

## CHEMICAL HYGIENE PLAN FOR

Name of Laboratory

Building & Room  
Number

Department or  
Division

Principal Investigator or  
Laboratory Manager

Person Responsible for  
Chemical Hygiene

Plan: Larry Tague, 426G Nash, 901-448-7152 (bus.) 901-755-4577 (home), e-mail: ltague@physio1.utm.edu

Revised:

CERTIFICATION OF ANNUAL REVIEW

This Chemical Hygiene Plan has been reviewed annually by:

Larry Tague  
Person Responsible for Chemical Hygiene Plan \_\_\_\_\_ Date \_\_\_\_\_

### PURPOSE OF CHEMICAL HYGIENE PLAN (1910.1450(e))

The development and implementation of a written Chemical Hygiene Plan (CHP) is the foundation of compliance required in OSHA's "Occupational Exposures to Hazardous Chemicals in Laboratories," published by Occupational Safety and Health Administration(OSHA) in the Federal Register, January 31, 1990, pages 3327-3335, which becomes part of 29 CFR 1910. Additionally, these rules are to be adopted by Tennessee Occupational Safety Administration, TOSHA. The University of Tennessee shall be subject to any additional rules on this subject adopted by TOSHA at a subsequent time.

This rule and standard applies to all persons, including University employees, students, & visitors authorized to be present at this particular location (laboratory). All persons subject to the CHP shall be informed of its location and availability as well as the material safety data sheets (MSDS) and other pertinent reference materials relating to their health and safety while in this particular work area. Application of the CHP is in compliance with University of Tennessee, Memphis, Administrative Manual, Laboratory Safety, Section 5.180, Safety and Health Policy, and Section 5.180, Safety and Health Procedure.

This plan shall be reviewed and evaluated for its effectiveness annually by the person responsible for this Chemical Hygiene Plan as well as the Associate Vice Chancellor for Safety and Security for UT Memphis.

The University of Tennessee is committed to providing a safe working environment and believes employees have a right to know about health hazards associated with their work. So that employees can make knowledgeable decisions about any personal risks of employment, this Chemical Hygiene Plan includes policies, procedures, and responsibilities designed to develop in employees an awareness of potentially hazardous chemicals in the workplace and to train employees in appropriate, safe working conditions.

It is important that employers assume responsibility for laboratory safety. All employees will have access to pertinent safety information through their supervisory staff. The people who work in any given laboratory are best able to detect potential hazards in either the facility or in work procedures. When safety concerns arise, employees are encouraged to contact their supervisor.

A training program has been designed for the benefit and protection of all laboratory employees. Necessary information will be available to inform the employee how best to handle hazardous chemicals and how to make use of the new law.

Dr. Leonard R. Johnson  
Vice Chancellor for Research  
Administration

Francine Rogers  
Institutional Biosafety Officer

(Date)

(Date)

## INDEX

Purpose of Chemical Hygiene Plan (1910.1450(e))

Index

Standard Operating Procedures  
Housekeeping  
Criteria For Safety Measures  
Chemical Inventory  
Material Safety Data Sheets  
Chemical Storage  
Labeling  
Engineering Controls  
Contaminated Waste Removal/Disposal  
Administrative Controls  
Record Keeping  
Personal Protective Equipment  
Training  
Chemicals Requiring Approval for Use  
Medical Consultations and Examinations  
Chemical Hygiene Plan Responsibilities  
Provisions for Additional Employee Protection  
Additional Safety Requirements Other Than Hazardous Chemicals  
Glossary  
References  
Appendices

## STANDARD OPERATING PROCEDURES

Because few laboratory chemicals are without hazards, general precautions for handling all laboratory chemicals should be adopted to include minimizing exposure and assuming that any mixture of hazardous chemicals is more toxic than the most toxic component.

The following procedures are used when working with chemicals:

