

# Safety and Security

## Policy 70190: Chemical Hygiene Plan

### 1. Purpose

1.1. The Occupational Safety and Health Administration (OSHA) regulation for occupational exposures to hazardous chemicals in laboratories, federal regulation 29 CFR 1910.1450 as adopted by Virginia, requires that each facility engaged in the laboratory use of hazardous chemicals develop and implement a written program known as a Chemical Hygiene Plan which identifies procedures, equipment, personal protective equipment and work practices that will:

- Protect faculty, staff and students from the health hazards presented by hazardous chemicals used in that particular laboratory; and,
- Keep potential hazardous chemical exposures to faculty, staff and students below the OSHA, permissible exposure levels (PEL) or as low as reasonably achievable.

### 2. Policy

2.1. This Plan implements guidelines and work practices that are capable of protecting faculty, staff and students from health hazards presented by hazardous chemicals used in laboratories. It is the basis for the chemical hygiene plan to insure the proper implementation of controls to protect the safety and health of every faculty, staff and student. It is to be used in conjunction with the Hazard Communication Plan. Faculty, Staff and Students may be exposed to hazardous chemicals in the course of their classes and all individuals with primary duties which involve laboratory operations are required to follow the provisions of this plan.

#### 2.2 Responsibilities

2.2.1. The Dean of Instruction has designated the Laboratory and Research Specialist I at the Locust Grove Campus to serve as Chemical Hygiene Officer for all its laboratories. The Chemical Hygiene Officer is the primary liaison for laboratory chemical safety issues. The Chemical Hygiene Officer works closely with the College Safety/Security Manager to ensure an optimal safety environment exists in the College's laboratories.

**2.2.2. Laboratory Instructors:** All laboratory instructors have responsibility for routine chemical hygiene and safety within their laboratory. The following are minimum responsibilities:

- Insure that everyone knows and follows all safety procedures for the specific activities taking place.
- Provide regular chemical safety and housekeeping inspections of each area for proper equipment and procedures.
- Know the current requirements for regulated substances used in that laboratory. The instructor must know the current product information on proper use, storage, handling and disposal.
- Determine the required levels of personal protective equipment and facility engineering controls, such as ventilation.
- Keep the quantities of hazardous materials at a minimum. Purchase only the quantities which are most likely to be fully used and limit the generation of hazardous waste.
- Establish and maintain a depository of Material Safety Data Sheets (MSDSs) for all chemicals and products used in their laboratory.

### **2.3. General Principals**

**2.3.1. Minimize Exposure:** It is prudent to minimize all chemical exposures. Because few laboratory chemicals are without hazards, general precautions for handling all laboratory chemicals should be adopted, rather than specific guidelines for particular chemicals. Inhalation, ingestion and skin contact with chemicals should be avoided as much as possible.

**2.3.2. Minimize Risk:** Do not underestimate the health and safety risks involved with any chemical. Exposure should be minimized for substances of unknown hazards and for work with substances which present special hazards. One should presume that any mixture will be more toxic than its most toxic component and that all substances of unknown toxicity are toxic.

**2.3.3. Ventilation:** Adequate ventilation must be provided. The best way to prevent exposure to airborne substances is to prevent mists, fumes, gases, etc. from getting into the working atmosphere or a person's breathing zone in unsafe concentrations by use of hoods, exhaust fans, or other ventilation devices.

**2.3.4. Hazardous Waste Disposal:** Dispose of all hazardous waste materials in accordance with College established procedures. Contact the Safety/Security Manager for assistance.

### **2.4. Exposure Determination**

**2.4.1.** Initial monitoring of potential chemical exposure of laboratory participants to hazardous substances is only required if a substance is regulated by a standard which requires monitoring and if there is reason to believe that exposure levels for that substance is routinely exceeding the action level for OSHA requirements.

