# Chemical Hygiene & Laboratory Safety Plan

# St. Mary's College of Maryland

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**St. Mary's College of Maryland**
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**Policy**

The following Chemical Hygiene & Laboratory Safety Plan (CHLSP) was developed to outline the protocols to safeguard laboratory workers in the college's chemical laboratories. This CHLSP complies with the Occupation Safety & Health Administration's (OSHA), Title 29 Code of Federal Regulations (CFR), Part 1910.1450, "Occupational Exposure to Hazardous Chemicals in Laboratories" and 29 CFR 1910.1200, "Hazard Communication Standard", 29 CFR 1910 Subpart Z, "Toxic & Hazardous Substances", ANSI Z358.1-2004, "American National Standard for Emergency and Eyewash and Shower Equipment" and NFPA 45, "Standard for Fire Protection for Laboratories using Chemicals. The OSHA laboratory rules apply to all who engage in the laboratory use of hazardous chemicals. The purpose of the rules is to assure that all laboratory worker exposure to hazardous chemicals is below certain Permissible Exposure Limits (PELs) for substances specified in 29 CFR Part 1910, Subpart Z.

Unfortunately, hands-on laboratory work with hazardous chemicals can put students and college faculty at risk to exposure, accidents and injuries; if the chemicals are mishandled, inappropriately used or have degraded due to age. Consequently, the St. Mary's College of Maryland recognizes the need for a CHLSP to implement work procedures and safety practices that protect students and staff from the health hazards associated with handling hazardous chemicals in order to create a safe laboratory environment.

Anyone handling or working near hazardous chemicals at St. Mary's College of Maryland laboratories are required to follow the written CHLSP for St. Mary's College of Maryland. This CHLSP specifies work practices, standard operating procedures, control methods, use of personal protective equipment and any special precautions necessary while working with hazardous substances in a college laboratory setting. This document is intended to strengthen Staff and Faculty knowledge of safety concerns so that they can model safety practices for their students to emulate.

## A. GENERAL PRINCIPLES FOR WORK WITH LABORATORY CHEMICALS

The primary goal of the CHLSP is to reduce, control or eliminate health hazards associated with hazardous chemicals in college laboratories. The recommended general principles or objectives to ensure worker protection from laboratory chemicals are to:

1. Minimize all chemical exposures through prescribed "general" precautions for laboratory chemicals rather than outlining specific guidelines for particular chemicals, while eye and skin contact should be avoided at all cost
2. Avoid underestimation of risk through the assumption that all substances of unknown toxicity are toxic
3. Provide adequate ventilation by use of fume hood and other precautionary devices
4. Institute a chemical hygiene program as a regular and continuing effort; and
5. Observe OSHA's Permissible Exposure Limits (PEL's) and Threshold Limit Values (TLV's) as outlined by the American Conference of Governmental Industrial Hygienists.

Over and above the OSHA requirements, St. Mary's College of Maryland general principle mandates for working with laboratory chemicals require staff to:

1. Classify and store chemicals in a compatible manner
2. Properly label and disposal of hazardous materials/wastes
3. Inventory chemicals annually
4. Provide and maintain adequate up-to-date safety equipment; and
5. Respond in a timely responsible manner to reported safety concerns.

**Chemical Hygiene Plan Definitions**

**Chemical Hygiene Officer** means an employee who is designated by the administration, and who is qualified by training or experience, to provide technical guidance in the development and implementation of a Chemical Hygiene Plan.

**Chemical Hygiene Plan** means a written program developed by the college Environmental Health & Safety Office along with chemistry experts to set forth procedures, equipment, personal protective equipment, and work practices that are capable of protecting students and faculty from health hazards presented by hazardous chemicals used in college laboratories.
**Emergency** means any occurrence, such as, equipment failure, rupture of containers or failure of control equipment which results in an uncontrolled release of a hazardous chemical into the laboratory.

**Explosive** means a chemical that causes a sudden, almost instantaneous release of pressure, gas and heat when subjected to sudden shock, pressure or high temperature.
**Hazardous Chemical** means a chemical that exhibits acute or chronic health affects under OHSA 29 CFR Part 1910.1200, Hazard Communication Standard; Appendices A and B provides further guidance in defining the scope of health hazards and determining if a chemical is considered hazardous.
**Laboratory** means a facility where the "laboratory use of potentially hazardous chemicals" occurs, which typically entails the use of small quantities of potentially hazardous chemicals in an area where scientific experimentation is being conducted.
**Laboratory Scale** means working with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by one person.
**Fume Hood** means a laboratory device: enclosed with a front moveable sash (window) made out of safety glass; constructed and maintained to draw air from the laboratory; to prevent or minimize the escape of air contaminants into the laboratory; and to allow chemical manipulation to be conducted in the enclosure without insertion of any portion of the laboratory worker's body other than arms and hands.
**Laboratory Use of Hazardous Chemicals** means handling or use of chemicals in which all of the following conditions are met:

1) "Laboratory Scale" chemical manipulations
2) Multiple chemical procedures or chemicals used; and
3) Protective laboratory practices and equipment are available and in common use to minimize the potential for student/teacher exposure to hazardous chemicals.

**Physical Hazard** means a hazard that is a combustible liquid, compressed gas, explosive, flammable liquid or solid, organic peroxide, oxidizer, pyrophoric material (spontaneous ignition in air), and unstable (reactive) or water reactive material.
**Permissible Exposure Limits (PELs)** OSHA-PELs tells you how much of an air contaminant, under 29 CFR Part 1910, Subpart Z, a worker can be exposed to for 8 hours per day, 40 hours per week over a 30 year period without suffering adverse health effects. PELs are recommended standards that merely serve as a warning, because most chemicals are not tested for long-term health hazards, reproductive effects and the potential to cause cancer to humans. The OSHA 29 CFR 1910, Subpart Z substances are found at: http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10147
**Unstable (or reactive)** means a chemical in the pure state that will vigorously polymerize, decompose, condense or become self-reactive under conditions of shock, pressure or temperature.
**Water-reactive** means a chemical that reacts with water to release a gas that is either flammable or a health hazard.
**Threshold Limit Values (TLV's)** are American Conference of Governmental Industrial Hygienist (ACGIH) exposure standards that are expressed in 3 ways: TLV-TWA is the Time-Weighted Average concentration for a normal 8-hour workday or 40 hour work week; TVL-STL is the Short-Term Exposure Limit or maximum concentration for 15-minute exposure with 4-periods in a workday with 60 minutes between exposures, never to exceed TVL-TWA; TVL-C is the Ceiling Limit or the amount that should never be exceeded. TVLs are the same as PELs in the respects that they are recommended standards that merely serve as a warning, because most chemicals are not tested for long-term health hazards, reproductive effects and the potential to cause cancer to humans.

