safety policies as they relate to operations under their control. Specific areas include employee and student education and training, identification and correction of unsafe laboratory conditions and recordkeeping. Specifically these individuals will:

- a. Identify all laboratories in the department.
- b. Identify Principal Investigators (PIs) for each laboratory.
- c. Provide training to PIs regarding requirements for compliance, elements of the program and specifics on what/how to train employees.
- d. Review the departmental program quarterly including:
  1. checklists
  2. accident reports
  3. maintenance reports
- e. Provide periodic training as necessary.
- f. Provide Safety Data Sheets (SDSs) to PIs when necessary.
- g. Assist PIs in identifying laboratory hazards.

#### 7.5 Principal Investigators (PIs) and Supervisors

It is the responsibility of the Principal Investigators and Supervisors to:

- a. Identify potential laboratory hazards.
- b. Provide employee training at initial assignment and prior to new exposure situations.
- c. Identify materials considered particularly hazardous (select carcinogens, allergens, embryotoxins, etc.).
- d. Define special circumstances under which employees must request approval before engaging in a given work activity.
- e. Conduct regular inspections of the laboratory.

#### 7.6 Laboratory Workers (Technicians, Student Assistants, Technical Assistants, Other Employees)

Employees who work in laboratory environments are responsible for the following:

- a. Plan and conduct each operation in accordance with the institutional and chemical hygiene procedures.
- b. Use common sense and good judgment at all times.
- c. Understand and comply with all Standard Operating Procedures. Report any significant problems arising from the implementation of the Standard Operating Procedures to the PI or Laboratory Instructor/Supervisor.
- d. Report all facts pertaining to every accident/incident and any action or condition that may exist that could result in an accident to the PI or Laboratory Instructor/Supervisor.
- e. Attend established education and training sessions.
- f. Ask questions of supervisors when there is concern about an unknown or hazardous situation.

- g. Understand the function and proper use of all personal protective equipment (PPE). Wear appropriate PPE when required or necessary.
- h. Contact the PI or Laboratory Instructor/Supervisor, and/or the Chemical Hygiene Officer if any of the above procedures are not clearly understood.

## 7.7 Students

Students are expected to always adhere to safe and healthful work practices defined by written and oral campus and departmental safety and health guidelines. They must also report laboratory hazards that become known to them, to their instructors or other responsible parties.

## 8.0 ELEMENTS OF THE PLAN

### 8.1 The Chemical Hygiene Plan addresses the following eight elements:

- a. Standard Operating Procedures (SOPs) relevant to safety and health considerations to be followed when laboratory work involves the use of hazardous chemicals;
- b. Criteria to be used to determine and implement control measures in order to reduce employee exposure to hazardous chemicals, particularly chemicals that are extremely hazardous;
- c. A requirement that fume hoods comply with existing regulations, and that specific measures be taken to ensure proper and adequate performance of all protective equipment;
- d. Provisions for employee information and training;
- e. The circumstances under which a particular laboratory operation, procedure, or activity shall require prior approval from the employer (or the employer's designee) before implementation;
- f. Provisions for medical consultation and medical examinations based on specified criteria;
- g. Designation of personnel responsible for implementation of the CHP including the assignment of a Chemical Hygiene Officer(s); and
- h. Provisions for additional employee protection for work with particularly hazardous substances. These include "select carcinogens," reproductive toxins, and substances which have a high degree of acute toxicity.

## 9.0 STANDARD OPERATING PROCEDURES (SOPs)

Standard Operating Procedures (SOPs) are written safety and health guidelines for laboratory work with hazardous materials which are required as a part of the Chemical Hygiene Plan (CHP). SOPs are written for hazardous chemicals when the chemical is used routinely in the laboratory and when its use poses a potential hazard to laboratory personnel. Departments shall develop laboratory specific SOPs on a case by case basis for more hazardous materials. The following general SOPs are included in Appendix B:

- a. Handling Chemicals

- b. General Safety Guidelines
- c. General Safety Attitudes
- d. Personal Hygiene
- e. Personal Protective Equipment
- f. Housekeeping
- g. Spills and Accidents
- h. Hazardous Waste Management
- i. Hazardous Waste Reduction

## 10.0 CRITERIA USED TO DETERMINE AND IMPLEMENT CONTROL MEASURES

### 10.1 Recognition of Potential Hazards

Departments and PIs/Laboratory Supervisors are responsible for recognizing potential hazards in the work areas under their jurisdiction. This requires familiarity with the processes and work operations involved, maintenance of an inventory of the chemical and physical agents associated with those processes, and periodic review of the different job activities of a work area. Departments shall also study the effectiveness of the existing control measures.

