

PRESBYTERIAN COLLEGE

Environmental Health and Safety

Chemical Hygiene Plan

Hazardous Waste Oversight Advisory Committee
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PREFACE

Responsibility of PC Chemical Hygiene Plan and the OSHA Lab Standard

The OSHA Lab Standard (29 CFR 1910.1450) ensures that employees are protected from chemical hazards. Employees and supervisors each have responsibilities to conform to this standard.

Lab Supervisors have the following duties:

1. Provide chemical safety information and training.

Training must be done prior to initial assignment and whenever new exposure situations arise. Documentation is highly recommended.

Information which must be provided to each employee includes:

- a. The OSHA Lab Standard "Occupational Exposures to Hazardous Chemicals in Laboratories" 29 CFR Part 1910.1450.
- b. Chemical Hygiene Plan.
- c. Material Safety Data Sheets (MSDS) and other reference material. These references must include Permissible Exposure Limits (PELs) or Threshold Limit Values (TLVs), and signs and symptoms associated with exposure.

Employees must be trained in:

- a. Detection methods and observations of a release of the chemical.
- b. Physical and health hazards associated with the chemical.
- c. The work practices, emergency procedures and personal protective equipment to be used for protection against overexposure.

Note that MSDSs will provide PELs, TLVs, detection methods, physical and health hazards, and necessary personal protective equipment.

2. Implement and enforce health and safety rules for your lab.

This includes ensuring that all employees are complying with the Standard.

3. Enforce the use and availability of appropriate personal protective equipment.

All College employees (supervisors and lab personnel) are responsible for the following:

1. Remaining cognizant of chemicals used in the lab.

Knowing the hazards associated with the chemical and ensuring they are stored and disposed of properly.

2. Request assistance from the Environmental Health and Safety Coordinator.

We can provide MSDSs, answer health and safety questions, air monitoring, ventilation hood problems, asbestos, waste disposal, radiation and biohazards.

Chemical Hygiene Plan

All laboratories that use hazardous chemicals must implement a Chemical Hygiene Plan. Responsibilities relating to the development and implementation of individual laboratory plans and guidance for the development of those plans are covered in a general plan for the campus as a whole.

A laboratory that utilizes hazardous chemicals* must implement a Chemical Hygiene Plan. This requirement is based on the Federal Occupational Safety and Health Administration's "Occupational Exposures to Hazardous Chemicals in Laboratories" standard, which is enforced on this campus by the South Carolina Department of Labor. The Chemical Hygiene Plan must include the following eight subjects:

1. Standard operating procedures;
2. Criteria to determine and implement specific control measures such as engineering controls and personal protective equipment;
3. A requirement that ventilation hoods and other engineering controls be functioning properly;
4. Information and training requirements;
5. A description of the circumstances under which a particular laboratory operation will require prior approval from the employer;
6. Provisions for medical consultation and medical exams;
7. Designation of a chemical hygiene officer; and
8. Provisions for additional protection for work with select carcinogens, reproductive toxins, and substances with a high degree of active toxicity, including the establishment of a designated area, the use of containment devices, procedures for safe removal of wastes, and decontamination procedures.

A general Chemical Hygiene Plan for the College as a whole has been prepared by the **Hazardous Waste Oversight Advisory Committee** and **was adopted by the full committee on April 27, 1992**. Copies of this Plan and the OSHA Lab Standards are available from the

Environmental Health and Safety Coordinator. The Plan may be adopted unchanged by a laboratory; **however, it may be necessary to add components to the plan that are specific to an individual laboratory.**

Further information concerning this policy statement should be directed to the Environmental Health and Safety Coordinator, Biological and Chemical Management Section.

**A hazardous chemical as defined by OSHA is "a chemical for which there is a 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."*

INTRODUCTION

The purpose of this Chemical Hygiene Plan is to define work practices and procedures to help ensure that laboratory workers at Presbyterian College are protected from health hazards associated with the hazardous chemicals with which they work. The Chemical Hygiene Plan is part of the College's compliance with the regulations promulgated on January 31, 1990, by the U.S. Department of Labor Occupational Safety and Health Administration (OSHA) entitled "Occupational Exposures to Hazardous Chemicals in Laboratories" (Code of Federal Regulations, 29 CFR 1910.1450).