## B. RESPONSIBILITIES OF COLLEGE PERSONNEL

Overall, the responsibility for chemical hygiene rests at all levels of faculty and staff within the college system, however, the President of the College holds the ultimate responsibility to provide continuing support for the college's Chemical Hygiene & Laboratory Safety Plan. Physically, the Environmental Health & Safety Officer at St. Mary's College of Maryland is the delegated administrator of the chemical

hygiene program and is responsible to work with Department Heads, Staff & Faculty Members, Lab Safety Officers and Building Safety Coordinators with regards to chemical hygiene in the college laboratories. The Department Chair is also responsible to implement the appropriate chemical hygiene policies and practices in order to monitor purchases, use and disposal of chemicals used in the laboratory as well has the authority to conduct all formal laboratory audits with the assistance of the Environmental Health & Safety Coordinator.

The Environmental Health & Safety Coordinator is responsible for: providing continuing support by ensuring the requirements of this CHLSP are followed; and training all appropriate staff in laboratory safety protocols found in this guidance. The Department Head is directly responsible for all chemical hygiene concerns in the college chemical laboratories. The Faculty Members are responsible for chemical hygiene laboratories that they work in.

The Environmental Health & Safety Coordinator will maintain a list of all individuals who will be responsible for: procurements, usage and disposal of chemicals used in colleges laboratory programs and will have the authority to conduct and document all informal and formal laboratory audits.

The designated Chemical Hygiene Officer is required to:

- Ensure students and staff know and follow the St. Mary's College of Maryland CHLSP
- Verify all chemical stockrooms/storerooms are adequate and well ventilated
- Conduct routine housekeeping inspections with an emergency equipment checklist
- Maintain documents/records of all routine inspections and condition of the emergency equipment

The Laboratory Supervisor (or in other words Faculty) or designee is responsible for laboratory oversight to:

- Plan and conduct activities according to the CHLSP
- Ensure students are knowledgeable with the CHLSP policies and practices
- Impose use of the appropriate protective apparel and equipment in the laboratory
- Ensure scale of work is suitable to the physical facilities available; and
- Report all facility and equipment problems immediately to the Environmental Health & Safety Coordinator and the Department Chair.
- Assure the appropriate protective equipments is available and in working order
- Determine the required levels of protective apparel and equipment
- Document in writing all identified facility or equipment problems to the Department Chair and the Environmental Health & Safety Coordinator promptly
- Provide access to reference material to include all Material Safety Data Sheets (MSDSs)
- Ensure that an annual inventory of laboratory chemicals is completed or updated
- Train faculty and students in the proper use of all assigned emergency safety devices and equipment to include: eyewashes, emergency showers, fire extinguishers, spill kits, first aide kits, emergency shutoffs, etc.
- Review the curriculum experiments for adequacy and appropriateness
- Train all staff and/or students prior to the introduction of new chemicals, new procedures, new experiments, substantially modified procedures and experiments, or unique new equipment(s); and

Appendix A, found in the back of this document, is a Laboratory Safety Contract that is required to be signed by both student and faculty before any laboratory experiments are conducted. As part of this contractual agreement, the student consents to wear proper attire during laboratory work. At the time the contract is passed out, is when the faculty member should fully explain the consequences and penalties of noncompliance with the safety practices. Henceforth, continuous reinforce and review of safety policies and practices should be conducted. Faculty members are responsible to keep all students' tests, contracts, and other information pertaining to safety education on file and available to the Environmental Health & Safety Coordinator upon request.

Lastly, it is the faculty member's responsibility to hold the students accountable for following the proper safety procedures while handling laboratory chemicals in the classroom and laboratory setting. To achieve this goal, the following objectives are recommended to assure student safety:

- Adopt safety training strategies for students as a learning tool
- Host student roundtable discussions to identify potential hazards
- Include students in the planning of safety concerns and consequences
- Maintain a copy of Appendix A, Laboratory Safety Contract signed by student and faculty member
- Role-play various safety practices for particular curriculum experiments
- Test students levels of understanding of safety practices and retrain, if needed
- Student-created location diagrams of safety equipment and emergency telephone numbers
- Demonstrate proper use of all the safety/emergency equipment in each laboratory; and
- Impose punishment for safety policy violations.

## C. LABORATORY FACILITIES

This CHLSP is not intended to address laboratory design but will give special attention to emergency alarms and communication systems; safety/shower/eye wash equipment; and laboratory ventilation and fume hood performance.

### Emergency Communication Systems

Due to the potential for chemical accidents or releases that can affect other areas of the college, emergency response fire alarms and/or some sort of method to communicate with the Public Safety Office should be available. Local fire department telephone number and any access number to the outside should be posted near the laboratory telephone (that is able to reach an outside line), fume hoods, chemical storage doorways, exits, safety showers and fire extinguishers.

### Shower & Eye Wash Equipment

The OSHA rules regarding emergency equipment does not adequately define what is considered "suitable facilities" for drenching eyes and body. Therefore, the American National Standards Institute (ANSI) promulgated the ANSI Z358.1-2009 provision to outline the installation; performance; use; and maintenance for emergency eye wash and shower equipment. Faculty members or their designee should instruct all students in the location and proper use of safety showers, eye washes, eye/face washes, eye washes/drench hose and drench hose units.

A safety shower should be located within 100 feet or 10 seconds walking distance from any location within the room. The shower area must be clearly labeled and kept clear of any obstructions. A large ring on a chain when pulled should readily open the valve of the shower allowing 20 gallon of potable lukewarm water per minute for 15 minutes. Eye washes require a controlled 0.4 gallons of water per minute for 15 minutes to rinse both eyes without injuring the user. Eyes/face washes require a controlled 3.0 gallons of water per minute for 15 minutes to rinse both eyes/face without injuring the user.
The ANSI standards allow drench hose units to supplement eye washes with a 3 gallon per minute water flow, but these units may not be used in place of a dedicated eye wash unit. ANSI standards also require all of the above emergency equipment to be activated weekly to ensure they are in proper working order. These weekly tests are required to be documented on an affixed tag attached to the plumbing system. In accordance with OSHA, maintenance of eye wash units should be inspected quarterly for problems, while other safety equipment should be inspected every 3 to 6 months.

### Laboratory Ventilation & Hoods

As with any laboratory safety equipment, the Faculty member or designee is required to instruct the students in their location on proper usage. The design of the laboratory should facilitate general ventilation for air intake and exhaust to avoid intake of contaminated air and the recirculation of air exhausted from laboratory hoods. However, the ventilation system should not be relied upon for protection from toxic

substances released into the laboratory. As well, all stockrooms and chemical storage areas are required to be well ventilated.

Maintenance of all ventilation or related equipment should undergo continuous evaluation and/or modification, if considered inadequate. The ventilation rate should be monitored at least every 3 months and reevaluated whenever any changes/modification has been made to the unit. Substances released into the air of the laboratory should be continually replaced to prevent the increase of hazardous contaminants. Direct air flow into the laboratory should be from non-laboratory areas to an exhaust system leading directly to the outside of the building. General air flow should not be turbulent but relatively uniform throughout the laboratory with no high velocity or static areas.

The National Fire Protection Association rules, NFPA 45, "Standard on Fire Protection for Laboratories Using Chemicals" apply to laboratory air supply systems for the identification, inspection and maintenance of laboratory ventilation systems and hood(s). The NFPA 45 rules require the following inspection/tests: visual inspection of the physical condition of the ventilation system and hood interior, sash and ductwork; measurement of hood airflow (test and balance); face velocity test verification of inward airflow over the entire hood face; and changes in work area conditions that could affect hood performance or overall laboratory ventilation. The quality and quantity of ventilation should be evaluated upon installation, regularly monitored annually and re-evaluated when the ventilation system is modified.