### 10.2 Hazard Identification

#### a. Labels

PIs/Laboratory Supervisors shall ensure that labels on incoming containers of hazardous chemicals are not removed or defaced.

#### b. Chemical Inventory and Safety Data Sheets (SDSs)

Each laboratory shall maintain a chemical inventory and provide personnel access to SDSs for all laboratory chemicals. Inventories and SDSs may be stored and accessed electronically.

#### c. Hazardous Chemicals Produced in the Laboratory

1. If the chemical composition is known and the chemical is produced exclusively for the laboratory of origin, the PI shall determine if it is hazardous as defined in the Appendix A. If it is a hazardous chemical, the PI will provide and document training (see Section 15.0 for toxicological properties, safe handling procedures, etc.).
2. If the chemical produced is a by-product with an unknown composition, the PI shall assume that the substance is a hazardous chemical and shall implement the CHP.
3. If the chemical substance produced is transferred to a user outside the lab, the PI will comply with the University Hazard Communication Program, including labeling and preparation of the SDS.

4. Laboratory prepared solutions of hazardous chemicals must be labeled with the identity of the chemical and an appropriate health and physical hazard warning. The identification used shall permit cross-referencing to the laboratory's SDS collection.

### 10.3 Evaluation of Potential Hazards

Departments shall evaluate the degree of risk arising from exposure to chemical, physical and biological agents. Evaluation involves making a judgment based on observation and measurement of the magnitude of these agents. Evaluation also involves determining:

- a. Toxicity and quantity of chemical agents;
- b. Routes of entry;
- c. Possibility of reaction with another agent (either chemical or physical);
- d. Duration of employee exposure;
- e. Levels of energy or air contaminants arising from a process or work operation (exposure determination); and
- f. Effectiveness of any control measures used.

### 10.4 Exposure Control

- a. Departments shall ensure that no employee is exposed to levels of hazardous materials greater than or equal to the Action Levels. In the absence of Action Levels, exposure shall not exceed the Permissible Exposure Level (PEL) (see Appendix G for a list of Cal/OSHA PELs).
- b. Departments shall take steps necessary to eliminate or reduce to the lowest practical level, employee exposure to airborne contaminants. This may be done by controlling the amount of the contaminant in the employee's breathing zone, by reducing the amount of time an employee spends in the exposure area, or by some other means.

### 10.5 Types of Control Measures

- a. Departments shall install control measures, the selection of which will depend on the nature of the harmful substance or agent and its routes of entry into the body.
- b. Control measures are divided into the following categories:
  1. Engineering Controls - Methods of controlling employee exposures by modifying the source or reducing the quantity of contaminants released into the workroom environment (e.g., exhaust hoods, glove boxes).
  2. Administrative Controls - Methods of controlling employee exposures to contaminants by job rotation, work assignment or time periods away from the contaminant. Although administrative control measures can limit the

duration of individual exposures, they are not generally favored by industry because they are difficult to implement and maintain.

3. Personal Protective Equipment - Personal protective equipment includes respirators and other protective equipment/devices. These are usually considered secondary to the use of engineering control methods.

## 10.6 Selection

Departments shall always attempt to first design safety into a potentially hazardous process. Only when engineering controls are determined to be insufficient shall administrative controls, personal protective equipment and other corrective measures be considered to achieve permissible levels of exposure.

## 10.7 Review and Updating

Because hazards may change over time, departments shall continually review and update health hazard control measures as necessary.

## 11.0 CONTROL MEASURES

### 11.1 General Laboratory Ventilation

- a. The University shall provide general laboratory ventilation systems that:
  1. Comply with the American Society of Heating Refrigerating and Air Conditioning Engineers (ASHRAE) Handbook of Fundamental Guidelines; the State Building Standards Code, Title 24, Part 2, California Code of Regulations; and Section 5142, Title 8, California Code of Regulations;
  2. Operate continuously during working hours;
  3. Provide a source of air for breathing and for input to local ventilation devices;
  4. Are not relied on for protection from toxic substances released into the laboratory;
  5. Continually replace air, preventing a build-up of toxic air concentrations during the work day;
  6. Direct air flow into the laboratory from non-laboratory areas and out to the exterior of the building; and
  7. Be inspected at least annually. Problems found during these inspections shall be corrected within a reasonable time.
- b. General ventilation shall only be used when local exhaust systems are impractical.
- c. General ventilation rates within a given workplace shall not only be calculated based on Threshold Limit Values (TLVs), but also on other factors, such as a type

and location of air diffusers, location of people in the room, and relative toxicity of the vapor.