1. Accidents and spills
  - a. Eye contact: promptly flush eyes with water for a prolonged period (15 minutes) and seek medical attention.
  - b. Ingestion: Each chemical affects the body differently. Consult MSDS &/or contact the Southern Poison Center, (Telephone #522-6701).
  - c. Skin contact: promptly flush the affected area with water and remove any contaminated clothing; use a safety shower when contact is extensive. If symptoms persist after washing, seek medical attention.
  - d. Clean-up: promptly clean up spills, using appropriate protective apparel and equipment and proper disposal. Clean-up should, in most cases, be performed by the staff technician. **IN ANY CASE WHERE THERE IS QUESTION AS HOW TO SAFELY CLEAN-UP SPILLS, CONTACT THE DEPARTMENTAL HYGIENE OFFICER Larry Tague IMMEDIATELY! IN ANY CASE WHERE THERE ARE SEVERE HEALTH HAZARDS DUE TO THE SPILL, CONTACT THE DEPARTMENTAL CHEMICAL HYGIENE OFFICER Larry Tague, WHO WILL IN TURN CONTACT THE UT MEMPHIS OFFICE OF SAFETY AFFAIRS, WHEN NECESSARY.**
  - e. Medical attention should be obtained for body contact of hazardous chemicals. (See Appendix A.)
2. Avoid unnecessary exposure to chemicals.
  - a. Do not smell or taste chemicals. Apparatus that can discharge toxic chemicals (vacuum pumps, distillation columns, etc.) should be vented into local exhaust devices.
  - b. Visually inspect gloves and test glove boxes before use.
  - c. Do not allow release of toxic substances in cold rooms and warm rooms, since these have contained recirculated atmospheres.
  - d. Use only those chemicals for which the quality of the available ventilation system is appropriate.
  - e. Never eat, drink, smoke, chew gum, or apply cosmetics or lip balm in areas where laboratory chemicals are present. Wash hands before conducting these activities outside the lab.
  - f. Storing, handling, or consuming food or beverages in chemical laboratory storage areas, refrigerators, glassware, or utensils that are also

used for laboratory operation is prohibited.

- g. Handle and store laboratory glassware with care to avoid damage; do not use damaged glassware. Use extra care with Dewar flasks and other evacuated glass apparatus; shield or wrap them to contain chemicals and fragments should implosion occur. Use equipment only for its designed purpose.
- h. Wash areas of exposed skin thoroughly before leaving the laboratory.
- i. Horseplay, disorderly conduct, or use of abusive language in the laboratory is prohibited. University of Tennessee, Memphis Personnel Procedures #580-15.
- j. Do not use mouth suction for pipetting or starting a siphon.
- k. Confine long hair and loose clothing.
- l. Wear shoes at all times in the laboratory, but do not wear sandals, perforated shoes. Where necessary special boots or shoes may be required.
- m. Keep the work area clean and uncluttered, with chemicals and equipment properly labeled and stored; clean up the work area on completion of an operation or at the end of each day.
- n. Ensure that appropriate eye protection, where necessary, is worn by all persons, including visitors, in areas where chemicals are stored or handled.
- o. Wear appropriate gloves when the potential for contact with toxic materials exists; inspect the gloves before each use, wash them before removal, and replace them periodically.
- p. Use appropriate respiratory equipment when air contaminant concentrations are not sufficiently restricted by engineering controls. Inspect the respirator before each use. The use of respirators require special evaluation and training before they are used.
- q. Use any other protective and emergency apparel and equipment as appropriate.
- r. Avoid use of contact lenses in the laboratory unless necessary; if they are used, inform supervisor so special precautions can be taken.
- s. Remove laboratory coats immediately upon contamination.
- t. Seek information and advice about hazards, plan appropriate protective procedures, and plan positioning of equipment before beginning any new operation.
- u. Leave lights on, place an appropriate sign on the door, and provide for containment of toxic substances in the event of failure of a utility service (such as cooling water) in an unattended operation.
- v. Use a hood for operations that might result in release of toxic chemical vapors or dust. As a rule of thumb, use a hood or other local ventilation device when working with any appreciably volatile substance with a TLV of less than 50 ppm.

Confirm adequate hood performance before use: keep hood closed at all times except when adjustments within the hood are being made. Keep materials stored in hoods to a minimum, and do not allow materials to block vents or air flow.

Leave the hood "on" when it is not in active use if toxic substances are stored in it or if it is uncertain whether adequate general laboratory ventilation will be maintained when it is "off".

- w. Keep all oxidizing agents stored at least 10' away from solvents.
- x. All chemicals should be stored in secure containers within (preferably) enclosed cabinets. If enclosed cabinets are not available, open shelving should have minimum 6" guards built across the front of the shelving to prevent containers from falling off of the shelves.
- y. Keep all flammable solvents stored separate from acids, each stored in authorized, appropriate storage cabinets. Keep all large quantity containers of chemicals within the appropriate storage cabinets, ONLY REMOVING AMOUNT NEEDED FOR SPECIFIC EXPERIMENT, IMMEDIATELY RETURNING LARGE STORAGE CONTAINER BACK TO THE APPROPRIATE STORAGE CABINET.
- z. All chemicals should be monitored monthly to ensure effective status and continuing safety measures (e.g. picric acid containers kept appropriately moist). IMMEDIATELY REQUEST DISPOSAL OF EXPIRED SUBSTANCES. STANDARD OPERATING PROCEDURES
- aa. If questionable hazardous conditions are found, IMMEDIATELY NOTIFY SUPERVISOR \_\_\_\_\_ and THE DEPARTMENTAL CHEMICAL HYGIENE OFFICER Larry Tague BEFORE ATTEMPTING TO REMEDY THE PROBLEM.