OSHA has defined a 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". In addition, OSHA defines a laboratory as "a workplace where relatively small quantities of hazardous chemicals are used on a nonproduction basis." Finally, laboratory workers are defined in the OSHA Lab Standard under the definition of "employee" as "an individual employed in a laboratory workplace who may be exposed to hazardous chemicals in the course of his/her assignments." An example of a laboratory worker would be a University teaching assistant or faculty member instructing an academic lab; the students in the academic laboratory would not be considered laboratory workers. If there is any confusion about whether a particular workplace is considered a laboratory which utilizes hazardous chemicals or whether someone is considered a laboratory worker, the Chemical Hygiene Officer will upon request make this determination.

This Chemical Hygiene Plan shall be perused by all laboratory workers prior to the commencement of lab duties at PC.

A written record stating that each laboratory worker has reviewed the Chemical Hygiene Plan and related health and safety policies and guides shall be kept by the person in charge of the lab or his supervisor.

This Chemical Hygiene Plan (referred to as the Plan throughout this document) will be reviewed annually by the Chemical Hygiene Officer and/or the Environmental Health and Safety Coordinator.

RESPONSIBILITIES

Specific to this Chemical Hygiene Plan, the Center for Environmental Health and Safety responsibilities include the following:

1. Appoint a Chemical Hygiene Officer who will routinely review the Chemical Hygiene Plan and suggest modifications as needed;
2. Provide technical assistance to laboratory supervisors and workers concerning appropriate storage, handling and disposal of hazardous chemicals;
3. Provide general laboratory safety training upon request;
4. Conduct exposure assessments and laboratory inspections upon request and on a routine basis;
5. Assist Student Health Programs in medical consultation as needed;
6. Provide technical assistance concerning personal protective equipment and laboratory safety equipment;
7. Maintain a library of manufacturer's Material Safety Data Sheets and other laboratory and chemical safety literature; and,
8. Remain current on rules and regulations concerning chemicals used on campus.

Deans, Directors, and Heads of Academic and Administrative Units have the primary responsibility for the health and safety of their staff and students. Specific responsibilities regarding the implementation of the Chemical Hygiene Plan include:

1. Collaborate with faculty and staff to tailor the Model Chemical Hygiene Plan to include lab-specific guidelines and to develop strategies to implement the Plan; and,
2. Make budget arrangements for health and safety improvements.

Faculty and staff in charge of supervising laboratories (referred to as laboratory supervisors throughout document) have the following responsibilities for implementing the Chemical Hygiene Plan:

1. Inform and train employees concerning chemical safety as required by this Plan;
2. Implement and enforce rules and standards concerning health and safety for laboratories under supervisor's jurisdiction;
3. Ensure compliance of laboratory workers with this Plan;
4. Ensure the availability and enforce the use of appropriate personal protective equipment;
5. Remain cognizant of chemicals stored and used in labs and their associated hazards;
6. Conduct internal inspections of labs for health and safety concerns;
7. Request assistance from the Environmental Health and Safety Coordinator as needed; and,
8. Request allocation of funds from superiors for health and safety improvements as needed.

Employee responsibilities regarding implementation of the Chemical Hygiene Plan:

1. Follow all health and safety standards and rules;
2. Report all hazardous conditions to the supervisor;
3. Wear or use prescribed protective equipment;
4. Report any job-related injuries or illnesses to the supervisor and seek treatment immediately;
5. Refrain from the operation of any equipment or instrumentation without proper instruction and authorization;
6. Remain aware of the hazards of the chemicals in the lab and how to handle hazardous chemicals safely; and

7. Request information and training when unsure how to handle a hazardous chemical or procedure.

STANDARD OPERATING PROCEDURES

"Standard operating procedures relevant to safety and health considerations to be followed when laboratory work involves the use of hazardous chemicals." 29 CFR 1910.1450(e)(3)(i)

The Plan represents a minimum set of guidelines for the handling of toxic chemicals on campus. Individual administrative units, laboratories or research groups are required to develop more detailed procedures as their situations warrant. Acceptable lab safety references of this document may be adopted in whole or may be useful in developing additional procedures. In all situations, individual faculty or staff will be responsible for enforcing adequate safety and hygiene measures in laboratories they supervise. If necessary, additional assistance from the Environmental Health and Safety Coordinator is available.