- d. The University shall alter the ventilation system only after thorough testing has indicated that worker protection from airborne toxic substances will continue to be adequate.

#### 11.2 Local Exhaust Ventilation

- a. The University shall only use local exhaust ventilation systems when every effort has been made to control the contaminant by isolation, a change in the process, or by substitution of a less harmful material.
- b. Local exhaust systems shall be the proper method of contaminant control if:
  - 1. air samples show that the contaminant in the atmosphere constitutes a health, fire, or explosion hazard;
  - 2. state or city codes require local exhaust ventilation at the particular process (i.e. at grinding or buffing wheels and wood-working machines);
  - 3. maintenance of laboratory machinery would otherwise be difficult;
  - 4. marked improvement in housekeeping or employee comfort will result;
  - 5. emission sources are large, few and fixed and/or widely dispersed;
  - 6. emission sources are near the employee breathing zone; and
  - 7. emission rates vary widely by time.

#### 11.3 Exhaust Hoods

The local exhaust hood is the point of air entry into the duct system and includes all suction openings regardless of their shape or mounting arrangement. Local exhaust systems can succeed only when the contaminant is drawn into the hood.

#### 11.4 Flammable Liquid Hazard Control

- a. Departments shall provide for safe handling of flammable liquids, regardless of the quantities involved. Problems associated with each flammable liquid shall be analyzed to determine the extent of flammability and health hazards so that appropriate control measures can be taken.
- b. To control these hazards, departments shall consider the characteristics of the specific liquid, the amounts of vapor involved, potential ignition sources, the kinds of operations, unsafe temperature, ventilation and type of building construction.
- c. EHSRMS or designated competent individuals shall determine the necessity of safeguarding electrical equipment; ventilation requirements; the need for eliminating sparks, open flames and other sources of ignition; safe material handling procedures; proper grounding procedures; and other factors promoting the maintenance of a safe environment (see National Electrical Code, NFPA 70, Chapter 5, Article 500).

- d. Departments shall obtain and use proper safety devices to protect workers from the hazards associated with flammable liquids.

#### 11.5 Emergency Eyewashes and Safety Showers

- a. Location
  - 1. Emergency eyewash facilities and safety showers shall be installed in accessible locations that require no more than 10 seconds for the injured person to reach in accordance with ANSI Z358.1 - 1981 and CCR, Title 8, Section 5162 specifications.
  - 2. If both an eyewash and shower are needed, they shall be located so that both can be used at the same time.
  - 3. The area of the eyewash and shower equipment shall be maintained free of items which obstruct their use.
- b. Performance
  - 1. The control valve shall be designed so that the water flow remains on without requiring the use of the operator's hands, and so that the valve remains activated until intentionally shut off.
  - 2. Personal eyewash units shall deliver potable water or other eye-flushing solution approved by the consulting physician.
- c. Maintenance
  - 1. Plumbed eyewash and shower equipment shall be activated at least monthly to flush the line and to verify proper operation.
  - 2. Other units shall be maintained in accordance with the manufacturer's instructions.

#### 12.0 SPECIAL CONTROL MEASURES FOR PARTICULARLY HAZARDOUS CHEMICALS

Departments shall follow special procedures when performing laboratory work with "select carcinogens" (see Appendix C), reproductive toxins (see Appendix D1), and acutely toxic substances (see Appendix E). Work with particularly hazardous chemicals requires that the following provisions be considered and included where appropriate:

##### 12.1 Designated areas should be posted and their boundaries clearly marked.

- a. These areas must be a restricted access exhaust hood, glove box, or portion of a lab designated for use of the particularly hazardous substances, for which all people with access are aware of the substances being used and necessary precautions.

- b. Only those persons with demonstrated knowledge and ability to work with particularly hazardous chemicals shall work with chemicals in the designated area.
- 12.2 Containment devices, such as fume hoods or glove boxes, shall be used when handling particularly hazardous chemicals which are volatile; when procedures involve manipulations that may result in the generation of an aerosol or airborne dust; and with any manipulation, handling, or reaction that may result in the uncontrollable release of the substance.
- 12.3 Safety procedures for removal of contaminated wastes shall be used.
- 12.4 Design decontamination procedures based on laboratory circumstances.

