Tillamook Bay Community College

ANNEX 3

LABORATORY SAFETY AND CHEMICAL HYGIENE PLAN

PURPOSE

The purpose of the laboratory safety and chemical hygiene plan is to prevent injury to those who use chemicals and to protect others who may be exposed to hazards from the laboratory and the environment. Also, to comply with Occupational Safety and Health Administration (OSHA) Regulations, “Occupational Exposures to Hazardous Chemicals in Laboratories."

Federal: 29 CFR 1910.1450
State: OAR 437, Division 2. Subdivision Z., "Toxic and Hazardous Substances."

This policy is not intended to supersede any other OSHA regulation and any other established safety and health laboratory procedure.

All laboratory personnel should read this plan in full. It is available for review in the following locations:

Central Campus- Rooms, 122, 124, 201, 202, and Custodial Closets.

II SCOPE

The OSHA standard applies to all laboratories that use hazardous chemicals in accordance with the definitions provided in 29 CRF 1910.1450. In general, the standard requires the formulation and implementation of a Chemical Hygiene Plan (CHP), which should include the necessary work practices, procedures, and policies to ensure that employees are protected from all potentially hazardous chemicals.

III RESPONSIBILITIES

The College President has the ultimate responsibility for chemical hygiene within the institution and provides, along with other officers and administrators, continuing support for efforts to improve chemical laboratory safety and health.

The Director of Facilities and Safety supervises implementation of the objectives of this plan.

1. The Chemical Hygiene Officer

TBCC does not have a full time Chemical Hygiene Officer. The senior science instructor

and Facilities Maintenance Specialist coordinate all laboratory health and safety activities.

These individuals report to Vice President of Academics and Student Services and Director of Facilities and Safety respectively. They individually have the authority to recommend that a laboratory be closed down or have the operations suspended if the lab does not conform to the health and safety practices required by this plan.

The science instructor and Facilities Maintenance Specialist exercise their authority to minimize the short and long-term danger to laboratory employees, other workers, the community and to the environment.

In this role, their primary duties are as follows:

- provide technical expertise and administrative support to the laboratory community in the area of laboratory safety and health

- ensure that hazardous substances are appropriately labeled, handled and stored, and that specific standard operating procedures are developed that instruct all personnel in the safest use of these substances

- review new research protocols prior to their initiation to determine if hazardous chemicals are used and, if so, to ensure proper measures are taken to protect laboratory personnel

- conduct biannual inspections of laboratories and storage areas and provide inspection forms to departmental personnel and principal investigators to conduct their own routine inspections

- write inspection report and recommend follow-up activities (with input from other members of the inspection team)

- coordinate the operation, acquisition and maintenance of fume hoods, emergency showers, eyewashes and fire extinguishers in all laboratories where chemicals are handled

- facilitate the correction of any violations noted by the County Fire Marshall or others charged with oversight responsibility

- conduct (or coordinate) department-specific laboratory health and safety training sessions, and assist laboratory supervisors in developing and conducting hands on sessions with employees

- investigate all reports of laboratory hazards, incidents, spill, fires and near misses to prevent repeat occurrences

- develop and maintain a College-wide chemical inventory system complete with access to an MSDS library

- maintain records of training, exposure, incidents, PPE, etc., and make them available to employees and administrative personnel

- coordinate all levels of waste collection, consolidation and removal (chemical, biohazard, radiological)

- remain aware of College wide health and safety issues

- complete an annual computerized inventory of all chemicals in storage rooms and laboratories in their departments

- maintain Material Safety Data Sheets (MSDS) for chemicals used in their departments

- ensure that all laboratory personnel are trained who come into contact with hazardous chemicals

- Develop checklists for needed safety items and to ensure proper acquisition of that equipment

2. Laboratory Supervisors

Laboratory supervisors have ultimate responsibility for chemical hygiene in the research or teaching laboratories in which they work. It is their duty to:

- know the guidelines and procedures in the Chemical Hygiene Plan

- write specific operating procedures for handling and disposing of extremely hazardous substances used in their laboratories and submit these procedures for review

- train laboratory personnel in these operating procedures and ensure the use of proper control measures

- conduct routine inspections of laboratories with their employees

- ensure that all appropriate controls including fume hoods and safety equipment are available and in good working order

- ensure all incidents in labs are reported to the Director of Facilities, Safety, and Human Resources and a written incident report is filed

- provide chemical inventories to departmental representatives

- supervise the maintenance of MSDS's

- before leaving the institution, prepare an inventory of excess and waste chemicals and locations of each