Some rules or standard operating procedures which apply to all labs on campus include the following:

General

Respect and understand the safety and health hazards associated with the chemicals and equipment in your laboratory, and practice the following general safety guidelines at ALL times:

- ***Unattended experiments.*** Leaving hazardous systems unattended is not good practice.
- ***Working alone.*** When working with hazardous materials, it is advisable to have a second person present, or at a minimum, maintain surveillance via telephone contact.
- ***Housekeeping.*** Exits, aisles and safety equipment must NOT be obstructed in any way with equipment, furniture, etc. Work areas and floors are not to be used for excessive storage. No unauthorized items shall be stored in the corridors. The Environmental Health and Safety Coordinator may be contacted for permission to store items in the corridors.
- ***Food, drink cosmetics.*** Eating, drinking, and the application of cosmetics is forbidden in areas where hazardous chemicals are used and shall be done only in well-

defined designated nonchemical areas. Do not store food in the same refrigerator with chemicals, biohazards or radioactive materials.

- **Horseplay.** Horseplay is forbidden.
- **Equipment.** Use proper equipment that is in good condition. For example, never use chipped or cracked glassware. Shield pressurized or vacuum apparatus and safeguard against bumping or overheating.
- **Disposal of chemicals.** Disposal of all laboratory waste shall follow the procedures outlined in a guide entitled Chemical Waste Management Guide, a copy of which is available at the Campus Services. In general, contact Biological and Chemical Management Section of the Center for Environmental Health and Safety to request a pickup.
- **Chemical spills and accident response.** Consult the Chemical Waste Management guide concerning chemical spills. For large spills/leaks call 911.
- **Mouth pipetting.** Mouth pipetting is forbidden.
- **Mercaptans.** To avoid false reporting of natural gas leaks, logs of mercaptan use should be kept when mercaptans will be used in a laboratory in such a manner that persons outside of the laboratory could smell the mercaptan and suspect a natural gas leak in the building.
- **Particularly dangerous chemicals,** for example, perchloric acid. If perchloric acid is heated above ambient temperature it will give off vapors that can condense and form explosive perchlorates. Hence, when heating perchloric acid above ambient temperature, a perchloric acid hood with a wash down system or a local scrubbing or trapping system should be used.

Personal Protection/Hygiene

Personal protection and personal hygiene are two very basic aspects of laboratory safety. Wearing appropriate personal protection and practicing good personal hygiene as described

below will minimize exposures to hazardous chemicals during routine use and in the event of an accident:

- **Attire.** Wear a lab coat or apron, cover feet (no sandals or open-toe shoes), and confine loose clothing and long hair.
- **Gloves.** Gloves are essential when working with hazardous substances. The proper gloves will prevent skin absorption, infection, or burns. All glove materials are not equally effective in protection from chemical hazards. Consult a chemical resistance chart such as the one found in Appendix 3 or contact the Environmental Health and Safety Coordinator for assistance in appropriate selection. Gloves must be removed before leaving the laboratory.
- **Eye protection.** It is state law and campus policy that personnel including students, staff, and visitors in laboratories wear safety glasses, goggles, or face shields at all times where eye hazards are a possibility. Goggles are recommended when chemical splashes are possible.
- **Face shields.** Face shields which cover the neck and ear areas should be worn when conducting a procedure which may result in a violent reaction.
- **Glass tubing.** When inserting tubing into stoppers, lubricate tubing and protect hands from being cut in the event of the tubing slipping and breaking.
- **Personal hygiene.** Hands should be washed frequently throughout the day, before leaving the lab, after contact with any hazardous material, and before eating or smoking.

Hazardous Material Handling and Storage

Hazards associated with various chemicals and gases vary widely. Understanding the hazards associated with a compound and minimizing the quantity used and stored in the lab will decrease the chance of injury.

- **Chemical storage.** Chemicals ideally should be stored by compatibility, not by alphabetical arrangement. Oxidizers should be separated from organics, air/water reactives must be kept dry and cyanides should be stored away from acids.