### 13.0 HAZARDOUS OPERATION APPROVAL PROCEDURES

#### 13.1 Prior Approval and Review by the Chemical Hygiene Officer

- a. PIs/Laboratory Supervisors shall obtain prior approval when a project or process includes the introduction of hazards into the laboratory environment or when existing hazards are discovered or suspected.
- b. Prior approval is required:
  - 1. When it is likely that the PEL for the chemical (see Appendix G) could be exceeded; or
  - 2. When members of the laboratory staff become ill, suspect that they or others have been exposed to a chemical, or otherwise suspect a failure of any safeguards.
- c. Prior approval should be considered:
  - 1. At the start of a new procedure, process or test (even if it is very similar to older practice);
  - 2. At the restart of an idle project or process;
  - 3. At the scale-up or scale down of a project or process;
  - 4. Whenever there is a change (addition, deletion or substitution) in raw materials;
  - 5. Whenever there is a change in the location of the procedure, process or test;
  - 6. Whenever there is a change in personnel;
  - 7. Whenever there is a change in toxicological data (and a new hazard is recognized);
  - 8. When an unforeseen event occurs (and a new hazard is recognized);
  - 9. Whenever there is an equipment or instrumentation modification (and a new hazard is introduced into the work environment); or
  - 10. Whenever an existing hazard is discovered or suspected.

## 13.2 Approval Procedure

- a. The request for approval shall be made by submitting a proposal to the Chemical Hygiene Officer for review.
- b. The proposal shall include:
  1. Description of the project, process or test;
  2. Hazardous materials that will be used (SDSs for each material);
  3. Specification of the safety precautions to be used at each step of the process;
  4. Employee exposure hazard;
  5. Control measures (engineering, administrative and/or personal protective equipment);
  6. Flow sheet of the process showing the equipment that will be used;
  7. The handling procedure of the products, by-products, and waste materials; and
  8. Location of the project, process or test.
- c. The College/School Chemical Hygiene Officer shall review each proposal as needed.
- d. If the project or process is approved, the project requestor and the Chemical Hygiene Officer shall meet to ensure that all hazards, prescribed safety procedures and control measures of the project are known. The project requestor and/or PI shall ensure workplace controls are in place prior to starting a new procedure. If there is a potential for an employee exposure, monitoring shall be conducted by EHSRMS in the beginning phases of the new procedure to ensure exposures are below permissible levels.

## 14.0 ENVIRONMENTAL MONITORING AND EMPLOYEE EXPOSURE DETERMINATION

### 14.1 Environmental Monitoring

Regular monitoring of airborne concentrations is not usually justified or practical in laboratories but may be appropriate when testing or redesigning hoods or other ventilation devices or when a highly toxic substance is stored or used regularly (e.g., three times per week).

### 14.2 Employee Exposure Determination

- a. Initial Monitoring

Initial monitoring and measurement shall be conducted if there is reason to believe that exposure levels for a substance exceed the Action Level (or in the absence of the Action Level, the Permissible Exposure Limit (PEL)).

b. Periodic Monitoring

Periodic monitoring shall be conducted in all areas where chemical exposure has been shown to exceed the Action Level (or in the absence of the Action Level, the PEL). Monitoring will be performed in accordance with the applicable Cal/OSHA, OSHA, NIOSH, and EPA standards.

c. Termination of Monitoring

Monitoring may be terminated when exposures are reduced to an appropriate level in accordance with the applicable standards.

d. Exposure Determination

Monitoring needs will be identified during laboratory safety inspections. In addition, if there is a risk or concern of potential employee overexposure, the EH&S Office will evaluate exposures on a case by case basis.

## 15.0 EMPLOYEE INFORMATION AND TRAINING

### 15.1 Frequency of Training

Employees shall be informed and trained on the hazards of chemicals present in the work area. Such information shall be provided at the time of an employee's initial assignment to a work area where hazardous chemicals are present and prior to assignments involving new hazardous chemical and/or new laboratory work procedures.