bb. Properly label all chemicals being disposed of, providing detailed listing of all agents within the containers. DO NOT MIX QUESTIONABLE AGENTS.

cc. A "Departmental Order Request Form" (see Appendix B) should be submitted to the departmental purchasing agent on all chemical orders, whether orders are being made by the telephone or typed purchase requisitions. **A COPY OF ALL CHEMICAL PURCHASE REQ'S (or DEPARTMENTAL ORDER REQUEST FORMS in the case of telephone orders) or MSDS Sheets ARE TO BE PROVIDED TO THE DEPARTMENTAL CHEMICAL HYGIENE OFFICER Larry Tague.** (This enables the Hygiene Officer to be aware of all chemicals entering the department so proper handling, monitoring, recordkeeping and training can be accomplished in a timely manner)

dd. Maintain a currently updated Material Safety Data Sheet (MSDS) manual within each laboratory area. Review the appropriate MSDS sheets in regard to any questions regarding how to safety handle, store or dispose of chemicals.

ee. Be aware of unsafe conditions and see that they are corrected when detected.

ff. No children allowed in laboratories.

## **HOUSEKEEPING**

Floors are cleaned regularly by housekeeping. All employees of the housekeeping department are formally trained in the risks associated with working in the laboratory. Information concerning specific risk in individual laboratories will be relayed by , a representative of the laboratory, to Mr. Whit Sutton, UT Housekeeping Department, Telephone 528-5661.

The housekeeping supervisor conducts a quarterly inspection of the lab areas to assess whether:

1. Stairwells and hallways are free of obstruction
2. Waste is deposited in appropriate receptacles and properly removed from the laboratory.
3. Chemical spills are cleaned according to established protocol.
4. Proper storage is accomplished to minimize clutter.
5. HOUSEKEEPING PERSONNEL ARE NOT TO CLEAN COUNTER TOPS. It is the responsibility of the assigned technical personnel to clean all countertops and upper surfaces within their laboratory area.
6. HOUSEKEEPING PERSONNEL ARE NOT TO CLEAN UP ANY TYPE OF SPILL UNTIL

APPROVAL AND INSTRUCTIONS ARE OBTAINED FROM THE ASSIGNED TECHNICAL STAFF OF

THE AREA. If technical personnel are not available, contact the Departmental Chemical Hygiene Officer for instructions.

## **CRITERIA FOR SAFETY MEASURE**

### **CHEMICAL INVENTORY**

Chemical inventory should be maintained on a current basis and a copy of the inventory provided to the Departmental Chemical Hygiene Officer on an annual basis. THE DEPARTMENTAL CHEMICAL HYGIENE OFFICER Larry Tague WILL PROVIDE THE CHEMICAL INVENTORY TO THE UT MEMPHIS OFFICE OF SAFETY AFFAIRS ON AN ANNUAL BASIS. THE CHEMICAL INVENTORY IS DUE DEC. 1 OF EACH YEAR.

A chemical inventory is performed quarterly, listing all the hazardous chemicals in the laboratory. Chemicals listed are those classified as hazardous by the Department of Transportation (DOT), the Environmental Protection Agency (EPA), or displaying a 2 or greater number in any section of the National Fire Protection Association (NFPA) diamond. DOT and EPA classifications are in Appendices C & D.

Chemicals are listed alphabetically by section according to the most commonly used name (e.g., bleach). A catalog number may be required by some manufacturers for MSDS. The average quantity in storage on a monthly basis, as well as the physical state (e.g., solid, liquid, gas), is included. The NEPA hazard classification, if known, is listed along with the manufacturer's name and complete address. A comment section is provided to further identify

the chemical's location (e.g., under the sink, third shelf in the safety cabinet, etc.) A chemical inventory form is provided in Appendix E. Inventories are computerized whenever possible to provide the capability of sorting according to manufacturer or location. A complete chemical inventory is located in the office of the person responsible for this Chemical Hygiene Plan, as well as in the local fire department and State Department of Labor, (TOSHA). A copy of the latest chemical inventories received will be maintained in the office of Safety Affairs.