IV PROCEDURE

1. General Supervisory Practices: The Chemical Hygiene Officer (CHO) has overall safety responsibility for maintaining a safe laboratory working environment. The senior science instructor has been designated as the CHO, and will ensure:

   A. That proper safety procedures are in place to protect students and staff;

   B. Students and staff know safety rules and procedures and follow them;

   C. Adequate emergency equipment in proper working order is available;

   D. Training in use of emergency equipment and safety procedures has been provided;

   E. Information on special or unusual hazards in non-routine work has been distributed to the laboratory workers;

   F. Routine safety inspections are conducted;

   G. An appropriate safety orientation has been given to individuals when they are first assigned to the laboratory;

   H. A copy of this plan has been made available to all concerned persons;

   I. Prior approval of the Laboratory instructor will be obtained before working with any new chemicals in new procedures. Planning for work with such materials will provide for disposal, spill prevention, and control.

   J. An annual review and update of this plan is required.

2. Laboratory Personnel General Safety Rules:

   A. Know the safety rules and procedures that apply to the work being done, and which are contained in this document. Determine the potential (i.e., physical, chemical, biological) and appropriate precautions before beginning any new operation (see MSDS).

   B. Know the location of and how to use the emergency equipment in your area, as well as how to obtain additional help in an emergency, and be familiar with emergency procedures.

   C. Know the types of protective equipment available and use the proper type for each job.

   D. Be alert to unsafe conditions, actions, and call attention to them so that corrections can be made as soon as possible. Someone else's accident can be as dangerous to you as any you might have.

   E. Avoid consuming food, beverages, or smoking in areas where chemicals are being stored.

   F. Avoid hazards to the environment by following accepted

s. Chemical reactions may require traps or scrubbing devices to prevent the escape of toxic substances.

G. Be certain all chemicals are correctly and clearly labeled. Post warning signs when unusual hazards, such as radiation, laser operations, flammable materials, biological hazards, or other special problems exist.

H. Remain out of the area of fire or personal injury unless it is your responsibility to help meet the emergency. Curious bystanders interfere with rescue and emergency personnel and endanger themselves.

I. Avoid distracting or startling others. Practical jokes or horseplay cannot be tolerated at any time.

J. Use equipment only for its designated purposes.

K. Position and clamp reaction apparatus thoughtfully in order to permit manipulation without the need to move the apparatus until the entire reaction is completed. Combine reagents in appropriate order, and avoid adding solids to hot liquids.

L. Think, act, and encourage safety until it becomes a habit!

3. Laboratory Health and Hygiene:

A. Wear appropriate eye and face protection at all times.

B. Use protective apparel, including face shields, gloves and other special clothing or footwear as needed.

C. Confine long hair and loose clothing when in the laboratory.

D. Do not use mouth suction to pipet chemicals or to start a siphon; a pipet bulb or an aspirator should be used to provide a vacuum.

F Avoid exposure to gases, vapors, and aerosols. Use appropriate safety equipment whenever such exposure is likely. Most often, this can be done by using the fume hood.

F. Wash well before leaving laboratory area. However, avoid the use of solvents for washing the skin. They remove natural protective oils from the skin and can cause irritation and inflammation. In some cases, washing with solvent might facilitate absorption of a toxic chemical.

4. Laboratory Housekeeping:

A. Work areas will be kept clean and free from obstructions. Clean up should follow the completion of any operation or at the end of each day.

B. Wastes should be deposited in appropriate receptacles.

C. Spilled chemicals should be cleaned up immediately and disposed of properly.

D. Unlabeled containers and chemical wastes should be disposed of promptly. Other materials or chemicals no longer needed should not accumulate in the laboratory.

E. Floors should be cleaned regularly; accumulated dust, chromatography absorbents, and other assorted chemicals pose respiratory hazards.

F. Access to exits, emergency equipment, controls, and such should never be blocked.

G. Equipment and chemicals should be stored properly; clutter should be minimized.

5. Shielding for Safety will be used:

A. For any operation having the potential for explosion;

B. Whenever a reaction is attempted for the first time;

C. Whenever a familiar reaction is carried out on a larger than usual scale;

D. Whenever operations are carried out under non-ambient conditions.

NOTE: Shields must be placed so that all personnel in the area are protected from the hazard.

6. Proper Handling of Glassware:

A. Careful handling and storage procedures should be used to avoid damaging glassware. Damaged items should be discarded or repaired.