According to OSHA, a laboratory hood should allow 2.5 linear feet of hood space per person and should be accommodate 2 workers at a time who are working with hazardous chemicals. Work conducted under the hood should be at least 6 inches from the front edge of the hood. Rule to thumb, the suggested ventilation rate of 4-12 room air changes per hour is considered adequate general ventilation. When not working under the fume hood, the hood sash should be kept closed at all times. Keep materials stored under the hood to a minimum and do not allow them to block vents or air flow. Leave hood "on" when it is not in active use if toxic substances are stored under the hood.

Velocity of the hood face should be between 60 to 100 linear feet per minute; however this face velocity should never be relied upon as an indicator for laboratory hood performance. OSHA suggests to use a fume hood when working with any volatile substance with a TLV of less than 50 parts per million. This information can be found on the Material Safety Data Sheets. The American Chemical Society's suggested reference is Saunders' "Laboratory Fume Hoods: A User's Manual." However, ANSI Z9.5, "Laboratory Ventilation" rules also provide further useful information.

Fume hoods will be inspected/re-certified every 12 months by the Environmental Health & Safety Coordinator or designee. Reports of hood inspections will be available for employee review at the Environmental Health & Safety Coordinator's office.

Safety Cabinets will be inspected/re-certified every 12 months by the Environmental Health & Safety Coordinator or designee. Reports of safety cabinet inspections will be available for employee review at the Environmental Health & Safety Coordinator's office.
St. Mary's College of Maryland additional laboratory equipment policy below:

**Emergency Exhaust System** is required in every science room with a manual switch to turn on the emergency exhaust system that is clearly labeled with a permanent sign.
**Goggle Sanitizing Cabinet** is required for students who use personal eye protection in accordance with the American National Standard Institute (ANSI) Z87.1-1979 standards for use, durability, and cleaning. Appropriate chemical resistant goggles can be purchased through your department's supply budget. Contact lenses should not be worn in the laboratory. If wearing contacts is unavoidable, the use of non-vented chemical splash goggles is required. Goggles must be sanitized between uses by a goggle sanitizing cabinet.
**Eye Wash & Shower Stations** are required to be located by signs posted in the lab identifying the unit. Eye wash and shower stations are required for every room, laboratory or shop where students handle materials or chemicals that are potentially dangerous to human tissue. All students should be instructed in the use of the eye wash and shower stations. All safety equipment should not be blocked by debris, be in

proper working condition and clearly labeled with instructions for use. Electrical outlets within six (6) feet of any water supply must be Ground Fault Circuit Interrupter (GFCI).
**Fire Blanket** ( if required) is to be mounted on a wall or placed in a cabinet no more than five (5) feet from the floor, be visible and readily accessible. If placed in a cabinet, the cabinet must be clearly labeled "Fire Blanket."
**Fire Extinguisher** policy requires, at minimum, 2-ABC fire extinguishers mounted no more than five (5) feet from the floor, visible and readily accessible near exit doors. The extinguisher cannot be more than 50 feet from any laboratory stations and cannot be blocked by storage or furniture. The Lab Supervisor should inspect the condition of the fire extinguishers at least weekly and notify the Department Chair and the Environmental Health & Safety Coordinator, if the extinguisher appears to be leaking, damaged, or discharged. Extinguishers should be recertified annually or in accordance with the type of fire extinguisher. Provide proper instruction on the use of a fire extinguisher to the class prior to the first laboratory exercise at the beginning of each school year.
**First Aid Kits** should be made available in the laboratories with their location clearly marked. The Lab Supervisor or designee should take inventory of the kit on a regular basis. The students should be aware of the proper use of the contents of the first-aid kit.
**Fume Hood** is used to prevent exposure to toxic, irritating, or noxious chemical vapors and gases as a source of positive ventilation and shut down when the emergency fan is turned on. It must be kept clean and contain minimal storage.
**Shut off Switches** for gas and electrical shut off are required to be clearly labeled and located in a non-lockable place accessible within 15 feet of the instructor's station to allow cut off of services. Valves must shut completely with one quarter (1/4) turn.

## D. COMPONENTS OF THE CHEMICAL HYGIENE PLAN

According to OSHA, a Chemical Hygiene Plan (CHP) is written to: protect laboratory workers from health hazards associated with hazardous chemicals, keep exposures below specified limits and to have the CHP readily available for review upon request. OSHA believes that controlling a hazard at its source is the best way to protect a worker. In accordance with OSHA, the CHP shall include the following elements:

- Standard Operating Procedures relevant to safety and health concerns that are to be followed when laboratory work involves the use of hazardous chemicals
- Criteria necessary to implement control measures to reduce exposure to hazardous chemicals which is to include the use of personal protective equipment with particular attention to the selection of control measures for extremely hazardous chemicals
- Properly functioning fume hoods and other protective equipment
- Provide laboratory worker training
- Specific laboratory procedures that require prior approval; and
- Designation of a Chemical Hygiene Officer.

### Chemical Procurement, Distribution & Storage

Before a substance is ordered and received, a MSDS must be obtained, if the college does not already have one, in order to have information on proper handling, storage and disposal should be known. Preferable all substance should be received in a central location. If a chemical is received without a manufacturer's label--do not accept it! No container should be accepted without an adequate identification label. No container is to be accepted without a label exhibiting the:

- Identity of the hazardous chemical
- Appropriate hazard warnings; and
- Manufacturer's name and address.

By law, it is the manufacturer's responsibility to label containers appropriately. Make this information available to all staff and faculty involved in shipping, receiving, storage and distribution.

St. Mary's College of Maryland acquisition policy requires that chemicals for lab work or demonstrations be ordered through the faculty or designated purchasers for the department. Acquiring chemicals through other means is strictly prohibited unless specifically approved by the Chair of the department.

Purchase the minimum amount of chemicals necessary for short-term use and distribution. If possible, purchase chemicals in class-size quantities only. Plan for the use of no more than one year's worth of chemicals. Do not stockpile chemicals, it is expensive and can be hazardous. Preferably, all hazardous chemicals should be received in a central location within the department and inspected before you sign the bill of lading.

The following guidelines must be followed when receiving and/or handling chemicals for the St. Mary's College of Maryland:

- Never open a reagent package until the label has been read and completely understood
- Mark all incoming chemicals with the date received and initials of person receiving the chemicals
- Clearly label all chemical storage areas with labels or placards on front of access doors to warn occupants and emergency response personnel such as fire fighters or paramedics
- Properly store flammable liquids in small quantities in containers; and
- Add the newly accepted chemical to the existing chemical inventory list.

**Personal Protective Equipment (PPE)**

PPE is defined as the use of specialized clothing and equipment designed to be worn by laboratory workers to protect them from direct exposure from health and safety hazards. Examples of these accessories are: safety goggles face shields, hard hats, hearing protection, gloves, respirators, lab aprons/coats and proper footwear. Always avoid skin contact by using gloves and log sleeves. Wash hands and arms after working with hazardous chemicals.