(NOTE: When chemical inventories are kept up currently, it serves the purpose of keeping tighter control over chemicals kept within lab areas, prevents excessive stock-piling of chemicals, thereby, greatly reducing the hazards involved, as well as significantly saving money by keeping only truly needed chemicals on hand. This also automatically reduces the amount of chemicals being disposed of, which provides another significant savings.)

## **MATERIAL SAFETY DATA SHEETS**

Upon completion of the chemical inventory, request letters are sent to manufacturers if Material Safety Data Sheets (MSDS) are missing. A sample letter is in Appendix F.

Individualized MSDS manuals will be provided to each designated laboratory section, with the MASTER MSDS LIBRARY maintained by the Departmental Chemical Hygiene Officer Larry Tague. Master MSDS library located in 426 Nash. Wood file cabinet immediately to your right when you enter the room labeled MSDS

The MSDS manuals will be kept in a 3-ring binder in each laboratory section. The MSDS are to be kept in alphabetical order along with a current chemical inventory listing placed in the front of each manual.

When a new chemical is introduced to the laboratory, **IMMEDIATELY NOTIFY THE DEPARTMENTAL CHEMICAL HYGIENE OFFICER** Larry Tague so proper training can be accomplished prior to the use of the chemical. At that point, the Departmental Chemical Hygiene Officer will determine if any special protection devices or procedures are required.

The MSDS for each chemical is located in the office of the person responsible for this Chemical Hygiene Plan. An example of a MSDS is in Appendix G.

## **CHEMICAL STORAGE**

Storage of laboratory chemicals presents an ongoing safety problem. Some storage charts assume an unlimited amount of cabinets. **CHEMICALS CAN BE STORED ALPHABETICALLY ONLY IN APPROPRIATE CATEGORIES! SPECIAL ATTENTION MUST BE PAID TO ENSURE OXIDIZING AND OTHER REACTIVE CHEMICALS ARE NOT STORED CLOSE TO INTERACTIVE AGENTS!**

All flammable cabinets are to be individually vented to allow proper vapor dissipation.

Chemical storage is kept as small as practical. Storage on bench tops and in hoods may cause potential exposure to fire and spills. Ventilated cabinets and specially monitored refrigerators are used for chemical storage only. No food is permitted in these refrigerators. Safety cans with a spring loaded spout are used for transporting flammable liquids.

Toxic chemicals, including carcinogens, are stored in ventilated storage areas in unbreakable chemical resistant secondary containers. These containers are labeled "CAUTION: HIGH CHRONIC TOXICITY OR CANCER-SUSPECT AGENT." A separate inventory list of carcinogens and suspected carcinogens is maintained by the Chemical Hygiene Officer according to federal and state regulations.

Cylinders of compressed gases are to be strapped or chained to a wall or bench top and are capped.

## **LABELING**

The 29 CFR 1910.1450 contains specific labeling requirements. Labeling must be done on all hazardous chemicals that are shipped and used in the workplace. Labels must not be removed or defaced.

## ON SHIPPING CHEMICALS

Chemical manufacturer, importers, and distributors make sure that each container of hazardous chemicals leaving the workplace is labeled, tagged, or marked with the following information:

1. Identity of the hazardous chemical
2. Appropriate hazard warnings
3. Name and address of the chemical company (i.e. manufacturer).

## ON IN-PLANT CHEMICALS

Each hazardous chemical transferred outside the laboratory that is not in its original container must also be labeled. These workplace labels must contain:

1. Identity of the hazardous chemical
2. Route of entry (e.g., eyes, nose, mouth, skin)
3. Health hazard
4. Physical hazard
5. Target organ affected. (HMIG Target Organ Labels may be used when the manufacturer labels do not sufficiently cover necessary details.)

An example of a computer-generated label is shown below:

LABORATORY

ACETIC ACID

Route of Entry: Eyes, Skin, Nose

Health Hazard: Poison

Physical Hazard: Corrosive

Target Organs: Skin and Lungs

## ENGINEERING CONTROLS

All biohazard and fume hoods are inspected annually and certified by Plant Engineering (Telephone 5661). Any hood not passing inspection is taken out of service immediately and not used until the hood has passed inspection. It is the responsibility of the employer to purchase the parts and to replace the unit in a timely fashion so as not to endanger the health and well-being of an employee or place the facility at risk.

Eyewash fountains are inspected every 3 months and records maintained by Safety Affairs (telephone 5502).

Safety showers are inspected, tested, and flushed annually and records maintained by Safety Affairs (telephone 5502).

