CHEMICAL HYGIENE PLAN
Columbia Gorge Community College

I. INTRODUCTION

A. Background: Faculty, staff and students perform laboratory analyses, conduct tests, research and teach to accomplish the College's mission. The Oregon Occupational Safety and Health Administration's (OROSHA) regulation for occupational exposures to hazardous chemicals in laboratories, federal regulation 29 CFR 1910.1450 as adopted by Oregon, requires that each facility engaged in the laboratory use of hazardous chemicals develop and implement a written program know as a Chemical Hygiene Plan which identifies procedures, equipment, personal protective equipment and work practices that will:

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

B. Purpose: This Plan implements guidelines and work practices that are capable or protecting employees from health hazardous presented by hazardous chemicals used in laboratories. It is the basis for the chemical hygiene program to insure the proper implementation of controls to protect the safety and health of every laboratory worker. It is to be used in conjunction with the Hazard Communication Program.

C. Scope: All laboratory workers may be exposed to hazardous chemicals in the course of their assignments and all individuals with primary duties involve laboratory operations, are required to follow the provisions of this plan.

II. RESPONSIBILITIES

A. Science department faculty has the ultimate responsibility for the safe use and handling of chemicals.

B. All faculty are responsible for continued support of this plan in their daily activities.

C. The Facilities Services Office will have overall responsibility for establishing and administering the Plan.

D. Each affected department is responsible for appointing a person for coordination and local implementation of the Plan. This position must be held by a qualified person adequately trained and experienced in the recognition of chemical hazards and able to support the safety and health protection procedures.

E. Laboratory Supervisors: All laboratory supervisors have responsibility for routine chemical hygiene and safety within their facilities. The following are minimum responsibilities:

1. Insure that everyone knows and follows all safety procedures for the specific activities taking place.

2. Provide regular chemical safety and housekeeping inspections of each area for proper equipment and procedures.
3. Know the current requirements for regulated substances used in that laboratory. The principle workers must know the current product information on proper use, storage, handling and disposal.
4. Determine the required levels of personal protective equipment and facility engineering controls, such as ventilation.
5. 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.
6. Establish and maintain a depository of Material Safety Data Sheets (MSDSs) for all chemicals and products used by their laboratory workers.

F. Laboratory workers and students: Everyone working in the laboratories is responsible for planning and conducting all operations in accordance with safe chemical hygiene procedures as instructed.

III. GENERAL PRINCIPLES

A. 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 that specific guidelines for particular chemicals. Inhalation, ingestion and skin contact with chemicals should be avoided as much as possible.

B. Minimize Risk: Do not under estimate 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 that its most toxic component and that all substances on unknown toxicity are toxic.

C. 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.

D. Hazardous Waste Disposal:

- No chemicals of any sort will be flushed or disposed of down the drain or disposed in any way that violates this policy.
- All acids will be neutralized.
- All heavy metals will be segregated in a negative vacuum.
- All organic chemicals will be handled in the same manner.
- When waste has reached a level of 100 grams they will be disposed of in an approved facility in accordance with proper procedures.
- Dispose of all hazardous waste materials in accordance with College established procedures. Contact the Facilities Services office for assistance.

IV. LABORATORY FACILITIES

A. 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.

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

C. 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.

D. Ventilation

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. 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. A fully opened hood face velocity should be moving an average of 100 feet per minute of air.
3. Canopy hoods are designed for proper exhausting of heat and should not be used to protect workers from fumes. There is generally not enough protection to keep toxic fumes away from the worker's breathing zone.
4. Four to twelve air changes per hour are normally adequate for general ventilation if other exhaust systems are used for control of chemical exposures. General room air flow should not be turbulent and other room fans should not be directed toward fume hoods.
5. All ventilation systems should be evaluated upon installation, monitored regularly and re-evaluated whenever changes are made.

V. CHEMICAL SAFETY RULES

A. Follow all safety instructions carefully as provided by each department.

B. Perform only authorized experiments. Persons who are responsible for experiments must inform others in the immediate area of any potential hazards.

C. Immediately report all accidents and unusual occurrences.

D. Horseplay cannot be tolerated in any laboratory or where any chemicals are being used.

E. Do not eat in the laboratory or any place where chemicals are stored and/or used.

F. Compressed gas cylinders:

1. Keep compressed gas cylinders secured by using a chain, strap, or stand to prevent tipping or falling at all times.
2. Identify the contents with a legible label.
3. Do not expose to temperatures above 125°F or 51.7°C.
4. Use a cart to move.
5. Do not lubricate, modify or tamper with cylinder valve.