Engineering controls are designed to eliminate or reduce exposure to a physical or chemical hazard through the use of machinery or equipment such as of fume hoods, respirators and adequate building ventilation. Administrative controls are changes in work policies and procedures to reduce duration, frequency and intensity of exposure to hazardous chemicals or hazardous conditions. A "Chemical Hygiene & Laboratory Plan" is considered an administrative control as well as best management practices, preventative maintenance policies, and routine inspections.

The preferred methods for reducing exposure in the laboratory, in order of general effectiveness are:

1. Substitution of less toxic or hazardous materials/chemicals
2. Engineering Controls
3. Administrative Controls; and/or
4. PPE.

The recommended PPE for a particular chemical is found on its respective MSDS. Keep in mind that PPE protects you from a hazard but does not remove the hazard from the work area.

General PPE requirements are found in OSHA's 29 CFR 1019.132 rules, which require a written hazard assessment in order to select the appropriate PPE for the particular laboratory activity. A written record to indicate each worker has been properly trained in PPE safety and equipment usage is required. The rules 29 CFR 1910.133, .134 138, and 1000 cover the OSHA requirements for Eye & Face; Respiratory; Hand Protection and Air Contaminants, respectively.

PPE should not be used as a substitute for engineering controls or work practices mandated through administrative controls to prevent exposure. As mentioned before, the above rules require the consideration of engineering and administrative controls, where possible, to achieve compliance, before selection and usage of proper PPE.

**Housekeeping, Storage, Maintenance & Inspections**

Laboratory floors should be cleaned regularly. Formal housekeeping and chemical hygiene inspections should be held at least semiannually. Access to exits, emergency equipment and utility controls should never be blocked. All laboratory work areas should be cleaned and counter wiped, glassware washed and put away, and students hands washed after using chemicals and before the leaving the classroom.

With regards to laboratory chemical storage, the amounts permitted should be as small as practical. Chemical storage on bench tops is not allowed and storage in fume hoods should be very minimal. Chemical exposure to heat or direct sunlight should be avoided. Storerooms should be segregated into well identified areas that are adequately ventilated. Highly toxic chemicals or opened containers should be in unbreakable containers or in secondary containment.

Toxic substances should be segregated with regards to compatibility in a well-identified area with local exhaust ventilation. Highly toxic or other chemicals whose containers have been opened should be in unbreakable secondary containers. Stockrooms/storerooms should not be used for preparation or repackaging. When chemicals are hand carried, the container should be placed in an outside container/ bucket or carried with both hand while having one hand on the bottom of the container to laboratory stations.

Stored chemicals should be examined at minimum annually for replacement, deterioration and container integrity. Periodic inventories should be conducted with unneeded items going for appropriate disposal or return. Storerooms holding hazardous chemicals should be under the control of the Science Teacher or Chemical Hygiene Officer and secured from entry to students and other building occupants.

The storage rooms should have adequate security. Safety features for the facility should include:

- Accessibility of approved fire extinguishers
- Working emergency shower or eye/face wash
- Forced ventilation from floor to ceiling with exhaust above roof level
- Impervious shelving with half-inch lip, secured to wall with the top shelf below eye level
- Explosion proof lighting and good illumination; and
- Spill Kit items (Appendix B) and other clean-up materials.

**Storage Room "DO'S":**

- Chemicals must be stored under lock and key when not in use
- Chemicals must be stored in adequately labeled containers
- Always store chemicals with labels in the forward, readable, position
- Chemicals that are transferred into a another container must include the following information on the label: chemical name, formula, concentration, hazard warning, name or initials of person responsible for transfer
- Flammable liquids and solids must be stored in a dedicated flammable storage cabinet
- Use of secondary containment to limit spills and avoid incompatibility problem
- Order chemicals in plastic containers or plastic-coated bottles to reduce breakage
- Plan your storage to survive a catastrophic event by limiting the potential for spills and breakage
- Return chemicals to their designated storage location promptly after use
- Store corrosives acids in a locked acid locker vented to the outside
- Isolate nitric acid within the acid storage cabinet by enclosing it in a high density polypropylene container because it not only is an acid but also an oxidizer
- Keep lab shelves organized and compatible chemicals together
- Do not permit unauthorized persons in the storage room; and
- Ensure hazardous waste or by-products are stored properly before disposal.

Before leaving, secure open chemical containers, close the flammable lockers, close the acid lockers, secure the chemical storage room/areas and secure entrance to the laboratories.

**Store Room "DON'TS":**

- Chemical storage rooms and closets should not have open floor drains
- Never grab a container from the top only, chemical containers should be carried with two hands
- Don't use unlabeled chemicals
- Don't permanently store chemicals in the fume hood
- Don't store chemicals over, under or near a sink or drain
- Don't mix chemicals in a sink
- Don't store reagents and/or apparatus on the lab bench
- Don't store chemicals on the floor
- Don't block aisles with stored chemicals
- Don't store chemicals above eye level or on top of cabinets
- Don't dispose of broken glassware in trash with wrapping it
- Don't store hazardous waste in the student work areas
- Don't store chemicals alphabetically

Keep accurate records of the amount of all chemical product on hand; this inventory should be updated at least annually.

Regulations on chemical storage can be obtained from the Environmental Protection Agency (EPA), Uniform Fire Code (UFC), National Fire Protection Association (NFPA), Florida Fire Protection Agency (FFPA), and Occupational Health and Safety Administration (OSHA).

**Signs and Labels**

Signs and labels should be posted on:

- Exits
- Chemical storage areas
- Areas approved for food and beverage consumption only
- Location signs for eyewash stations, and first aid kits
- Warnings for areas or equipment where specials or unusual hazards exist
- Labels identifying contents of containers, including waste receptacles; and
- Emergency telephone numbers to Public Safety (4911), emergency responders, Lab Coordinator and Chemical Hygiene Officer/Environmental Health & Safety Coordinator

Place signs conspicuously in the laboratory and on refrigerators to warn occupants that:

- No food or drink is permitted in the refrigerator
- No food or drink is permitted in the laboratory; and
- Hands must be washed after working with chemicals and before leaving the lab.

Original manufacturers' labels, by law, must be on all incoming chemicals under OSHA's Hazard Communication Standard. An MSDS must be promptly reviewed and readily available in hard copy for all hazardous chemicals in storage. Laboratory users must be provided a copy of all MSDSs within 24 hours upon written request. Stock solutions and reagents must be labeled with the name of the contents, their hazards, and the preparation date. Unlabeled container with unknown contents must be handled as hazardous waste. Disposal of unknown chemicals is very expensive.

**Spills & Accidents**

A spill control policy should be developed and include considerations for prevention, containment, cleanup and reporting for all releases and spills occurring in laboratories. The spill policy should include a one-page emergency plan to outline immediate response requirements. Proactive practice drill should be conducted so all students are familiar with the spill control and any accompanying emergency plan. There should be an alarm system to alert building occupants in all parts of the school. All accidents or near

accidents should be reported so they can be analyzed so in the future so any similar situation can be avoided. In the event of a spill or release, the emergency circumstances should be communicated immediately to all personnel in the surrounding area and Main Office. At that time, all spill procedures should be implemented with regards to: evacuation, ventilation requirements, medical care, spill response and reporting.