Fire extinguishers are inspected annually by Fire Officer (telephone 5661).

All chemical stockrooms/storerooms are adequate and well ventilated and located in \_\_\_\_\_.

Ventilated storage cabinets for chemicals are provided as needed and have a separate exhaust duct. These cabinets are located in \_\_\_\_\_.

Exhaust air from glove boxes and isolation rooms is passed through scrubbers or other treatment before being released into the regular exhaust system.

Cold rooms and warm rooms have provisions for rapid escape and also for escape in the event of electrical failure. This information can be found in \_\_\_\_\_.

Air flow through the laboratory should be relatively uniform and be exhausted to the exterior of the building. Quality and quantity of ventilation are monitored every 3 months and records maintained by Plant Engineering (telephone 5661).

All chemical hygiene-related equipment is monitored continuously and modified if inadequate.

## CONTAMINATED WASTE REMOVAL/DISPOSAL

To assure the minimal harm to people, other organisms, and the environment will result from the disposal of waste laboratory chemicals, the waste disposal program, ( a copy of which is maintained in each laboratory area) located in \_\_\_\_\_, specifies how waste is to be collected, segregated, stored, and transported and includes consideration of what materials can be incinerated. All disposal is done in accordance with the Tennessee Department of Health and Environment. The Master Waste Disposal Program is to be maintained by the Departmental Chemical Hygiene Officer and re- evaluated on an annual basis.

### ADMINISTRATIVE CONTROLS

The Principal Investigator or Laboratory Manager is responsible for the safe operation of the area. All activities and procedures require approval by the person responsible for the Chemical Hygiene Plan and the Chief Chemical Hygiene Officer before implementation. Environment monitoring is required in all laboratories for the following chemicals stored or used 3 times/week:

#### 29 CFR 1910 Subpart Z

21-86)	1910.1001	Asbestos, tremolite, anthophyllite, and actinolite (eff. 7-
	1910.1002	Coal tar pitch volatiles; interpretation of term
	1910.1003	4-Nitrobiphenyl
	1910.1004	alpha-Naphthylamine
	1910.1005	[Reserved]
	1910.1006	Methyl chloromethyl ether
	1910.1007	3,3'-Dichlorobenzidine (and its salts)
	1910.1008	bis-Chloromethyl ether
	1910.1009	beta-Naphthylamine
	1910.1010	Benzidine
	1910.1011	4-Aminodiphenyl
	1910.1012	Ethyleneimine
	1910.1013	beta-Propiolactone
	1910.1014	2-Acetylaminofluorene
	1910.1015	4-Dimethylaminoazobenzene
	1910.1016	N-Nitrosodimethylamine
	1910.1017	Vinyl chloride
	1910.1018	Inorganic arsenic
	1910.1025	Lead
	1910.1028	Benzene
	1910.1029	Coke oven emissions
	1910.1043	Cotton dust
	1910.1044	1,2-dibromo-3-chloropropane
	1910.1045	Acrylonitrile
	1910.1047	Ethylene oxide
	1910.1048	Formaldehyde
	1910.1101	Asbestos

All spills are contained according to OSHA guidelines, and appropriate spill kits, located at \_\_\_\_\_, are used.

Assessment of significant risk of all operations is made by the Principal Investigator, Laboratory Manager or the person responsible for the Chemical Hygiene Plan. Chemical hygiene and safety policies will be established for each task performed and engineering controls or personal protective equipment assigned.

### RECORD KEEPING

The laboratory has established and maintained an accurate record for each employee of environmental monitoring, medical consultations, and examinations, including tests or written opinion required.

Accident records are written and retained by the Departmental Chemical Hygiene Officer (Telephone #448-7152), with a copy maintained in the individual's personnel file.

Inventory and usage records for high-risk substances are retained by each Principal Investigator and/or Laboratory Manager, as well as the Departmental Chemical Hygiene Officer (Telephone #448-7152), with a copy to the Office of Safety Affairs.

Environmental monitoring records are maintained by the Departmental Chemical Hygiene Officer (Telephone #448-7152) and the Office of Safety Affairs.

Medical consultation records are maintained by the Departmental Chemical Hygiene Officer (Telephone #448-7152), with a copy maintained in the individual's personnel file and the Office of Safety Affairs.

Training attendance records are maintained by the Departmental Chemical Hygiene Officer (Telephone #448-7152), with an annual report provided to the Office of Safety Affairs.

EXCEPTION: When there is not a specified Departmental Chemical Hygiene Officer, full responsibility for all training and record-keeping becomes the responsibility of the Principal Investigators and Laboratory Managers.