B. Hand protection should be worn when inserting glass tubing into rubber stoppers or corks or when placing rubber tubing on glass hose connections. Tubing should be held close together to limit movement of glass should a fracture occur.

NOTE: If possible, use plastic or metal connectors.

C. Vacuum-jacketed glass apparatus should be handled with extreme care to prevent implosions. Dewar flasks should be taped or shielded. Only glassware designed for vacuum work should be used.

D. Hand protection WILL be worn at all times when picking up broken glass.

7. Working with Flammable Hazards:

A. Do not use an open flame to heat a flammable liquid or to carry out a distillation under reduced pressure.

B. Us an open flame only when necessary and extinguish it when it is no longer needed.

i. Before lighting a flame, remove all flammable substances from the immediate area. Check all container of flammable materials in the area to ensure that they are tightly closed.

C. Notify other occupants of the laboratory in advance of lighting a flame.

D. Store flammable materials properly.

E. When volatile flammable materials may be present, use only non-sparking electrical equipment.

8. Working with Cold Traps and Cryogenic Hazards:

A. Always use gloves and a face shield when preparing or using cold baths (severe burns if allowed to contact the skin).

B. Never use liquid nitrogen or liquid air to cool flammable mixtures in the presence of air because oxygen can condense from the air, causing an explosion.

C. Always wear dry gloves when handling dry ice. Never lower head into dry ice chest; carbon dioxide is heavier than air, and suffocation can result.

9. Working Alone and Unattended Operations:

A. Generally avoid working in laboratories alone unless arrangements have been made with staff to cross check periodically.

B. Never perform experiments or procedures with unknown hazardous materials.

C. For laboratory operations that are carried out overnight, a plan should be developed to address utility service failure (i.e., electricity, water, inert gas, etc.).

D. Leave lights on and plan a periodic inspection of the operation with facilities maintenance personnel.

NOTE: Individual instructors have the responsibility to determine whether the work

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Special safety precautions

10. General Ventilation:

A. All hazardous/toxic chemicals identified by OSHA, Subpart Z., will be used so that quantities of their vapors or dusts do not produce adverse toxic effects from entering the general laboratory atmosphere. Whenever feasible, a hood should be used when working with Subpart Z. chemicals.

B. Operations such as running reactions, heating or evaporating solvent, and transfer of chemicals from one container to another should be performed in the safest manner possible.

IV Chemical procurement, distribution and storage

1. Procurement Procedures:

A. Before any new chemical/substance is ordered, the requestor will review the following:

i. Potential hazards;

ii. Safe handling procedures and methods;

iii. Waste disposal procedures;

iv. Proper personal protective equipment.

NOTE: This information can be obtained from the label, manufacturer's insert, or the MSDS. The MSDS should be reviewed prior to ordering any chemical or substance.

B. When turning a requisition into the senior instructor, the requestor will inform the senior instructor of any hazards associated with the chemical or substance (i.e., attach MSDS to requisition).

C. All chemical/substances will be received in a central location to aid in monitoring the chemical that may eventually enter the waste disposal stream. All chemicals identified under OSHA Subpart Z. will be inventoried and quantities (gal., lbs., etc.) of chemical/substance recorded.

D. No container of a chemical or substance will be accepted unless the following information accompanies the received order:

i. Material Safety Data Sheet (MSDS) or satisfactory container label with:

ii. Description of the hazards;

iii. Precautionary information;

iv. First aid;

v. Spill and clean-up procedures;

vi. If appropriate, special instructions to physicians.

2. Procedures for Storing Chemicals:

A. Annual audits will be conducted for the purpose of inspecting:

i. If chemicals have been stored beyond their appropriate shelf life or have deteriorated;

ii. If containers have defaced or questionable labels;

iii. If the containers are leaking or have corroded caps;

iv. If the containers have developed any other problems and should be disposed of in a safe manner.

NOTE: A first-in, first-out system of stock keeping should be used.

3. Procedures for Storing Chemicals in Laboratories:

A. General Considerations:

i Every chemical in the laboratory should have a definite storage place and should be returned to that location after each use.

e of chemicals on bench tops and hoods is forbidden.

ii.

ii. Storage of chemicals on bench tops and hoods is forbidden.

Laboratory refrigerators will be properly labeled as to their appropriate use such as for the storage of chemicals only; food must not be placed in them. All containers placed in the refrigerator should be properly labeled (identification of contents and owner, date of acquisition or preparation, and nature of any potential hazard).

iv. Flammable liquids should not be stored in a laboratory refrigerator unless the unit is an approved, explosion-proof, or laboratory-safe type.

v. Chemicals stored in the laboratory should be inventoried periodically and, at the same time, containers that have illegible labels and chemical that appear to have deteriorated should be disposed of appropriately.