Be prepared for accidents. Assure that at least 2 people are present at all times when working with hazardous chemicals. Breakable containers should be stored in chemical resistant trays so in the event of a release the secondary containment can be placed under the fume hood. If a major spill occurs outside the hood, evacuate the area and assure that cleanup personnel wear appropriate protective equipment.

Standard ABC fire extinguishers should be readily accessible in strategic areas in the laboratories and near hallway entrances of the laboratory. A smoke detector should be installed, at minimum, in each chemical storage area. And it is recommended that a pail of sand be located in the laboratories for emergency use.

Chemical spills and leaks can occur in any laboratory. In order to minimize injury to health, property, and fire, the supplies listed in Appendix B, Spill Kits must be on hand to deal for minor spills. Without risking personal safety, the clean up of a minor spill utilizing these supplies listed in Appendix B is allowed if wearing appropriate protective clothing. However, any major spill will require professional remediation.

### If a spill of a hazardous chemical occurs:

- Evacuate classroom immediately
- Affected skin or clothing should go immediately under eye wash/shower/drenching unit
- Avoid breathing the vapor if it is a liquid spill and turn on emergency exhaust
- Notify an HR Administrator & Chemical Hygiene Officer/ Environmental Health & Safety Coordinator as soon as possible regarding the incident
- Notify the health aide of any injuries
- Follow the MSDS's instructions for clean-up procedures
- Follow the general procedures for using the Spill Kit listed in Appendix C; and
- Deny access to the area until cleanup has been completed.

### Emergency Protocols are found in Appendix C, Laboratory Hazards & Emergency Actions

- Spills must be remediated after the room has been evacuated and the area stabilized, however, the safety of staff and students takes precedence
- Know the correct evacuation routes
- Know the location of the master shut-offs for gas and electrical power
- Know what to do during a power outage
- Events causing material damage but not effecting students must be attended to immediately, however, the safety of staff and students takes precedence at all times; and
- Post emergency telephone numbers near all telephones.

**Laboratory Information and Training Program**

The aim of a laboratory Information & Training Program is to assure that all individuals at risk of chemical exposure in the laboratory are adequately informed about the chemicals they work with in the laboratory, risks involved with these chemicals and what to do if an accident occurs. With regards to emergency and PPE training, every laboratory worker should know the location and proper us of available protective apparel and equipment as well as emergency protocol required during a spill or release incident. All instructors should be trained in the proper use of emergency equipment, spill/release procedures as well as first aid instruction.

Department Chairs shall provide instructors with pertinent information to ensure they are familiar with the hazards of chemicals found in their laboratories and storage areas. Scientific literature and the Chemical Safety Officer/ Environmental Health & Safety Coordinator technical assistance concerning chemical

hygiene will always be available. This information is to be provided before the initial work in the science laboratories begins or when working for the first time with a hazardous chemical. Any laboratory worker who works with hazardous chemicals at the St. Mary's College of Maryland are required to know the contents of this CHLSP and be familiar with the content of the OSHA 29 CFR 1910.1450, "Occupational Exposure to Hazardous Chemicals in Laboratories."

All laboratory instructors, and/or coordinators are required to be familiar with:

- permissible exposure limits (PELs) for OSHA regulated substances found in 29 CFR Part 1910, Subpart Z for approximately 500 hazardous substances
- Other recommended exposure limits not addressed by OSHA for chemical they use
- Signs and symptoms associated with exposures to hazardous chemicals used in the laboratory; and
- Location and availability of known reference material on hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory to include Material Safety Data Sheets received from chemicals suppliers or directly from the manufacturer.

The training part of this requirement is the familiarization of methods to detect the presence or release of a hazardous chemical such as visual appearance or odor of hazardous chemicals while being released; knowing the physical/health hazard used each day in the laboratory; and the protective measures students and schools staff must take to protect themselves from laboratory chemical exposure.

**Waste Disposal Program**

The aim of a waste disposal program is to assure minimal harm to humans or the environment from the disposal of waste laboratory chemicals and their by-products left from curriculum experiments. The program is required to specify how waste is to be collected, segregated, stored and transported. Transportation from the school must be in accordance with Department of Transportation regulations or lab-packed with licensed and insured Hazardous Waste Transporters.

During the planning stage of a school experiment, assure that each laboratory operation includes training and waste disposal procedures. Deposit chemical waste in appropriately labeled containers. Do not discharge concentrated acids and bases or highly toxic substances into the sewer or any other substances that might: interfere with the biological activity of the local wastewater treatment plant; create a fire or explosion; or cause structural damage to the school building. Store contaminated waste in closed, suitably labeled, impervious containers. Unlabeled containers of chemicals and solutions should go for prompt laboratory review and disposal and if partially used they should not be reopened.

Most importantly, the laboratory coordinator should be contacted after the voluntary termination of an instructor, so they can assure that the chemicals that the instructor was responsible for are inventoried, the storage room cleaned out, and all unwanted chemicals go for proper disposal. No new instructor should accept the onerous of legacy wastes/unwanted chemicals that they did not order, were never responsible for, and are aged and unusable.

It is recommended that waste should be moved to a central storage location at least once per week or designated "Satellite Accumulate" sites should be set up. A Satellite Accumulate site allows for the accumulation of by-products that is generated on daily basis to be stored outside of the formal storage area and labeled with the Hazardous Waste label with the date the first waste is added to the container and after full, the date the container is placed into storage. Once the container is full, it must be place in storage within 3 days.

Indiscriminate disposal of laboratory chemicals by pouring waste chemicals down the drain or adding them to mixed refuse for landfill burial is unacceptable. Volatilizing chemicals in the fume hood, which is considered media-exchange, should not be used as a means of disposal. Disposal by recycling or chemical decontamination should be used when possible under an approved waste minimization program. Disposal for unwanted or waste chemicals require the:

- Establishment of disposal procedures/mechanisms before chemicals are purchased

- Formulation of a comprehensive list of chemicals you wish to go for disposal
- Science Teacher to ensure laboratory chemicals are disposed of in compliance with the Resource Conservation and Recovery Act (RCRA) state rules designed to minimize damage to human health and to the environment
- Reuse/recycle of chemicals whenever possible, before disposing/discarding of unwanted chemicals, contact other schools to determine if your overstocked items can be used at other locations
- Expired or obsolete chemicals go for disposal
- Disposal of chemicals instructions obtained from the manufacturer or licensed chemical contractor who professionally lab-pack laboratory waste for disposal—you will be contacted by the Environmental Health & Safety Coordinator with the scheduled date of hazardous material disposal for the campus
- MSDS(s) with the chemical/s that have been declared a waste
- Classification of chemicals as a hazardous or non-hazardous
- Laboratory analyses of unlabeled bottles (a special problem), all mystery bottles will under go a battery of costly laboratory tests to determine the disposal method, so it is very important to label each chemical properly
- Fume hoods never used to evaporate a hazardous waste or chemical you want to discard
- When in doubt concerning the disposal of unwanted or waste chemicals, contact the St. Mary's College of Maryland Environmental Health & Safety Coordinator to assist with arrangements for the disposal.