2.4.2. Proper ventilation, personal protective equipment (PPE), good hygiene and prudent work practices are all measures that can be taken to reduce the probability of laboratory exposure. Periodic spot checks of laboratory facilities should be conducted to insure that these actions are being implemented.

## 2.5. Medical Assistance

2.5.1. Immediate medical attention is provided through emergency services. Dial 911 for emergency services.

2.5.2. Information specific to the incident must be provided. This includes the identity and amount of the hazardous chemical(s); a MSDS (if possible); and conditions of how the exposure occurred.

## 2.6. Equipment

2.6.1. **Design:** Each laboratory should have an appropriate general ventilation system suitable for personal comfort levels and not create indoor air quality problems. Adequate storage areas should be provided, as well as laboratory fume hoods, safety eyewash fountains and deluge showers.

2.6.2. **Maintenance:** Building mechanical and fire safety systems must be operable and provide a high level of protection to building occupants and equipment.

2.6.3. **Usage:** The type of work being performed and its scale or level of effort must be appropriate to the size and type of the laboratory facility available.

## 2.7. Ventilation

2.7.1. General ventilation is provided primarily for occupant comfort, it should not be relied on for protection from toxic substances released into the laboratory. Local exhaust ventilation and fume hoods are required to protect people from overexposure to chemicals.

2.7.2. Fume hoods should be monitored to confirm proper operation. Periodic ventilation surveys should be performed to insure adequate air flow. Do not use a fume hood if the fan does not operate.

2.7.3. General room air flow should not be turbulent and other room fans should not be directed toward fume hoods.

2.7.4. All ventilation systems should be evaluated upon installation, monitored regularly and re-evaluated whenever changes are made.

## 2.8. Personal Protective Equipment(PPE)

2.8.1. PPE includes clothing, gloves, aprons, glasses or goggles that will be provided at no cost to Faculty, Staff or Students. PPE must be compatible with the hazards of the chemical in use. The MSDS provides information as the type of PPE to be used. Actual selection may vary depending on availability of other equipment such as fume hoods, ventilation systems, etc.

2.8.2. Eye protection must be used at all times during the performance of laboratory procedures.

**2.8.3.** Students, faculty and staff should dress appropriately while working in the laboratory. Sandals, short pants and bare feet are not allowed.

### **3. Procedures**

#### **3.1. Chemical Safety Rules**

- 3.1.1.** Follow all safety instructions carefully as provided by each Instructor.
- 3.1.2.** Perform only authorized experiments. Instructors who are responsible for experiments must inform others in the immediate area of any potential hazards.
- 3.1.3.** Immediately report all accidents and unusual occurrences.
- 3.1.4.** Horseplay cannot be tolerated in any laboratory or where any chemicals are being used.
- 3.1.5.** Do not eat in the laboratory or any place where chemicals are stored and/or used.
- 3.1.6.** Compressed gas cylinders:
  - Keep compressed gas cylinders secured by using a chain, strap, or stand to prevent tipping or falling at all times.
  - Identify the contents with a legible label.
  - Do not expose to temperatures above 125°F or 51.7°C.
  - Use a cart to move.
  - Do not lubricate, modify or tamper with cylinder valve.

#### **3.2. Planning Laboratory Experiments**

- 3.2.1.** List all possible reactions, including side reactions, before starting. Consider all reactants, intermediates and products in terms of flammability, toxicity and reactivity. Follow recognized safety procedures concerning protective equipment, housekeeping and handling as described on MSDSs and manufacturers instructions.
- 3.2.2.** If a reaction is unknown, always start with small quantities of material and carefully observe reaction characteristics such as temperature, color, viscosity and physical state. Obtain safety data on reactants and products from reference books, analysis or MSDS. Provide adequate cooling, ventilation, pressure relief, and gas purging. Isolate the reaction vessel, if possible, and make frequent inspections of the reaction and equipment.
- 3.2.3.** Know what to do in case of accident. Follow established procedures in case of fire, bodily injury, equipment failure or power failure.