VI. POTENTIAL PROBLEM CHEMICALS

A. Typical operations conducted in laboratories create a variety of exposure risks. Uncommon chemicals may have unknown physical, chemical and toxicological properties.

B. Commonly used reagents may also require evaluation of potential exposure to personnel.

C. Chemicals in the following physical states may cause exposures by inhalation, absorption or ingestion: gases, vapors, mists, fumes, dusts, gels, liquids or solids.

D. Flammables: Know the location and proper use of fire extinguishers and other pertinent safety equipment in your area when handling or using flammables. Never heat flammable liquids with an open flame, hot plate or un-insulated resistance heaters. Use a heating mantle, steam bath or hot water bath. Electrically driven stirrers should be explosion proof. Handle solvents in exhaust hoods or in a well ventilated area.

E. Reactives: Understand the possible dangers for each application or process. Keep the amounts used and stored in the laboratory at a minimum. Segregate all chemicals that have capabilities of explosive reactions with each other.

F. Corrosives: Understand possible dangers before using. Store in proper containers as product manufacturer recommends. Inspect containers regularly for damage and determine that the lids fit properly.

VII. PLANNING LABORATORY EXPERIMENTS

A. 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.

B. In an unknown reaction, 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.

C. Know what to do in case of accident. Follow established procedures in case of fire, bodily injury, equipment failure or power failure.

VIII. HOUSEKEEPING

A. Used equipment, chemicals, and supplies should not be left on bench tops or in fume hoods. Return used apparatus to designated storage areas.

B. Never under any circumstances dump chemicals or even suspected chemicals down the drain. All chemicals or suspected chemicals should be disposed of properly.

C. Keep the assembled equipment orderly and back from the bench edge.

D. Aisles, walkways and exit doorways should be clear, dry and free of obstructions.
E. Equipment and supplies should not block access to fire extinguishers, safety showers, eyewash fountains or other emergency equipment.
F. Keep drawers and cabinet doors closed when not in use.
G. 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.
H. Do not eat or smoke in the laboratory or use laboratory glassware as containers for foods or beverages.
I. Do not store food in laboratory refrigerators.

IX. PROCUREMENT/STORAGE

A. Procurement: Information on proper handling, storage and disposal should be known to those who will use it prior to receipt of the hazardous substance.

B. Storage:
1. 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.
2. Acids should be segregated from bases and active metals such as sodium, potassium, magnesium, etc.
3. Store flammables only in approved safety cans or cabinets. Segregate from oxidizers and keep away from sources of ignition.
4. Store oxidizers in cool, dry place away from combustible material.
5. Store water reactive chemicals in a cool, dry place and post warning signs not to fight fire with water.
6. Store pyrophorics in a cool, dry place in airtight containers.
7. Laboratory 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 or returned to the storage area.

X. SIGNS.

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.

XI. EXPOSURE DETERMINATION

A. Initial monitoring of potential chemical exposure of laboratory workers 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.

B. 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 worker exposure. Periodic spot checks of laboratory facilities should be conducted to insure that these actions are being implemented.

XII. TRAINING: Faculty, staff and student training will be accomplished and documented through the use of lecture, conference, or appropriate audio visual media.

XIII. PERSONAL PROTECTIVE EQUIPMENT (PPE)

A. PPE includes clothing, gloves, aprons, respirators, glasses or goggles that will be provided at no cost to the employee. 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.

B. Respirators will be provided and selected based on the specific hazards of the chemical in use. Fit testing must also be provided at the time of issue to the employee.

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

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

XIV. MEDICAL ASSISTANCE

A. Immediate medical attention is provided through emergency services at the Mid Columbia Medical Center and the emergency responders from the Mid-Columbia Fire and Rescue. Dial 911 for emergency services.

B. 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.

XIV: WASTE DISPOSAL: Follow procedures established in the campus Hazardous Waste Disposal and Pollution Prevention Program policy. Contact the Facilities Services Office, 541 506-6071.

References:

29 CFR 1910.1200: Hazard Communication, OSHA;
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10099

29 CFR 1910.1450: Chemical Hygiene, OSHA;
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10106

29 CFR 1920.132: Personal Protective Equipment, OSHA; http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9777

40 CFR 261: Environmental Protection Agency, Resource Conservation and Recovery Act; Identification and listing of hazardous waste; http://www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_40/40cfr261_00.html