## E. GENERAL PROCEDURES FOR WORKING WITH CHEMICALS

### Basic Rules and Procedures for Working with Chemicals

The following OSHA rules and procedures are required by all St. Mary's College of Maryland personnel and students in the event of an accident and spill:

- Eye Contact: Promptly flush eyes with water for a prolonged period (15 minutes) and seek medical attention
- Ingestion: Encourage the victim to drink large amounts of water and seek medical attention
- Skin Contact: Promptly flush the affected area with water and remove any contaminated clothing, If symptoms persist after washing, seek medical attention
- Spill Clean-up: Promptly clean-up spills, using appropriate protective apparel and equipment and proper disposal

To avoid unnecessary exposure to chemicals involves the development and encouragement of safe laboratory practices:

- Do not smell or taste chemicals
- Vent any discharge of toxic chemicals into fume hood
- Avoid eating, smoking, gum chewing or application of makeup where laboratory chemicals present
- Avoid storage, handling and consumption of food or beverage in chemical storage areas, refrigerators, laboratory glassware and utensils
- Handle and store glassware with care to avoid damage
- Use equipment for designated purpose
- Wash hands copiously after working in the laboratory
- No horseplay in laboratory area that could distract, confuse or startle another lab worker
- Do not mouth suction pipette or start a siphon
- Confine long hair, loose clothing and wear shoes not sandals
- Keep work area clean and uncluttered
- Make sure chemical bottles and equipment is properly labeled and stored
- Clean up the work area at the end of each day
- Assure the appropriate eye protection is worn where chemicals are stored and handled
- Inspect gloves before use, wash them before removal and replace them periodically

- Inspect the respirator before use
- Use appropriate respiratory equipment when necessary
- Use any other protective and emergency equipment as appropriate
- Avoid use of contact lenses in the laboratory unless unavoidable
- Remove laboratory coat and aprons immediately if contaminated
- Seek information about hazards and plan procedures with regards to protection and equipment
- Unattended operations requires signs on the door and provisions for secondary containment
- Be alert to unsafe conditions and see that they are corrected; and
- Do not work alone if procedure being conducted is hazardous.

## F. SAFETY RECOMMENDATIONS

According to OSHA the following is a list of major categories of safety hazards found in laboratories: Corrosive agents, electrically powered equipment, fires and explosions, low temperature procedures and pressurized/vacuum operations, which also include the use of compressed gas cylinders. The following general guidelines have been developed by St. Mary's College of Maryland and are requisites to be followed by laboratory workers and school faculty members as outlined below.

**Equipment Requirements for All Laboratory Workers:**

- Ensure that eyewash fountains and emergency showers will supply at least 15 minutes of water flow
- Keep all equipment in working order
- Do not block exits, aisles, or accesses to emergency equipment or controls
- Do not permit students to use broken or unsafe equipment
- Maintain a file of instruction/operating manuals for all science equipment
- All gas valves in the lab should be turned off at the end of the lab.
- Check the stability of shelving that stores chemicals and glassware
- All rough glass edges should be fire polished using prescribed common science practice procedures
- Place glass-ware contaminated with blood or other body fluids in a "Sharps Container," that is properly labeled.
- A fume hood should be used for any activity which might result in the release of toxic vapors, mists, fumes, dust or known allergens, flammable gases and noxious odors. Fume hoods must be used when the risk of exceeding a PEL is present or for any chemical whose PEL is 50 ppm or less
- Never lean into the fume hood
- Place fire extinguishers near an escape route
- Compressed gas cylinders must be secured at all times
- Large gas cylinders should be chained to the wall
- All moving belts and pulleys should have safety guards; and
- Report missing/stolen materials or chemicals to the Department Chair immediately.

Faculty Safe Work Practices:

- Unsafe conditions, inoperable or damaged safety equipment or any other potential hazards in the classroom or storeroom should be reported in writing to the Department Chair, the Chemical Safety Officer, and the Building Coordinator and a maintenance order submitted by the individual who discovers the condition.
- Lab entrances should always be locked when not in use
- Involve students in the pre-lab phase to plan actions in case of an accident
- Warn students of all anticipated hazards.
- Provide verbal and written safety instructions to students
- Document students' understanding of proper safety practices prior to each lab activity
- Document in your lesson plans safety measures you take as a part of your teaching
- Never allow students to be left unsupervised

- Report accidents to a Human Resource Administrator, Department Chair and the Environmental Health & Safety Coordinator. Document the incident in writing on the "*Worker's Compensation Report of Initial Injury Report*". A copy should remain with the supervisor and the original sent to the Human Resource Department.
- Accidents should be analyzed to prevent repeat incidents
- Never overlook any infraction of a safety procedure
- Establish clear safety rules based on safety standards and anticipated events
- Consider individual student differences in maintaining safety
- Be aware of current safety research and regulations
- Use proper procedure when an accident or injury occurs (see Appendix D)
- Do not permit horseplay in the lab--Maintain Control!
- Group sizes should conform to a number which can perform the experiment safely
- Plan enough time for the experiment and clean up
- Instruct students never to eat or drink in the classroom
- All students performing scientific experiments must wear the appropriate required PPE
- Visitors to the classroom must follow safety rules
- Hand protection should be worn when picking up broken glass. Small pieces should be swept up with a brush and dust pan
- Allow falling objects to fall; never try to grab a falling object
- Allow glassware to cool after heating by placing it on a special heat-transfer surface.
- Do not submerge hot glassware in water
- Always pour acid into water--never water into acid
- Never pipette with your mouth, use a pipette bulb or automatic filler
- Before using an open flame remove all flammable substances from the immediate area. Do not use an open flame to heat a flammable liquid or pressurized distillation. Restrict use of an open flame and extinguish it as soon as it is no longer needed
- Develop a written plan of action for emergencies to secure the lab. In a fire drill event, make sure equipment, including heat sources, are turned off
- Include a list of safety rules with a substitute's lesson plan, however, it is advisable that a substitute not conduct a lab activity
- Document safety violations and report safety concerns in writing to H&S
- Post emergency telephone numbers in a conspicuous location in the science room
- Do not permit students to take science materials home
- Teach and practice safety precautions when working with electrical current
- Be aware of students' medical predispositions that could be compromised in lab situations (e.g., epilepsy, allergic reactions, pregnancy, etcetera); and
- Collaborate with other science colleagues when reviewing and updating lab activities to current safety standards.
- Always inform co-workers of plans to carry out hazardous work
- Establish a specific safety plan for each building.

A key feature in creating a safe laboratory environment is a school science curriculum that has well-planned laboratory experiences. To create a safe laboratory environment requires: planning, instruction, and a certain amount of troubleshooting. Planning refers to the teacher having done the lab activity previously to familiarize himself/herself with the procedures and how long it will take. It also includes outlining safety procedures for a given activity and documenting these safety considerations in each lesson plan. Planning can refer to the teacher taking steps to insure student knowledge and accountability for safety practices.