Volatile toxic substances shall be stored in volatile storage cabinets adequate to the purpose or in hoods when storage cabinets are unavailable. If volatile substances are stored in a hood, other uses of the hood shall be restricted to activities compatible with the chemical and physical properties of the stored or used chemicals. When volatiles must be stored in a cooled atmosphere, explosion-proof refrigerators or cold rooms designed for this purpose must be used.

- ***Chemical handling.*** Use bottle carriers for transporting chemicals which are in glass containers. Close caps securely and avoid storing chemical containers in hard to reach areas. Pour chemicals carefully, and never add water to concentrated acid. Metal containers and nonconductive containers (e.g., glass or plastic) holding more than five gallons must be grounded when transferring flammable liquids.
- ***Cylinder storage.*** Cylinders must be stored in well-ventilated areas with their protective caps screwed on and the cylinder secured (e.g., strapped or chained down) to reduce the chance of the cylinder being knocked over. Do not store cylinders near heat or highly trafficked areas. Do not store flammables and oxidizers together. Do not store empty and full cylinders together. Storage of large quantities of cylinders must be done in an approved gas cylinder storage area.
- ***Cylinder handling.*** Use appropriate handcarts to move cylinders. Cylinders must be secured to the cart during transport. Highly toxic gases should not be moved through the corridors, particularly during business hours. Always consider cylinders as full and handle them with corresponding care.
- ***Labels.*** Make sure all labels are legible. Label all secondary containers with the chemical name and appropriate hazards. Date all peroxidizable and other chemicals which may become unstable over time; test and/or dispose of them when appropriate.
- ***Containers.*** Check the integrity of containers. Observe compatibilities, for example, hydrofluoric acid must not be

stored in glass and some oxidizers should not be stored in plastic containers.

CONTROLLING CHEMICAL EXPOSURES

"Criteria that the employer will use to determine and implement control measures to reduce employee exposure to hazardous chemicals including engineering controls, the use of personal protective equipment and hygiene practices; particular attention shall be given to the selection of control measures for chemicals that are known to be extremely hazardous."

29 CFR 1910.1450(e)(ii)

There are three major routes of entry for a chemical to enter the body: inhalation, skin and eye contact and ingestion. Three types of controls for prevention of these various routes of entry include: engineering controls, personal protective equipment and administrative controls. Each route of entry a chemical can take to enter the body can be controlled by a number of varying controls as explained below:

1. Inhalation hazards

Inhalation of chemicals is the most common route of entry a chemical can take to enter the body. To avoid significant inhalation exposure, engineering controls such as substituting a less volatile or a less toxic chemical or substituting a liquid or solid chemical for a gaseous one is the best means of control. If substitution is not practical, ventilation should be used to lessen the chance of overexposure. The use of well-functioning local exhaust ventilation such as ventilation hoods, biological safety cabinets, vented glove boxes and other local exhaust systems is often required to minimize exposure to hazardous chemicals. Dilution ventilation may be used to reduce exposure to nonhazardous nuisance odors. For extremely toxic chemicals such as those classified as poison gases by State or Federal Department of Transportation (e.g., arsine, phosgene) the use of closed systems, vented gas cabinets, failsafe scrubbing, detection or other stricter controls may be required.

If both substitution and engineering controls are unavailable, the use of personal protective equipment may be required to reduce inhalation exposures. Respiratory protection from dust masks to self-contained breathing apparatus may be utilized to this end. If laboratory employees wear respirators, requirements of the OSHA Respirator Standard (1910.139) must be met. This Standard requires training in the proper use of respirators, medical surveillance to ensure the user is capable of wearing a respirator, and fit testing to ensure that

the respirator fits properly. A lab worker or his/her supervisor should contact the Environmental Health and Safety Coordinator in the event that respiratory protection is utilized to control exposures to hazardous chemicals.

Finally, administrative controls can be utilized to reduce the risk of overexposure to hazardous chemicals. Some examples of administrative controls include:

- Minimization of exposure time for individual employees;
- Restricted access to an area where a hazardous chemical is used;
- Allowing a process that emanates nuisance odors to be done only after typical office hours, when most of the staff in the buildings have gone home; and,
- Proper signage on lab doors to indicate special hazards within, a list of lab supervisor and occupants of the lab who should be contacted in the event of an emergency and appropriate telephone numbers.