All records are kept, transferred, and made available in accordance with 29 CFR 1910.20.

## **PERSONAL PROTECTIVE EQUIPMENT**

Employees are required to wear gloves when the employee has the potential for direct skin contact with blood, hazardous chemicals, and infectious materials.

Lab coats are to be worn in the laboratory area and are to be buttoned to protect the employee's clothing. Lab coats are provided by \_\_\_\_\_.

In areas where chemical splashes are great (e.g., histology), an impervious apron appropriate for the task is worn.

All personal protective equipment is removed immediately upon leaving the work area (or as soon as possible) and placed in an appropriate laundry hamper located at \_\_\_\_\_ and laundered on site or by an outside contract service \_\_\_\_\_.

Masks and eye protection or chin-length face shields are worn to prevent splashes or sprays of blood, infectious materials, or hazardous chemicals if there is a potential for eye, nose, or mouth contamination. This equipment is located at \_\_\_\_\_.

Where the use of respirators is necessary to maintain exposure below permissible exposure limits, the employer provides, at no cost to the employee, the proper respiratory equipment located at \_\_\_\_\_. The respirators shall be selected and used in accordance with the requirement of 29 CFR 1910.134. Training and fit testing are required for the use of the respirators.

## **PERSONAL PROTECTIVE EQUIPMENT**

### **TRAINING**

Training is a necessary and important part of the Chemical Hygiene Plan. All employees are trained at the time of the employee's initial assignment to a work area where hazardous chemicals are present and before assignments involving new exposure situations. Refresher information and retraining sessions are held periodically - no less than annually. Training is conducted by the employee's immediate supervisor who was appropriately trained for this task by the person responsible for the Chemical Hygiene Plan. All training is documented in writing by attendance records.

Before training can begin, a lesson plan outlines the expectations of the program and the timeframe for the learning outcome. The lesson plan includes.

#### **I. OBJECTIVES**

Upon completion of the Chemical Hygiene Training Program, the employee will be able to:

- A. Locate the potentially hazardous chemicals in the workplace
- B. Recognize the chemical labeling and its meaning

- C. Locate the MSDS book in the workplace
- D. Locate the health hazard, physical hazard, environmental protection, and special protection sections of the MSDS and explain their use
- E. Identify the person responsible for the Chemical Hygiene Plan by name and title
- F. Discuss the major components of the facility's standard labeling system
- G. Identify the appropriate protective clothing for the area and demonstrate its use
- H. Demonstrate emergency procedures in the event of a hazardous chemical spill
- I. Describe the environmental monitoring protocol.

## II. ACTIVITY PLAN

- A. A list of audiovisuals used and directions
  - 1. Videotape or slide/tape
  - 2. Equipment instructions
  - 3. Handouts
- B. An outline guide of what to say and the time limits for each discussion
- C. Topics to be covered
  - 1. Content of the lab standard
  - 2. Location of the CHP
  - 3. Identification of hazardous chemicals
    - a. Location of chemical inventory
    - b. Location of MSDS
      - i. Obtaining a copy
    - c. Labeling information
      - i. Hazard warnings
      - ii. Carcinogen warnings
      - iii. Location in workplace
  - 4. Procedures for handling hazardous chemicals
    - a. Work practices
    - b. Proper moving, storing, and use
    - c. PEL for specific chemicals used by the employee
    - d. Visual appearance of chemicals used by the employee
    - e. Environmental monitoring required
    - f. Signs and symptoms of exposure
    - g. Location of Target Organ poster (Appendix G)
    - h. Protective equipment used to prevent overexposure
    - i. Conditions to avoid
  - 5. Environmental protection
    - a. Emergency procedures
    - b. Spill containment (Think C.L.E.A.N. protocol)
    - c. Medical consultation procedures
  - 6. Documentation of initial and annual training

## III SUMMARY

- A. Restate the objectives.
- B. Restate the main points.
- C. Answer any questions to clear up misunderstandings.

## CHEMICALS REQUIRING APPROVAL FOR USE

There are certain chemicals used in the \_\_\_\_\_ Department that due to their particular hazardous nature require an evaluation of the

proposed protective procedures before any activity involving handling of the chemical is commenced. If you plan to work with any of the chemicals appearing on the attached listing, you must complete the Permission for Chemical Use form and submit to \_\_\_\_\_, the person responsible for the Chemical Hygiene Plan for review. The proposed procedure for safely handling the substance will be evaluated by the person responsible for the Chemical Hygiene Plan and a recommendation for approval or rejection by the Departmental Chairman, \_\_\_\_\_ will be drafted. In no circumstance can work with the chemical be started prior to granting of approval.