B. Flammable Liquids:

i. Quantities of flammable liquids greater than one liter should be stored in approved containers (portable approved safety cans are one of the safest methods of storing flammable liquids).

ii. Flammable liquids received in large containers should be repackaged into safety cans for distribution to laboratories; such cans must be properly labeled to identify their contents.

iii. Other considerations in the storage of flammable liquids in the laboratory include ensuring that aisles and exits are not blocked in the event of fire;

that accidental contact with strong oxidizing agents such as chromic acid, permanganates, chlorates, per chlorates, and peroxides is not possible; and that sources of ignition are excluded.

NOTE: See OSHA 1910.106, NFPA No. 30-45 for further information and requirements.

C. Toxic Substances:

i. Chemicals known to be highly toxic, including those classified as carcinogens, should be stored in ventilated storage areas in unbreakable chemically resistant secondary containers.

ii. Only minimum working quantities of toxic materials should be present in the work area. Storage vessels containing such substances should carry a label such as the following:

CAUTION: HIGH CHRONIC TOXICITY OR CANCER SUSPECT AGENT (See Sections XI.B.8 and 9.)

iii. Storage areas for substances that have high acute or chronic toxicity should exhibit a sign warning of the hazard, have limited access, and be adequately ventilated.

iv. An inventory of toxic materials should be maintained.

v. Adequate ventilation must be maintained for hazardous materials that have a high vapor pressure (mercury and mercaptans).

D. Compressed Gases:

i. Cylinders of compressed gases should be securely strapped or chained to a wall or bench top to prevent their being knocked over accidentally.

ii. When they are in use, it is good practice to keep them capped.

iii. Care should be taken to keep them away from sources of heat or ignition.

4. Housekeeping, Inspection, and Maintenance

A. Housekeeping: See Section 111.0.1. through 7.

B. Inspections:

i. Will be conducted quarterly beginning each calendar year;

ii. Will be documented;

iii. Deficiencies will be corrected immediately.

NOTE: See Appendix A. for inspection procedure and checklist.

C. Maintenance:

i. All eyewashes and safety showers will be checked weekly for adequate water flow and to insure cleanliness of the water.

ii. Fire extinguishers will be inspected annually to insure they are full and operating properly.

iii. Fume hoods and other equipment should be inspected at least monthly to assure proper operation.

V First Aid and Emergencies

1. Anticipated Emergencies are:

A. Thermal and chemical burns;

B. Cuts and puncture wounds from glass or metal, including possible chemical contamination;

C. Skin irritation by chemicals;

D. Poisoning by ingestion, inhalation, or skin absorption;

E. Asphyxiation (chemical or electrical); and

F. Injuries to the eyes from splashed chemicals.

2. Accident Reporting:

A. Follow the College's reporting procedures.

B. Medical Treatment: Notify supervisor or senior instructor and fill out appropriate forms.

C. Non-Medical (first aid only): Notify supervisor.

3. Fires and Explosions:

A. Alert all laboratory personnel and send someone for assistance.

B. If authorized and trained in the use of portable fire extinguishers, try to extinguish fire immediately by:

i. Using correct fire extinguisher;

ii. Using an inverted beaker or watch glass to suffocate;

iii. Ensure correct extinguishing media is used for fire:

- Class A Fire: ordinary combustible solids such as paper, wood, coal, rubber, and textiles.
- Class B Fire: petroleum hydrocarbons (diesel fuel, motor oil, and grease), volatile flammable solvents.
- Class C Fire: electrical equipment.
- Class D Fire: combustible or reactive metals (sodium and potassium), metal hydrides, or organometallic.

C. Avoid entrapment in a fire; always fight a fire from a position accessible to an exit;

D. If there is any doubt whether the fire can be controlled by locally available personnel and equipment, the following action should be taken:

i. Call 911;

ii. Confine the emergency (close hood sashes, door between laboratories, fire doors) to prevent further spread of the fire;

iii. Assist injured personnel;

iv. Evacuate the building to avoid further danger to personnel.

E. In case of explosion, immediately:

i. Turn off burners and other heating devices;

ii. Stop reactions in progress;

iii. Assist in treating victims;

iv. Vacate the area until it has been decontaminated.