2. Skin/eye contact hazards

To reduce the risk of a chemical entering the body via skin and eye contact, engineering controls include substitution and appropriate ventilation as described above in Inhalation hazards. The more obvious means of preventing skin and eye contact is the wearing of personal protective equipment such as eye protection, face shields, gloves, appropriate shoes, lab aprons, lab coats, and other protective equipment as appropriate to the hazard. Since the chemical resistivity of the different types of protective equipment varies significantly, the lab supervisor should consult Appendix 3 or other references to ascertain that the protective equipment material is resistant to the chemical being protected against.

Administrative controls to reduce skin/eye contact include:

- Enforcement of policies pertaining to skin and eye protection; and,
- Discarding or repair of cracked or broken glassware.

3. Ingestion

Ingestion of chemicals is the least common route of entry into the body. However, a laboratory worker can easily ingest chemicals into the body via contaminated hands if they are not washed prior to eating, smoking, or sticking part of the hand or a writing tool that has been in contaminated hands into the mouth. Some controls for preventing this route of exposure include engineering controls, such as isolating the hazardous substance so minimal contact is required (e.g., use glove box), personal protective equipment such as the wearing of gloves, and administrative controls such as restricting mouth pipetting, encouraging good personal hygiene and designating a well-marked nonchemical area where eating, drinking and the application of cosmetics is permitted.

At the request of faculty, staff or students, exposure evaluations may be conducted by the Environmental Health and Safety Coordinator for any suspected overexposure to substances regulated by OSHA and/or ACGIH TLV's. [Note: ACGIH TLV is "American Conference of Governmental Industrial Hygienists Threshold Limit Value".] Records of exposure evaluations will be kept at the Campus Services.

VENTILATION HOODS AND OTHER ENGINEERING CONTROLS

"A requirement that fume hoods and other protective equipment are functioning properly and specific measures that shall be taken to ensure proper and adequate performance of such equipment."
29 CFR 1910.1450(e)(3)(iii)

Laboratory Ventilation Hoods

The ventilation hood is the primary laboratory ventilation control system for protecting laboratory personnel from exposure to hazardous chemicals. The hood itself is one component of the system which consists of a working chamber, an exhaust system, proper hood location, make-up air to the hood, a hood monitoring system, hood operating parameter, routine performance surveys, and system maintenance.

Ventilation Hood Air Flow

Air flow patterns are affected by many factors, including traffic patterns, room make-up air, doorways, room size, hood location, work practices, objects inside the hood, baffle adjustment, and sash opening. These are considerations for design, installation and use of ventilation hoods. Ideally, the air should flow into the lab from doors, hallways and the room air supply and exit the room through the ventilation hood. There should not be any turbulence at the hood face which could spill contaminated air into the room. All areas of the open hood face should have a velocity sufficient to draw room air and not spill contaminated air from the hood.

Hood Classification Guidelines

Standards of performance for ventilation hoods are set forth by ANSI/AIHA Z9.5 and OSHA 29 CFR 1910.145(e)(3)(iii). The average face velocity of optimally performing hoods should be between 80 and 120 feet per minute (FPM) when measured with the sash raised to the 18" mark. These average face velocities and the date of survey will appear on the inspection sticker located on the front of the ventilation hood. Ratings are also stated according to the hood performance as follows:

<u>SCORE</u>	<u>CRITERION</u>	<u>USAGE</u>
Pass	Average face velocity 80-120 fpm	Normal chemical hood use

Restrict	Average face velocity 70-79 or 121-150 fpm	Not recommended for use With highly toxic materials
Fail	Not meeting the above standards	Storage only

Ventilation Hood Work Practices

1. All work involving hazardous chemicals should be performed inside a ventilation hood.
2. Before work begins, check to be sure the hood fan is turned on.
3. Check the airflow by observing the monitor, or in the absence of a monitor use a "kimwipe" taped to the open sash.
4. Check the inspection sticker to determine if the hood has been currently (yearly) inspected and what performance rating it was given. If observable questions arise about inspection or current hood performance, contact the Environmental Health and Safety Coordinator (EHS) for assistance.
5. Ventilation hoods should be used with the sash positioned at 18" or lower when possible for optimal performance and as a protective shield.
6. All equipment and materials should be located at least 6" back inside the hood from the sash face.
7. Large items should be elevated at least 2" from the hood base to insure airflow to the baffle opening at the rear interior base of the hood.
8. Do not use the ventilation as a storage cabinet. Excessive storage can obstruct air flow and cause areas of low air velocity at the face opening.
9. Do not extend face or head inside the hood.
10. Minimize traffic and other sources of cross drafts (i.e. open windows, doors, fans, etc.) which may pull contaminated air from the hood.