#### EXAMPLE ONLY - (ACUTELY HAZARDOUS CHEMICALS)

The listing provided below is to provide an idea of the types of materials that should be considered as an acute hazard and would warrant approval before use. The person responsible for the Chemical Hygiene Plan should review the chemical inventory listing and designate the acutely hazardous materials actually present. The listing should be reviewed as necessary to keep it up-to-date.

Toxic Gas	Acutely Toxic Compounds
Carbon monoxide	Dioxin
Arsine	Ricin
Fluorine	Plutonium
Hydrogen cyanide	Cyanide Compounds
Hydrogen selenide	Pesticides
Phosphine	
Shock Sensitive Compounds	Highly Corrosive Compounds
Picramide	Benzenesulfonic acid
chloride	
Picric acid	Hydrofluoric acid
Various nitro compounds.	
Example - Nitroglycerin	Methanoic acid
Benzoyl peroxide	Ethanoyl chloride
Acetyl peroxide	Benzotrichloride
Extremely Flammable Compounds	
Carbonyl sulphide	
Carbon monoxide	
Ethylene oxide	
Arsine	
Di-n-propylamine	

#### MEDICAL CONSULTATIONS AND EXAMINATIONS

All employees needing medical attention use the **University Health Services at the Randolph Dormitory, 790 Madison, Suite 218, telephone 528-5630.**

All medical examinations and consultations are performed by or under the direct supervision of a licensed physician without cost to the employee, without loss of pay, and at a reasonable time and place. A board-certified physician in occupational medicine is used whenever possible.

The employee is sent for medical evaluation:

1. Whenever signs and symptoms associated with a hazardous chemical develop
2. When environmental monitoring reveals an exposure level routinely above the action level
3. Whenever an event takes place in the work area such as spill, leak, or explosion resulting in hazardous chemical exposure.

The laboratory provides the following information to the physician:

1. Identify of the hazardous chemical(s) to which the employee may have been exposed
2. A description of the conditions under which the exposure occurred - including quantitative exposure data (if available)

3. A description of the signs and symptoms of exposure
4. A copy of the MSDS for the chemical(s) involved.

University Health Services provides a written opinion to the employee, supervisor and Safety Officer that will not reveal specific finding of diagnosis unrelated to the exposure but will include:

1. Any recommendation for further medical follow-up
2. Results of the medical examination and any associated tests
3. Any medical conditions that may be revealed in the course of the examination that may place the employee at increased risk as a result of exposure to a hazardous chemical found in the workplace.
4. A statement by the physician that the employee has been informed of the consultation/examination results and any medical condition that may require further examination or treatment.

#### **CHEMICAL HYGIENE PLAN RESPONSIBILITIES**

The chemical hygiene responsibilities for a specific laboratory rest with the person who is appointed by the Principal Investigator or the Laboratory Manager and receives backing from the department chairman. This person must:

Work with administrators and other employees to develop and implement appropriate chemical hygiene policies and practices.

Certify the performance of protective equipment

Monitor procurement, use, and disposal of chemicals used in the lab

See that appropriate audits are maintained

Help project directors develop precautions and adequate facilities

Know the current legal requirements concerning regulated substances

Seek ways to improve the chemical hygiene program.

The immediate supervisor has overall responsibility to:

Ensure that workers know and follow the chemical hygiene rules, that protective equipment is available and in working order, and that appropriate training has been provided

Provide regular, formal chemical hygiene and housekeeping inspections including routine inspections of emergency equipment

Know the current legal requirements concerning regulated substances

Determine the required levels of protective apparel and equipment

Ensure that facilities and training for use of any material being ordered are adequate.

The laboratory employee is responsible for:

Planning and conducting each operation in accordance with the institutional chemical hygiene procedures

Developing good personal chemical hygiene habits.

In order to assure compliance with the University of Tennessee Safety Policies, the UT Memphis Safety Officer has the authority to initiate action to close down a laboratory if they are not meeting the requirements of the UT Memphis Chemical Hygiene Plan.