4. First Aid:

A. Each laboratory person will be trained in emergency first aid, pulmonary and cardiac resuscitation.

B. Refresher training should occur as required.

C. Training records will be documented and retained for a minimum of five years.

D. All trained personnel should carry a valid first aid card.

VI Medical Consultation and Medical Examinations

1. Those who work with hazardous chemicals will be given an opportunity to receive

medical attention, including any follow-up examinations required, under the following conditions:

A. Development of signs or symptoms associated with a hazardous chemical to which they may have been exposed.

B. When exposure monitoring reveals an exposure to an OR-OSHA regulated substance routinely above the action level.

C. Whenever an event takes place such as a spill, leak, explosion, or other occurrence resulting in the likelihood of a hazardous exposure.

2. All medical examinations or consultations will be by, or under the supervision of, a licensed physician, and will be provided without cost or loss of pay, and at a reasonable time and place.

3. The College will provide to the physician:

A. The identity of the hazardous substance;

B. Description of the conditions causing the exposure, including quantitative exposure data if available;

C. Any medical condition which may be revealed which might place the employee at increased risk as a result of exposure to a hazardous substance in the workplace.

D. A statement that the employee has been informed of the results of the medical examination or consultation and any medical condition that may require further examination or treatment.

E. The written opinion will not reveal specific findings of diagnosis unrelated to occupational exposure.

VII Records

1. Accident records will be written and retained.

2. Records will attempt to document that the facilities available and precautions taken while carrying out activities are compatible.

3. In work with chemicals of moderate, chronic or high acute toxicity, records will indicate amounts of these materials on hand, amounts used, and the names of the workers involved.

4. Medical records or copies thereof will be retained in accord with state and federal regulations.

VIII Signs and Labels

1. Emergency telephone numbers to be called in the event of fire, accident, flood, or hazardous chemical spill will be posted in the laboratory.

2. When possible, labels on containers of chemicals will contain information on the hazards associated with the use of the chemical. Waste containers are labeled for the type of waste that can be safely deposited.

3. Signs will be posted to show the locations of safety showers, eyewash stations, exits, and fire extinguishers. Extinguishers are labeled to show the type of fire for which they are intended.

4. Laboratory areas that have special or unusual hazards will be posted with warning signs. Standard signs and symbols have been established for a number of special situations such as radioactivity hazards, biological hazards, fire hazards, and laser operations.

IX Spills and Accidents

1. A written emergency plan is prepared for the unexpected event such as fire or explosion. The plan includes procedures for evacuation, shutdown, return, start-up, and drills.

2. A spill control policy is developed which will include consideration of:

   A. Prevention: Storage, operating procedures, monitoring, inspection, and personnel training.

   B. Containment: Engineering controls on storage facilities and equipment.

   C. Clean-up: Countermeasures and training of personnel to help reduce impact of a chemical spill.

   D. Reporting: Provisions for internal and external reporting (e.g., to state and federal

Agencies).

3. All accidents or near accidents will be analyzed and the results of such analyses and recommendation for the prevention of similar occurrences will be distributed to all who might benefit.

X Information and Training Program

1. Aim: to assure that all individuals at risk are adequately informed about the work in the laboratory, its risks, and what to do if an accident occurs. Educational activities will be provided for all persons who may be exposed to potential hazards in connection with laboratory operations. New persons going into the laboratory will be educated about safety procedures and the procedures to use in the event of accident.

2. Emergency and Personal Protection Training: Instruction on the proper use of protective apparel and safety equipment, emergency procedures, and first aid will be available to everyone who might need it. Full-time personnel will be trained in the proper use of emergency equipment and procedures. Receiving room, storeroom, and stockroom personnel will be knowledgeable about or trained in the handling of hazardous substances. Such training will include the physical handling of containers of chemicals so that they are not dropped, bumped, or subject to crushing by being piled one upon another. Information will be provided about environmental and hazard initiating exposures that must be avoided. Some of the more common items with which receiving room, storeroom, and stockroom personnel will be familiar include the following:

   A. The use of proper material-handling equipment, protective apparel, and safety equipment.

   B. Emergency procedures, including the cleanup of spills and the disposal of broken containers.

   C. The meanings of the various DOT labels on shipping packages.

   D. The proper methods of material handling and storage, especially the incompatibility of some common substances; the dangers associated with alphabetical storage; and the sensitivity of some substances to heat, moisture, and other storage hazards.

   E. The special requirements of heat-sensitive materials, including those shipped refrigerated or packed in dry ice.

   F. The problems associated with compressed gases, including unique situation such as the construction of an acetylene cylinder.