11. When using electrical equipment in a hood take extra precautions to prevent spark sources from causing fire or explosion. All electrical connections should be made outside the hood.
12. Do not use perchloric acid heated above ambient temperature in a ventilation hood unless it is a specifically designed perchloric acid hood with a wash-down system.
13. Emergency plans should be understood by all hood users in the event of an unexpected occurrence such as fire or explosion in the hood.
14. If assistance is needed regarding the safe operation of a ventilation hood, contact the Environmental Health and Safety Coordinator.

EMPLOYEE INFORMATION AND TRAINING

"Provisions for employee information and training as prescribed in paragraph (f) of this section." 29 CFR 1910.1450(e)(3)(iv)

All individuals who work in laboratories who may be exposed to hazardous chemicals must be apprised of the hazards of chemicals present in their work area. This information and training as outlined below must be provided before initial assignment and before new exposure situations. Equipment necessary for the safe handling of hazardous substances must also be provided. Upon request by Departments or other administrative units, the Environmental Health and Safety personnel will give presentations concerning general lab safety practices. However, training specific for the particular lab where an employee is assigned is the responsibility of that employee's supervisor. The supervisor shall determine the frequency of refresher information and training:

Information

Laboratory workers shall be informed of the location and availability of the following:

- 29 CFR Part 1910.1450 "Occupational Exposures to Hazardous Chemicals in Laboratories" (OSHA Lab Standard);
- Chemical Hygiene Plan;
- Reference materials on chemical safety, including Material Safety Data Sheets (MSDSs);
- Permissible exposure limits (PELs) for OSHA regulated substances, or if there is no applicable OSHA Standard, the recommended exposure limits or threshold limit value (TLVs) may be provided; and,
- Signs and symptoms associated with exposure to the hazardous chemical found in the lab.

Training

Laboratory work training shall include:

- Detection methods and observations that may be used to detect the presence or release of a hazardous chemical. Examples of detection methods include visual appearance, odor, and an understanding of chemical monitoring devices;

- Physical and health hazards of the chemicals; and,
- The work practices, personal protective equipment, and emergency procedures to be used to ensure that the employee may protect himself/herself from overexposure to hazardous chemicals.

The manufacturer's Material Safety Data Sheets will generally contain most of the above information needed to comply with the information and training requirements of the OSHA Lab Standard. Hence, employees should peruse and understand the relevant MSDSs and/or other comparable literature on the hazardous chemicals which are used or stored in their laboratory. The employee's supervisor must provide additional training for specific lab hazards.

The OSHA Lab Standard, the SIUC Chemical Hygiene Plan, a library of MSDSs and other health and safety references are maintained at the Campus Services Environmental Health and Safety Office and are available to students, faculty or staff upon request. A list of safety and industrial hygiene literature available from the Environmental Health and Safety Office is found on the Reference page.

Copies of MSDSs may be obtained from the chemical supplier or from the Environmental Health and Safety Coordinator. Although the Environmental Health and Safety Coordinator maintains a library of MSDSs, individual departments or laboratories must maintain their own files of Material Safety Data Sheets and other reference materials.

PRIOR APPROVAL

"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."
29 CFR 1910.1450(e)(3)(v)

The responsibility for approval of the acquisition and use of toxic chemical agents rests with the laboratory supervisor. Certain materials including radioactive materials, recombinant DNA and certain biohazards require prior internal (campus) or external approval at various levels. If there are questions concerning the need for approvals, the Environmental Health and Safety Coordinator should be consulted.