#### **PROVISIONS FOR ADDITIONAL EMPLOYEE PROTECTION**

RESERVED

ADDITIONAL SAFETY REQUIREMENTS OTHER THAN FOR HAZARDOUS CHEMICALS

1. Dispose of glass and sharp objects in authorized safety disposal containers.
2. Dispose of all contaminated waste in authorized biohazard bags.
3. Non-contaminated waste is to be disposed of in regular trash, NOT IN BIO-BAGS. Placing routine items in biological bags cost the departmental needlessly. Routine trash disposal is already included in the department's general overhead.
4. Corridors are to remain unobstructed at all times. All carts or other mandatory objects placed within authorized hallways should be placed on the same side of the halls, allow smooth flow of traffic in and out of the laboratory area.
5. NEVER obstruct exits, fire extinguishers, firehoses, gas valves, etc.
6. Doors into laboratory areas are to remain shut at all times unless held open by Fire Marshall approved magnetic door openers. NEVER PROP DOORS WITH UNAUTHORIZED OBJECTS (e.g. rubber or wooden door stops)!
7. Make sure all equipment is properly grounded and that the wiring of all equipment is in good condition. If cracks in insulation or exposure of the wiring is noticed, IMMEDIATELY UNPLUG THE EQUIPMENT AND NOTIFY YOUR IMMEDIATE SUPERVISOR and DEPARTMENTAL CHEMICAL HYGIENE OFFICER.
8. In any case of exhaust failure, IMMEDIATELY NOTIFY YOUR IMMEDIATE SUPERVISOR and DEPARTMENTAL CHEMICAL HYGIENE OFFICER. If personnel are in danger of contamination by toxic or infectious agents, IMMEDIATELY REMOVE ALL PERSONNEL FROM THE AREA, CLOSING OFF THE AREA UNTIL THE PROBLEM HAS BEEN PROPERLY RESOLVED.
9. Chemical Storage Cabinets are to be placed at least six feet away from laboratory exits.

## GLOSSARY

The following terms are used as part of the Chemical Hygiene Program:

ACUTE An adverse effect with symptoms of high severity coming quickly to a crisis.

CARCINOGEN A substance capable of causing cancer.

CHEMICAL AGENTS A wide variety of fluids that have a high potential for body entry by various means. Some are more toxic than others and require special measures of control for safety and environmental reasons.

CHRONIC An adverse effect with symptoms that develop slowly over a long period of time or that frequently recur.

COMBUSTIBLE Able to catch on fire and burn.

DOT Department of Transportation

EPA Environmental Protection Agency

FLAMMABLE Capable of being easily ignited and of burning with extreme rapidity.

INFECTIOUS AGENTS Sources that cause infections either by inhalation, ingestion, or direct contact with the host material.

LABORATORY SCALE Work with chemicals that can easily and safely be manipulated by one person excluding the commercial production of chemicals for sale.

LC 50 The concentration of a substance in air that causes death in 50% of the animal exposed by inhalation. A measure of acute toxicity.

LD 50 The dose that causes death in 50% of the animals exposed by swallowing a substance. A measure of acute toxicity.

MSDS Material Safety Data Sheet

MUTAGEN Capable of changing cells in such a way that future cell generations are affected. Mutagenic substances are usually considered suspect carcinogens.

OSHA Occupational Safety and Health Administration, the regulatory branch of the Department of Labor concerned with employee safety and health.

PEL Permissible Exposure Limit. This is the legally allowed concentration in the workplace that is considered a safe level of exposure for an 8-hour shift, 40 hours per week.

pH A measure of how acidic or caustic a substance is on a scale of 1 to 14. A pH of 1 indicates that a substance is acetic; and a pH of 14 indicates that a substance is basic.

PHYSICAL AGENTS Workplace sources recognized for their potential effects on the body. Heat exposure or excessive noise levels are examples of this risk group.

SENSITIZERS Agents to repeated exposure over time creating an allergic reaction at some point in time.

STERILITY Changes made in male or female reproductive systems resulting in inability to reproduce.

TERATOGENS A substance that causes a deformity in newborns if a significant exposure exists during pregnancy.

TLV Threshold Limit Value. The amount of exposure allowable for an employee in an 8-hour day.

## **REFERENCES**

The following references were used to assist in the preparation of this plan:

1.U.S. Department of Labor, final rule part II. Federal Register 29 CFR Part 1910. Occupational Exposure to Hazardous Chemicals in Laboratories, Wednesday, January 31, 1990.

2.National Research Council. Prudent Practices for Handling Hazardous Chemicals in Laboratories, National Academy Press, 1981.

3.National Research Council. Prudent Practices for Disposal of Chemicals from Laboratories, National Academy Press, 1983.

4.A Model Chemical Hygiene Plan for Laboratories Terry Jo Gile, MT (ASCP), MAEd Clinical Laboratory Management Association, Inc. 1990

## **APPENDICE**

