   G. The hazards associated with flammable liquids (especially the danger of their vapors catching fire some distance from the container) and explosives and of toxic gases, vapors, and oxygen displacement.

   H. Substances that react with water, giving rise to hazardous conditions (e.g., alkali metals, burning magnesium, metal hydrides, acid chlorides, phosphates, and carbides).

I. The federal and state regulations governing controlled substances such as radioactive materials, drugs, ethyl alcohol, explosives, needles and syringes.

J. Chemicals that have offensive smells.

K. Packages that exhibit evidence that the inside container has broken and leaked its contents.

3. Frequency of Training: Training and education will be regular, continuing activities. The frequency of refresher information and training is determined by the College.

4. Literature and Consulting Advice: Literature and consulting advice on laboratory safety and on the physical and biological hazards of chemicals will be readily available to those responsible for laboratory operations and those actually involved. Laboratory workers will be encouraged to read about the potential hazards of the work going on in their laboratory and to know about the availability of various resources that describe safe operating conditions. This literature will be available in a form that is readily accessible both to those responsible for laboratory operations and to laboratory workers themselves.

XI Waste Disposal Program

Chemicals will be dispensed of in such a way that people, other living organisms, and the environment generally are subjected to minimal harm by the substances used or produced in the laboratory. Acceptable disposal methods for various chemicals should be used.

1. Content:
The waste disposal program specifies how waste is to be collected, segregated, stored, and transported, and includes consideration of what materials can be incinerated. Transport from the institution will be in accordance with DOT regulations.

2. Discarding Chemical Stocks:
Unlabeled containers of chemicals and solutions will undergo prompt disposal. If partially used, they will not be opened.3. Frequency of Disposal:
Waste will be removed from laboratories to a central waste storage area at least once per week and from the central waste storage area at regular intervals.

4. Method of Disposal:

A. The most practical disposal method for laboratory waste should be used.

B. Indiscriminate disposal by pouring waste chemicals down the drain or adding them to mixed refuse for landfill burial is unacceptable.

C. Hoods will not be used as a means of disposal for volatile chemicals.

D. Disposal by recycling or chemical decontamination will be used when possible.

XII Safety Equipment

A. Eyewash and Safety Showers

1. Purpose

   To provide guidelines for determining when an eyewash and/or safety shower is required.

2. Background

   Since an eyewash and/or shower is a first aid rather than a preventive measure, the approach used in this program has been to consider the hazard(s) of the chemical and the immediate and appropriate first aid measures to be used in the event of an emergency. Finally, it should be emphasized that this program is only a guideline and that compliance must evaluate each situation for the approach, which will best protect the affected individual(s).

3. Factors to be evaluated:

   A. Chemical

   B. Physical State

   C. Concentration

   D. pH

   E. Skin and Eye Toxicology

   F. Temperature

4. Employee Functions:

   A. Work Practices During Chemical Handling, Transfer, or Disposal

      i. Frequency

      ii. Duration

      iii. Quantity

   B. Employee Training and Knowledge of Hazards

   C. Proximity to Other Employees

   D. Personal Protective Equipment Used

5. Equipment Availability:

A. Availability of Eye Washing and Body Flushing Equipment and/or Other sources of Water.

i. Type and description

ii. Location- Facility Layout

111. Employee Awareness of Water Facility Location and Function.

6. Requirements

The appropriate enforcement of the eyewash/shower rule OAR 437-02-161 (5) requires an evaluation of the potential exposure based on the contributing factors including: the chemical used, the employee's function, and the availability of eye washing and body flushing equipment.

A. Eyewashes:

Eyewash facilities are provided in stations where an individual may reasonably be exposed to a substance that can cause corrosion or permanent tissue damage to the eyes.

B. Safety Showers:

Safety showers are provided where substantial areas of the body may be exposed to large quantities of materials which are either highly corrosive or highly toxic by skin absorption.

C. Clean Water Under Pressure:

Clean water under pressure is available in other work areas where individuals can be exposed to substances, which can cause corrosion, or permanent tissue damage to the eyes or the substance is highly corrosive or highly toxic by skin absorption.

7. Testing, Training and Signage

A. Testing:

All eyewash and shower facilities will be adequately maintained and should be activated weekly to flush the supply line and verify proper operation.

Self-contained units should be maintained in accordance with the manufacturing instructions. Particular attention must be given to changing the flushing fluid so that a safe flushing fluid is available when needed.

B. Training:

Employees must be trained in accordance with OAR 437-01-760 (1) (d) as to the hazards associated with the material and contact with the eyes and/or skin, and the location of the eyewash/shower station. .