Instruction refers to concise and easily understood written and verbal instructions for a lab activity, as well as materials being prepared and measured ahead of time. It includes equipment being procured and checks to assure all equipment operational and safe. Troubleshooting refers to identifying all the possible hazards of an activity and taking steps to minimize the dangers. If the potential hazards outweigh the educational value, the activity should be omitted.

## Lesson Plans

In the classroom, faculty members are required to incorporate health and safety as an integral part of their instruction. Ultimately, it is their responsibility to make certain that proper safety considerations have been made and that the appropriate precautions have been taken. **These safety features should be reflected in the documented training plans. Appendix D demonstrates the Hazards/Hazard Assessment for Students which outlines risk types and prevention policies.**

Faculty members should ask themselves the following questions before conducting every laboratory experiment:

- What are the risks associated with this activity?
- What are its worst possible outcomes?
- What do I need to do to be prepared if these outcomes should occur?
- What practices, equipment and facilities would reduce risks?
- How can I relate these hazards to dangers that my students face in their everyday lives?

## G. LABELS & MATERIAL SAFETY DATA SHEET

A Material Safety Data Sheet (MSDS) is a document that contains comprehensive information regarding the physical and chemicals characteristics of the substance and is prepared by the manufacturer and/or supplier. MSDSs contain hazard evaluations on the use, storage, handling, and emergency procedures all related to that material. The MSDS is designed to contain more complete information about the material than the label. Every MSDS is intended to tell what the hazards of the product are, how to use the product safely, what to expect if the recommendations are not followed, what to do if an accident occurs, how to recognize symptoms of overexposure, and what to do if such incidents occur.

With respect to labels and Material Safety Data Sheets, the Laboratory Supervisor and/or the Chemical Hygiene Officer or is responsible to:

- Require labels on all containers of hazardous chemicals
- Maintain MSDS's received with incoming shipments of hazardous chemicals; and
- Ensure all MSDS's are readily accessible to laboratory workers.

It is the ***responsibility of the Department Chair or designee to*** know what substances are used in every college experiment, to review the MSDS for each substance, and to provide the MSDS to their students for review before students work with those chemicals.
It is the ***responsibility of the students*** to read and understand the MSDSs for every chemical before using them during a lab activity.
All Material Safety Data Sheets must be available in each chemistry laboratory classroom. The Environmental Health & Safety Coordinator, Public Safety and the Health Unit should also maintain a copy of all MSDSs for all chemicals used or maintained at the college to include cleaning solutions found in custodial closets. The MSDSs can be sorted by labs, so all of the MSDSs for materials used in that particular lab can be grouped together.

# Appendix A: Laboratory Safety Contract

## [Enter Topic] Training Session

## Attendance List

| Name (Printed) | Signature | Date |
|---|---|---|
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**By signing this form, I agree that I have attended this training class in its entirety. The information was presented in a language I understand and I had the opportunity to ask questions of the trainer.**

# Appendix B: SPILL KIT

# SPILL KIT

## *IF A MEDICAL EMERGENCY EXISTS, REFER TO APPENDIX D*

Maintain one spill kit for each chemical laboratory
Attach the following list and procedures to the lid of the 5-gallon spill kit bucket

***CONTENTS – "ORDER & IMMEDIATELY REPLACE AS USED"***

- *Five (5) gallon plastic bucket with lid*
- *Absorbents such as sand and vermiculite*
- *Mix sand with neutralizing agents such as Sodium Carbonate or Bicarbonate*
- *Plastic bags of different sizes (4 each)*
- *Universal absorbent pads, 16 x 20 (4 each)*
- *Rubber gloves (2 pair)*
- *Splash goggles (1 each)*
- *Lab apron (1 each)*
- *Paper towels*
- *Broom and dust pan*
- *Sponges*

***The instructions on the MSDS for spill cleanup should be followed.***

***GENERAL PROCEDURES FOR USING SPILL KIT:***

1. *Mix 256 ounces of absorbent sand with 26 ounces of sodium carbonate (10:1) in 5 gallon bucket*
2. *Use Personal Protective Equipment (PPE), minimally use gloves, goggles and apron.*
3. *Ask for assistance--The Plant Manager/Head Custodian is available for urgent response*
4. *Double bag all hazardous waste and label the bag with the chemical name(s) of the waste.*
5. *For disposal, please call Plant Manager/Head Custodian and the Health & Safety Office.*

***ROOM NUMBER FOR THIS SPILL KIT**: _____*

***THE PERSON MAINTAINING THIS KIT IS**: _____*

# Appendix C: LABORATORY HAZARDS & EMERGENCY ACTIONS

***IN ALL CASES* of injury, hazardous spill, material damage, etc.:**

1. FOLLOW EMERGENCY PROCEDURES FOUND BELOW
2. AS NEEDED, NOTIFY THE PUBLIC SAFETY FOR ASSISTANCE
3. BE PREPARED TO ACT: ***Know the location and how to use the evacuation routes, eye wash, emergency shower, fire blanket, fire extinguisher, fume hood, exhaust systems, shutoffs, etc.***

| | |
|---|---|
| **EQUIPMENT OR ROOM FIRE**<br>• Evacuate students<br>• Activate (pull) nearest Fire Alarm Pull Station<br>• Turn off gas master shutoffs<br>• Turn off gas master shutoffs<br>• Call front office or directly call 4911<br>• Close doors and windows<br>• Close flammable and acid lockers<br>• Unplug all appliances and equipment | **BODY FIRE**<br>• Evacuate, if necessary<br>• Activate (pull) nearest Fire Alarm Pull Station<br>• Use a fire blanket (drop & roll)<br>• Immediately flush with cool water<br>• Call 4911<br>• Call nurse's office |
| **FAINTING**<br>• Immediately move person to fresh air<br>• If due to a chemical, evacuate students and activate the emergency exhaust fan<br>• Keep the head lower than the rest of the body<br>• Keep warm and/or cover with blanket<br>• Call nurse's office<br>• If breathing or heart stops, apply CPR/artificial resuscitation while you send someone to call 911 | **TOXIC EXPOSURES / POISONING**<br>• Call 4911 and/or poison control<br>• Follow MSDS emergency and first aid procedures<br>• Call front office/nurse<br>• Identify substance<br>• Give MSDS to emergency personnel |
| **CHEMICAL SPILLS ON BODY**<br>• Follow MSDS emergency/first aid procedures<br>• Call 4911<br>• Identify substance<br>• Remove clothing or contacts as needed<br>• Call front office/nurse<br>• Give MSDS to emergency personnel | **FLOOR OR COUNTER SPILL**<br>• Follow MSDS emergency and first aid procedures<br>• Activate emergency exhaust fan<br>• Evacuate if PEL exceeded or chemical an irritant<br>• Clear students from the spill area if necessary<br>• Follow **SPILL KIT** (**Appendix B**) procedures<br>• Contact Maintenance/Head Custodian for disposal |
| **MINOR CUTS**<br>• Follow MSDS emergency and first aid procedures<br>• Follow universal precautions<br>• Allow to bleed briefly<br>• Wash with soap and water<br>• Apply antiseptic and sterile bandage | **EYE INJURY**<br>• Follow MSDS emergency and first aid<br>• Flush eye with water for at least 15 minutes using emergency eye wash<br>• Remove contacts, if necessary<br>• Do not rub eye<br>• Call front office/nurse |
| **BODY BURNS**<br>• Follow MSDS emergency and first aid procedures<br>• Send student to the nurse's office with an escort | **AFTER THE EMERGENCY**<br>• Cleanup and prepare for the next emergency<br>• File a Student Accident/Incident Report or a worker's comp Report of Injury<br>• Get statement from witnesses<br>• Repeat safety training |