MEDICAL CONSULTATION

"Provisions for medical consultation and medical examinations in accordance with paragraph (g) of this section."
29 CFR 1910.1450(e)(3)(vi)

An opportunity to receive medical consultation shall be provided under the following circumstances: if an employee develops any symptoms thought to arise from chemical overexposure; after an event such as a major spill, leak or explosion which may result in an overexposure; or an overexposure is identified as the result of an evaluation by the Chemical Hygiene Officer. The Student Health Program will designate one or more physicians at any given time to be consulting physicians. Following notification of overexposure, arrangements for an appropriate medical examination must be completed before the exposed individual may return to work. Any medical examination required by this Plan shall be provided without cost to the employee, without loss of pay and at a reasonable time and place. Records of any medical examination will be maintained at the Health Services Office.

Note: *In the event of an accident leading to serious or life-threatening injury, the employee should be taken by ambulance directly to the Laurens County Hospital Trauma Center.*

CHEMICAL HYGIENE OFFICER

"Designation of personnel responsible for implementation of the Chemical Hygiene Plan including the assignment of a Chemical Hygiene Officer and, if appropriate, establishment of a Chemical Hygiene Committee."
29 CFR 1910.1450(e)(3)(vii)

The Environmental Health and Safety Coordinator will be designated as the Chemical Hygiene Officer for PC. **The Hazardous Waste Oversight Advisory Committee will serve as the PC Chemical Hygiene Committee.**

Academic units should appoint their own Chemical Safety Representatives to help implement this Plan in their units.

SPECIAL PROVISIONS FOR SELECT CARCINOGENS, REPRODUCTIVE TOXINS AND ACTUELY TOXIC CHEMICALS

"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. Specific consideration shall be given to the following provisions which shall be included where appropriate:

- (A) *Establishment of a designated area;*
 - (B) *Use of containment devices such as fume hoods or glove boxes;*
 - (C) *Procedures for safe removal of contaminated waste; and*
 - (D) *Decontamination procedures."*
- 29 CFR 1910.1450(e)(3)(viii)*

In addition to the general safety guidelines mentioned in the first section and throughout the Plan, special precautions are needed when handling genotoxins, reproductive toxins and chemicals with a high degree of acute toxicity. A minimum set of guidelines that should be followed are listed below. The lab supervisor should ensure that these and other precautions designed to minimize risk of exposure to these substances are taken:

- Quantities of these chemicals used and stored in the laboratory should be minimized, as should their concentrations in solutions or mixtures.
- Work with genotoxins, reproductive toxins and acutely toxic chemicals should be performed within a functioning hood, biological safety cabinet, ventilated glove box, sealed system, or other system designed to minimize exposure to these substances. (The exhaust air from the ventilation systems may require scrubbing before being released into the atmosphere.) In all cases, work with these types of chemicals shall be done in such a manner that the OSHA permissible exposure limits or similar standards are not exceeded.
- Compressed gas cylinders, which contain acutely toxic chemicals such as arsine and nitrogen dioxide, should (and may be required to) be kept in ventilated gas cabinets.

- The ventilation efficiency of the designated ventilation hood, glove box or gas cabinet, and the operational effectiveness of mechanical and electrical equipment used to contain or manipulate these special substances should be evaluated periodically by the laboratory personnel at intervals determined by the laboratory supervisor. The interval of evaluating systems may vary from weekly to biannually depending upon the frequency of usage, quantities employed and level of hazard.
- Each laboratory utilizing these substances must designate an area for this purpose and must sign or mark this area with an appropriate hazard warning. The designated area may be an entire laboratory, an area of the laboratory or a device such as a ventilation hood or glove box. The designated area should be marked with a DANGER, specific agent, AUTHORIZED PERSONNEL ONLY or comparable warning sign.
- All laboratory workers who work in a laboratory which has an area designated for use with genotoxins, reproductive toxins and acutely toxic chemicals must have training regarding the deleterious effects of these substances as well as signs and symptoms regarding exposure to these substances, whether or not they actually work with the substance themselves. Training to ensure the safe handling and storage of these substances is required for those who use these materials. This training is the responsibility of the laboratory supervisor and must be done prior to the use of any of these materials.
- Laboratory workers working with these chemicals must have access to appropriate protective equipment and clothing (available at no expense to the workers) and must be trained on how to properly utilize the safety equipment. For example, when working with highly toxic gases, it is often recommended that the workers have available and be trained to use self-contained breathing apparatus.
- Detection equipment may be required in laboratories where chemicals (especially poisonous gases) with a high degree of acute toxicity are utilized.
- All wastes contaminated with these substances should be collected and disposed of in a timely manner and appropriately as outlined in the Environmental Health and Safety's waste

disposal guide mentioned previously. For special disposal information, call the Biological and Chemical Management Section or the Environmental Health and Safety Coordinator. If possible and as soon as practical, waste shall be destroyed by a suitable, generally acceptable chemical procedure to lessen or eliminate their toxicity.