### 15.2 Employee Information

Employees shall be informed of the following:

- a. The content of the Chemical Hygiene Plan (CHP) and its appendices which shall be made available to employees.
- b. The location and availability of the CHP.
  1. Master copies of the CHP will be kept by the Deans, Directors, Department Chairs and Department Heads responsible for laboratory areas, and EHSRMS.
  2. The CHP will be available for review during normal work hours and additional copies may be distributed to employees, as appropriate.
- c. The exposure limits for Cal/OSHA regulated substances or recommended exposure limits for other hazardous chemicals where there is no applicable

Cal/OSHA regulation. The following guides can be used to obtain this information:

1. Cal/OSHA Airborne Contaminants (see Appendix G for Cal/OSHA's list);
  2. Safety Data Sheets (SDSs);
  3. NIOSH Pocket Guide to Chemicals; and
  4. ACGIH Threshold Limit Values and Biological Exposure Indices.
- d. Signs and symptoms associated with exposures to hazardous chemicals used in the laboratory. This information can be found in the SDSs for the chemical(s) in use.
- e. The location and availability of known reference materials on the hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory including, but not limited to, SDSs received from the chemical supplier.

### 15.3 Employee Training

Employee training shall include:

- a. Methods and observations that may be used to detect the presence or release of a hazardous chemical (i.e. monitoring conducted by EHSRMS, continuous monitoring devices, visual appearance or odor of hazardous chemicals, etc.);
- b. The physical and health hazards of chemicals in the work area;
- c. The measures employees can take to protect themselves from these hazards, including specific procedures the University has implemented to protect employees from exposure to hazardous chemicals (i.e. appropriate work practices, emergency procedures, personal protective equipment, etc.); and
- d. Applicable details of the Chemical Hygiene Plan.

### 16.0 MEDICAL MONITORING

The University Medical Monitoring Program is designed to provide safe placement of employees, maintenance of employee health and to ascertain the effectiveness of hazard control methods. Certain laboratory workers who work with hazardous chemicals shall be provided an opportunity to receive medical consultation and examination. Employees who meet specific criteria shall be provided appropriate medical consultation and exams at no cost to the employees, without loss of pay and at a reasonable time and place.

### 17.0 RECORDKEEPING

Records relating to occupational injuries and illnesses, medical surveillance, exposure monitoring, inspections and other activities and incidents relevant to occupational safety and health shall be kept by EHSRMS and various departments, committees and designed PIs and laboratory supervisors. Detailed responsibilities and procedures are contained in the Section 14.0 of the University Injury and Illness Prevention Program Manual.

## 18.0 EMPLOYEE ACCESS TO EXPOSURE AND MEDICAL RECORDS

Procedures for employee access to occupational safety and health related records is contained in Section 15.0 of the University Injury and Illness Prevention Program Manual.

**APPENDIX AA**  
**CHEMICAL HYGIENE PLAN ADDENDUM**  
**For Jordan Research Center**

In addition to the campus wide provisions of the Chemical Hygiene Plan, the following additional provisions are added which pertain to the Jordan Research Center (JRC) only.

1.0 Chemical Hygiene Committee

1.1 A Chemical Hygiene Committee will established for the JRC consisting of representatives from:

- a. Environmental Health & Safety, Risk Management and Sustainability
- b. College/School Chemical Hygiene Officers
- c. Departmental Heads/Safety Coordinators
- d. Principal Investigators
- e. Any other relevant stakeholders

1.2 The responsibilities of the Committee are as follows:

- a. Review new projects/SOPs to ensure compliance with appropriate codes and regulations regarding chemical use and storage.
- b. Review proposals to change or modify existing projects/SOPs.
- c. Discuss, explore, study and resolve problems that arise in the laboratories.
- d. Review investigations of laboratory accidents and causes of incidents.
- e. Submit recommendations to the Chemical Hygiene Officer on laboratory problems.

2.0 Chemical Handling and Storage

2.1 Principal Investigators will maintain inventories detailing types and quantities of all chemicals in use.

2.2 All chemical purchases must be approved in advance by either the Chemical Hygiene Committee, Chemical Hygiene Officer, departmental chemical technician, or other appropriate designated individual; to ensure that only authorized types/amounts of chemicals are stored and used in the building.

2.3 Adequate chemical storage facilities for all types and quantities of acquired chemicals will be maintained. Storage facilities will be monitored on a regular basis to ensure they remain in compliance with the CHP and all regulatory requirements.

- 2.4 Receiving and transfer of chemicals within the building will only be done in compliance with established SOPs.
- 2.5 Ventilation rates will be verified periodically per design minimum requirements in all areas where chemicals are in use.
- 2.6 Dedicated storage areas will be maintained for nitric acid and any regulated carcinogens.