# Appendix D: Laboratory Hazard /Hazard Assessment Form

| **Department:** | **Date:** | **Completed by:** |
|---|---|---|

| | |
|---|---|
| ☐A worksite | Specify location: |
| ☐An employees job description | Name of Department Head:<br>Phone Number of Department Head:<br>Alternate Responsible Individual: |
| ☐The job description for a class of employees | Working title of positions:<br>Position Number(s): |

**EYE/FACE HAZARDS**

| *Check the box for each hazard:* | | *Description of hazard(s):* | *Controls in place:* | *Identify required PPE.* |
|---|---|---|---|---|
| Chemical Exposure | Yes ☐ | | ☐Work in fume hoods | ☐Safety glasses |
| High Heat/Cold | Yes ☐ | | ☐Enclosure/guarding | ☐Safety goggles |
| Dust or Flying Debris | Yes ☐ | | ☐Shielding (bystanders) | ☐Face shield |
| Impact | Yes ☐ | | ☐Safe Work Practices | ☐Welding helmet |
| UV Light | Yes ☐ | | ☐Dust collection system | ☐Cutting goggles |
| Other | Yes ☐ | | ☐Other: Ventilation exhaust | ☐Other: |

**HEAD HAZARDS**

| *Check the box for each hazard:* | | *Description of hazard(s):* | *Controls in place:* | *Identify required PPE.* |
|---|---|---|---|---|
| Impact | Yes ☐ | | ☐Canopy | ☐Class G hard hat |
| Electrical Shock | Yes ☐ | | ☐DE-ENERGIZATION | ☐CLASS E HARD HAT |
| Entanglement | Yes ☐ | | ☐Hair secured | ☐Class C hard hat |
| Other: | Yes ☐ | | ☐Other: | ☐Bump cap/welding cap |

**FOOT/LEG HAZARDS**

| *Check the box for each hazard:* | | *Description of hazard(s):* | *Controls in place:* | *Identify required PPE.* |
|---|---|---|---|---|
| Chemical Exposure | Yes ☐ | | ☐Substitution | ☐Work boots |
| High Heat/Cold | Yes ☐ | | ☐Mechanical device used | ☐Steel-toed shoes/boots |
| Impact/Compression | Yes ☐ | | ☐Housekeeping | ☐Slip-resistant shoes |
| Puncture | Yes ☐ | | ☐Isolation/grounding | ☐Puncture-resistant shoes |
| Explosive/Flam. atmos. | Yes ☐ | | ☐Safe Work Practices | ☐Non-conductive |
| Slippery/Wet Surfaces | Yes ☐ | | ☐Appropriate clothing | ☐Metatarsal protection |
| Electrical | Yes ☐ | | ☐Other: | ☐Shin guards |
| Other: | Yes ☐ | | ☐Other: | ☐Other: |

**HAND/ARM HAZARDS**

| *Check the box for each hazard:* | | *Description of hazard(s):* | *Controls in place:* | *Identify required PPE.* |
|---|---|---|---|---|
| Chemical Exposure | Yes ☐ | | ☐Substitution | ☐Chemical-resistant gloves |
| High Heat or Cold | Yes ☐ | | ☐De-energization | ☐Thermal-protective gloves |
| Cuts or Abrasion | Yes ☐ | | ☐Elimination | ☐Cut-resistant gloves |
| Puncture | Yes ☐ | | ☐Avoidance | ☐Leather gloves |
| Electrical Shock | Yes ☐ | | ☐Safe Work Practices | ☐Voltage-rated–Class: |
| Vibration/grip | Yes ☐ | | ☐Other: | ☐Latex/nylon exam gloves |
| Bloodborne Pathogens | Yes ☐ | | ☐Other: | ☐Anti-vibration gloves |
| Other: | Yes ☐ | | | |

**BODY/TORSO HAZARDS**

| *Check the box for each hazard:* | | *Description of hazard(s):* | *Controls in place:* | *Identify required PPE.* |
|---|---|---|---|---|
| Chemical Exposure | Yes ☐ | | ☐Reduce time exposed | ☐Lab coat |

| | | | | |
|---|---|---|---|---|
| Extreme Heat/Cold | Yes ☐ | | ☐Guards/barriers | ☐Apron: |
| Impact | Yes ☐ | | ☐Safe Work Practices | ☐Flame-retardant |
| Cut/Abrasion/Puncture | Yes ☐ | | ☐De-energization | ☐Coveralls |
| Electrical Arc | Yes ☐ | | ☐Mechanical devices | ☐Vest |
| Pushing/pulling/lifting | Yes ☐ | | ☐Other: | ☐Tyvek suit |
| Other: | Yes ☐ | | ☐Other: | ☐Other: |

**FALL HAZARDS** Work on a surface with an unprotected side or edge that is 4 feet or more above a lower level

| *Check the box for each hazard:* | | *Description of hazard(s):* | *Controls in place:* | *Identify required PPE.* |
|---|---|---|---|---|
| Fall hazard | Yes ☐ | | ☐Guardrail<br>☐Safe ladder practices | ☐Full-body harness |

**NOISE HAZARDS** Noise exceeding 90 dBA during an 8 hour work period

| *Check the box for each hazard:* | | *Description of hazard(s):* | *Controls in place:* | *Based upon EHSS evaluation:* |
|---|---|---|---|---|
| Noise hazard | Yes ☐ | | ☐Noise reduction<br>☐Reduced exposure | ☐Ear plugs<br>☐Ear muffs |
| Ultrasonics | Yes ☐ | | | |

**RESPIRATORY HAZARDS** Harmful dusts, mists, fumes

| *Check the box for each hazard:* | | *Description of hazard(s):* | *Controls in place:* | *Based upon EHSS evaluation:* |
|---|---|---|---|---|
| Chemicals/pesticides | Yes ☐ | | ☐Fume hood | ☐Half-face |
| Particulates | Yes ☐ | | ☐Local exhaust ventilation | ☐Full-face |
| Confined space work | Yes ☐ | | ☐Increase air flow | ☐Air-line/SCBA |
| Welding/cutting fumes | Yes ☐ | | ☐Filtration | ☐PAPR |
| Other | Yes ☐ | | ☐Work outside | ☐Dust mask |

I certify that the above inspection was performed to the best of my knowledge and ability, based on the hazards present on this date.
(Department Head or designee Signature)
Note: Computerized signature is recognized as an authorized signature