- The designated working area shall be thoroughly and appropriately decontaminated and cleaned at regular intervals determined by the laboratory supervisor. The interval may be a short as one day or as long as six months depending upon the frequency of usage and level of hazard.
- Special precautions to avoid release and exposure to highly toxic chemicals, genotoxins and reproductive toxins must be utilized. For instance, volatile substances should be kept cool and contained; gases should have properly functioning valves, check valves, regulators, containment which can withstand pressure buildup, and appropriate piping and dispersive solids should be kept in closed containers, used in places with minimum air currents, and appropriate contact materials should be used to avoid static charging.
- Emergency response planning for releases or spills shall be prepared by the lab supervisor and included in the training of the laboratory workers and others who may be affected in the building. The Environmental Health and Safety Coordinator should be involved in this planning.

APPENDIX 1

PRESBYTERIAN COLLEGE Chemical Hygiene Plan - Awareness Certification

The Occupational Safety and Health Administration (OSHA) requires that laboratory employees be made aware of the Chemical Hygiene Plan at their place of employment (29 CFR 1910.1450). The South Carolina Department of Labor enforces this OSHA Standard at PC.

After reading the "Model Chemical Hygiene Plan" and other relevant health and safety guidelines as provided to you by your supervisor, please complete and return this form to your supervisor or departmental office. By signing below, you acknowledge that you are aware of the Chemical Hygiene Plan and the policies and procedures applicable to the OSHA Lab Standard (29 CFR 1910.1450). Your supervisor will provide additional information and training as appropriate.

Signature_____ Date_____

Name (please print)

Social Security Number

Supervisor, P.I. for area

Department

Building(s)/Room No(s)

Job Classification

APPENDIX 2

PRESBYTERIAN COLLEGE

(Department)

Employee Laboratory Safety Training Record

The PC Model Chemical Hygiene Plan requires that laboratory supervisors train their employees on the following topics:

- The location and availability of the OSHA Lab Standard, SIUC Model Chemical Hygiene Plan, chemical safety reference materials (including Material Safety Data Sheets), and OSHA PELS if available;
- Location and availability of the signs and symptoms associated with exposure to the hazardous chemicals with which employees work;
- Detection methods and observations that may be used to detect the presence or release of a hazardous chemical in the lab, e.g., odor, monitoring equipment or visual appearance;
- The physical and health hazards of the chemicals with which employees work; and,
- Work practices, personal protective equipment and emergency procedures to be used to ensure protection from overexposure to the hazardous chemicals with which employees work.

In addition to the training given by the lab supervisor, it is the employee's responsibility to request information and training when unsure how to handle a hazardous chemical or procedure and to follow all health and safety rules while working in the lab.

After training has been received from the laboratory supervisor, please complete this form and return it to your departmental office where it will be kept in your personnel file. Please feel free to write any comments or notes on the back of this page indicating the type of training you have received.

(Employee's Signature)

(Date)

Employee's Name (please print)

(Social Security No.)

Lab Supervisor's Name (please print)

APPENDIX 3

The column headings in Table 6.1 stand for the following materials:

- Butyl – Butyl rubber
- CPE – Chlorinated polyethylene
- Viton/Neoprene – Layered material, first material on surface
- Natural Rubber – same
- Neoprene – same
- Nitrile + PVC – Nitrile rubber + polyvinyl chloride
- Nitrile – Nitrile rubber
- PE – Polyethylene
- PVA – Polyvinyl alcohol
- PVC – Polyvinyl chloride
- Viton – same
- Butyl/Neoprene – Layered material, first material on surface

Taken from CRC Handbook of Laboratory Safety, 4th ed.

APPENDIX 4

OSHA Lab Standard

Please see

<http://www.cehs.siu.edu/Chemical/CHP/Appendix%204.htm> for more information concerning the OSHA Lab Standard.

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