C. Signage:

The facilities should be identified with a highly visible sign. The area around the facility should be well lighted and highly visible.

Inspection Procedures and Checklist

1. EYE AND FACE PROTECTION

Yes	No	Does the equipment provide adequate protection against the hazards for which designed?
Yes	No Yes	Is it reasonably comfortable when worn?
No	Yes	Does it fit snugly and not unduly interfere with the movements of the wearer?
No Yes	No	Is it durable?
Yes	No Yes	Is it capable of being disinfected and is it easily cleanable?
No		Is it kept clean and in good repair?
Yes	No	Have employees been informed of all limitations and precautions regarding equipment, and are they strictly observed?
Yes	No	Do all eye and face protection devices comply with ANSI Standard Z87.1-1989, "Practice for Occupational and Educational Eye and Face Protection"?
		Are laboratory employees in compliance with (City/County/Entity) policy?

2. EMERGENCY EYEWASH STATION AND SHOWERS

Yes	No	Does your laboratory facility have emergency eyewash station or showers?
Yes	No	Does the eyewash fountain provide a "spent" stream or spray of aerated water for an extended period (15 minutes)?
Yes	No	Are the eyewash station and showers tested and cleaned on a weekly basis?
Yes	No	Is the shower capable of drenching the subject immediately and large enough to accommodate more than one person if necessary?

3. HAZARD COMMUNICATION

Yes	No	Does your laboratory have an updated chemical inventory, including quantities of each chemical?
Yes	No	Has your laboratory identified OSHA Subpart Z. "Hazardous Chemicals"?
Yes	No	Is each chemical properly labeled or accompanied by a Material Safety Data Sheet (MSDS)?

B. Fume hoods

The OSHA Laboratory standard required that "fume hoods and other protective equipment function properly and that specific measures be taken to ensure proper and adequate performance of such equipment." Provisions are also required for additional employee protection when working with particularly hazardous substances.

The College will provide the following controls where they are needed to protect individuals and to ensure that:

- General ventilation systems and fume hoods are functional and meet the requirements for procedures performed
- Personal protective equipment is appropriate and available

1. Ventilation Systems

A. General Ventilation

The general ventilation system in laboratories must be well maintained and the quantity of airflow monitored every 3 months.

Four to 14 (8-14) room changes per hour should be provided by general ventilation in laboratories where fume hoods are used as the primary method of control. Storage areas used for flammables must have 6 air changes per hour. Air should be 100% outside air in all active laboratories and chemical storage areas. Air removed from the laboratories through vents and ducts by general ventilation should be vented to the outside, not into the general facility circulation. Intake vents for the system should be far enough removed from the system's exit port to prevent cross contamination. A slightly Negative pressure should be maintained in laboratories to ensure airflow into the laboratory from uncontaminated areas. These advisories will be taken into account in all future design and redesign of ventilation systems for laboratory use.

General ventilation will not be relied on to protect employees from toxic exposures. Fume hoods and other local exhaust systems devices must be used for these purposes. Specific circumstances under which fume hoods must be used are indicated below.

Fume hoods minimize personal risk of exposure to toxic and hazardous materials isolating activities from the general laboratory environment and by capturing chemical vapors, fumes and mists at their source, preventing them from entering the general laboratory environment. Their use is encouraged whenever possible and mandated for certain substances and procedures as outlined below.

2. Performance Requirements

Facilities Maintenance checks hood flows at least once yearly. Hood malfunctions must be reported to Facilities Maintenance though a work order request and the hood flow checked once it is back in operation and before work is to commence.

A. Use of Hoods

- The toxicity of the substance used should be considered when deciding if it needs to be worked with in a fume hood. Hoods should be used if the material is a known or suspected carcinogen/mutagen, reproductive hazard, sensitizer, acutely toxic, or presents any type of hazard.

- The quantity should be considered when deciding to use a hood. Hoods should always be used when handling large quantities of chemicals (over 500ml of liquid or over 30gm of solid material).

- Flammable and reactive materials should be handled in a fume hood.

- Running new experiments that may be unpredictable or old reactions that have a history of causing problems should be used in a hood.

B. Required Work Practices with a Fume Hood

- All laboratory employees must check the functioning of the fume hoods before use and employ work practices that optimize the protection afforded by fume hoods. If the hood is not constantly venting, it must be turned on and the face velocity checked prior to use.