#### **3.3. Housekeeping**

- 3.3.1.** Used equipment, chemicals, and supplies should not be left on bench tops or in fume hoods. Return used apparatus to designated storage areas.
- 3.3.2.** Keep the assembled equipment orderly and back from the bench edge.

- 3.3.3. Aisles, walkways and exit doorways should be clear, dry and free of obstructions.
  - 3.3.4. Equipment and supplies should not block access to fire extinguishers, safety showers, eyewash fountains or other emergency equipment.
  - 3.3.5. Keep drawers and cabinet doors closed when not in use.
  - 3.3.6. Clean up dropped or spilled material immediately for disposal in an appropriate waste container. Chemical spills and leakages should be neutralized when necessary and cleaned up immediately. Chemical spill clean-up kits should be available in each lab with appropriate materials for the chemicals in that area.
  - 3.3.7. Do not eat or smoke in the laboratory or use laboratory glassware as containers for foods or beverages.
  - 3.3.8. Do not store food in laboratory refrigerators.
- 3.4. Procurement/Storage/Inventory**
- 3.4.1. Procurement: Information on proper handling, storage and disposal should be known to those who will use it prior to receipt of the hazardous substance.
  - 3.4.2. Labels on incoming containers of hazardous chemicals are not to be removed or defaced.
  - 3.4.3. Storage:
    - Hazardous chemicals should be segregated in an area with proper ventilation, containment and adequate handling and emergency equipment available. Containers should be examined regularly for deterioration or other abnormal features. Storage areas should not be used for other operations and should be controlled by a designated individual.
    - Acids should be segregated from bases and active metals such as sodium, potassium, magnesium, etc.
    - Store flammables only in approved safety cans or cabinets. Segregate from oxidizers and keep away from sources of ignition.
    - Store oxidizers in cool, dry place away from combustible material.
    - Store water reactive chemicals in a cool, dry place and post warning signs not to fight fire with water.
    - Store pyrophorics in a cool, dry place in airtight containers.
  - 3.4.4. Inventory
    - Inventory storage should be kept at a minimum. Exposure to heat or direct sunlight should be avoided and unused or unneeded items should be disposed of as hazardous waste.
    - Hazardous chemicals shall be inventory at the end of each semester with the quantities and amount of each chemical. Documentation of the Hazardous chemicals quantities and amounts shall be provided to the Chemical Hygiene Officer and Safety/Security Manager

### **3.5. Signs**

- 3.5.1.** Location signs for safety showers, eyewash stations, other safety and first aid equipment, exits and storage areas should be posted. Warning signs designating restricted areas or hazardous equipment are also required.

### **3.6. Training**

- 3.6.1.** Faculty, staff and student training will be accomplished and documented through the use of lecture, conference, or appropriate audio visual media.

### **3.7. Waste Disposal**

- 3.7.1.** Follow procedures established for Hazardous Waste Disposal. Contact the Safety/Security Manager.

## **4. Definitions**

- 4.1.** Chemical Hygiene Officer means an employee who is designated by the employer, and who is qualified by training or experience, to provide technical guidance in the development and implementation of the provisions of the Chemical Hygiene Plan.
- 4.2.** Chemical Hygiene Plan means a written program developed and implemented by the employer which sets forth procedures, equipment, personal protective equipment and work practices that are capable of protecting faculty, staff and students from the health hazards presented by hazardous chemicals.
- 4.3.** Hazardous chemical means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed faculty, staff and students.
- 4.4.** Laboratory means a facility where the "laboratory use of hazardous chemicals" occurs.

## **5. References**

College of William and Mary, Chemical Hygiene Plan  
University of Mary Washington, Laboratory Standard  
OSHA 29 CFR 1910.1450, Chemical Hygiene

## **6. Point of Contact**

Garland Fenwick  
Facilities Manager

## **7. Approval and Revision Dates:**

Approved by President's Council on February 12, 2007.