- Methods for evaluating fume hood performance will be a subject covered in employee training and will generally include:

  continuous monitoring devices

  velometers to check flow

  smoke tests to check flow direction

- Storage of chemicals and waste should be kept at a minimum in the hoods. If the hood is one of the designated satellite storage areas, only the bottle that is being currently filled should be kept in the hood, capped at all times unless in use. Hoods used for experiments that generate particular hazards should have filters or scrubbing devices attached to the exhaust to collect these before they are released into the environment.

- Hood sashes should be closed when hood is not in use. Keep sashes down as much as possible even when in use to improve overall performance of the hood. If chemicals or reactions remain in hood after use, the fan should be left running.

- Keep all chemicals and equipment at least 6 inches inside the hood face.

- Connect electrical equipment to outlets outside the hood when possible. This way, in the event of an emergency, one can disconnect equipment without creating a spark inside the hood. Be cautious of tripping hazards with cords.

- Wash the hood work surface as often as necessary to maintain a clean dry surface.

- Fume hoods in which heating perchloric acid, strong oxidizing agents, or highly reactive chemicals are used:

- Hoods in which these materials are used should serve an independent duct. If you are unsure of whether this is the case when using these materials, DO NOT GO FORWARD WITH YOUR WORK. CONTACT THE LAB SUPERVISOR.

- When the hood is not functioning adequately, it should not be used and Facilities Maintenance should be notified to determine if the system was routinely shut down or malfunctioning. The experiment should cease and an alternative found until the hood is back on line.

- The lab and department should be notified in advance of plans for any modification to fume hoods in laboratory facilities to ensure that safety regulations are considered.

Fume Hood Inspection Procedures and Checklist

1. Prior to starting an experiment, know the physical, chemical and toxicological properties of all the materials that you will be working with.

2. Prior to using the hood, verify that the exhaust system is operational.

3. Work at least 6 inches inside the hood.

4. Keep hood surfaces clear and baffles unobstructed to allow proper airflow.

5. When large pieces of equipment are used inside the hood, elevate the base at least two inches from the hood bench to allow proper airflow.

6. Lower sash to the lowest possible position; use the sash as a shield.

7. Keep hair, jewelry, clothing, etc., out of fume hood.

8. Walk slowly in front of fume hoods to minimize interfering with air flow.

9. Check hood flow periodically with a hood velometer.

10. Report all hood malfunctions to the Director of Facilities, Safety, and Human Resources.

11. Biosafety cabinets or laminar flow hoods are for biologicals only; do not use flammable chemicals in these hoods.

PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING FOR ROUTINE USE

Choose protective equipment and clothing based on the types of chemicals handled, the degree of protection required, and the areas of the body that may become contaminated. All clothing and equipment must at a minimum meet standards set by the American National Standards Institute (ANSI).

Every effort must be made to evaluate the effectiveness of equipment and make improvements where possible

Special consideration must be given to purchasing appropriate personal protective equipment and other safety equipment when extremely hazardous substances are involved.

Eye Protection

All laboratory personnel must wear some type of eye protection when working in the laboratory. This acts as a protection not only of chemical, biological and radiological hazards but also from physical hazards as well. All eyewear must meet the American National Standards Institute's (ANSI) "Practice for Occupational and Educational Eye and Face Protection", Z87.1 – 1989. Prior to use, personnel will verify that the equipment has been approved for the particular procedure (e.g., protective equipment may be ANSI certified for chemical splashes but not for impact). For labs, ANSI standards require a minimum lens thickness of 3mm impact resistance, passage of flammability test and lens retaining frames.

Do not wear contact lenses, even under glasses or goggles, when performing lab experiments. Gases and vapors can concentrate under lenses and cause permanent eye damage. It is almost impossible to remove contact lenses to irrigate the eye in an emergency. Soft lenses can absorb solvent vapors.

The following table should be consulted in choosing protective eyewear: EYE PROTECTION GUIDELINES	
Type of eye protection	Conditioning Requiring Use
Standard safety glasses with side shields and brow guard	Handling of aqueous solutions, biologicals Mild corrosives, etc.
Chemical resistant goggles, indirect vents	Handling strong corrosives, solvents, large volume of chemicals, etc.
Impact protection glasses/goggles	Working with glassware under reduced or elevated pressure. Glassware in high temperature operations
Face shields for impact and splash	Potential for flying objects, particles or chemical splash
Both goggles and face shield	Vacuum system, reactions with potential for explosions
Specialized eye protection	Lasers, ultraviolet, infrared or other light sources, glass blowing, welding, torch use