UNION COLLEGE

LABORATORY CHEMICAL HYGIENE PLAN

Purpose: This Laboratory Chemical Hygiene Plan (known hereafter as the "Plan") outlines the workplace safety and health measures for the safe use, storage, and disposal of hazardous chemicals in the laboratory. It is written to meet the specific safety and health requirements outlined in the federal regulation 29 CFR 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories. These measures are considered best practices for use of all chemicals, whether classified as hazardous or non-hazardous.

Scope: This Plan applies to all employees of Union College who use hazardous chemicals in a laboratory.

Plan last updated:

09/28/2016

The Union College EHS Department acknowledges the following institutions whose websites provided information that was referenced in creating this Plan:

- University at Buffalo
- Cornell University
- UCLA

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A-Hazard Assessment Checklist for Laboratories

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1.0 DEFINITIONS

Action level is a concentration for a specific airborne contaminant at which action is required. It is usually identified as half the PEL or TLV.

Employees at Union College include full-time, part-time, temporary Faculty, Staff, Administrators and Work-study students.

Hazardous chemical is a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may create a health hazard to exposed employees, or the chemical creates a physical hazard to employees.

Health hazard is a chemical that is classified as a carcinogen, a toxic or highly toxic agent, reproductive toxin, irritant, corrosive, sensitizer, hepatoxin, nephrotoxin, neurotoxin, an agent that acts on the hematopoietic systems, an agent than can damage the lungs, skin, eyes, or mucous membranes.

Laboratory is a workplace where the use of hazardous chemicals occurs and where relatively small quantities of hazardous chemicals are used on a nonproduction basis.

Nanomaterials are materials of which a single unit is sized (at lease in one dimension) between 1-100 nanometers, where 1 nanometer is equal to 1×10^{-9} meter.

Near-Miss is an unplanned event that did not result in injury, illness, or damage; but had the potential to do so.

Particularly hazardous substances include select carcinogens, reproductive toxins and substances that have a high degree of acute toxicity, or are highly unstable or explosive.

Permissible exposure limit (PEL) is the maximum legally enforceable concentration of a chemical substance or physical agent to which employees can be exposed. The PEL is usually expressed in parts per million (ppm) or milligrams per cubic meter (mg/m^3) and is provided in Section 8 of the Safety Data Sheet for each chemical. Not every chemical has a PEL.

Physical hazard pertains to a chemical that has one or more of the following hazardous effects: combustible dust, compressed gas, corrosive to metal, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, self-heating, unstable (reactive) or water reactive.

Threshold Limit Value (TLV) of an airborne chemical represents the time-weighted average concentration under which most people can work consistently for eight hours a day, day after day, with no harmful effects.

2.0 PLAN ADMINISTRATION

2.1 Plan Administrator

The Plan Administrator is qualified by training or experience and designated by Union College to provide technical guidance in the Plan's development and is authorized to implement and enforce the provisions of the Plan. The Plan Administrator, or a designated person or persons, will provide employees who work in the laboratory with health and safety information about the specific hazards found in the laboratory and assist Faculty and Staff in matters relating to chemical safety.

The Plan Administrator works with Department Chairpersons and Directors, Faculty and Staff to:

- Monitor procurement, use, storage and disposal of chemicals used in the laboratory.
- Assist with assessments of laboratories, preparation and stock rooms and make recommendations for improving hygiene practices.
- Maintain assessment and chemical inventory records.

The Plan Administrator

- Knows the current legal requirements concerning regulated substances.
- Seeks ways to improve the chemical hygiene program.
- Reviews incident reports and makes recommendations to Departments for improvements in lab procedures.
- May designate Faculty, Staff or other Administrators to implement any provision of this Plan.

Plan Administrator: Liz Dobson-Davis, EHS (x6340, dobsonde@union.edu)

2.2 Department Chairpersons and Directors

- Assume responsibility for Department employees engaged in the laboratory use of hazardous chemicals.
- Communicate with the Plan Administrator about questions or suggestions from Faculty or Staff for improving the Plan policies and/or procedures.
- Meet with Faculty and Staff to discuss violations noted in the annual Hazards Assessment for Laboratories and ensures timely actions are taken to correct the violations.
- Work with the Plan Administrator to ensure the Department remains in compliance with all applicable federal, state, college, local and Departmental codes and regulations.
- Provides resources from the operating budget to ensure the health and safety of Departmental Faculty, Staff, visitors and students.

2.3 Faculty and Staff

Comply with chemical hygiene requirements in the laboratory, including:

- Ensure students comply with the Plan and do not operate equipment or handle hazardous chemicals without proper training and authorization.
- Always wear personal protective equipment (PPE) that is compatible with the degree of hazard of the chemical.
- Follow all pertinent safety rules when working in the laboratory.
- Review laboratory procedures for potential safety problems.
- Ensure visitors follow the laboratory rules and assume responsibility for laboratory visitors.
- Ensure PPE is available and properly used by students and visitors.
- Conduct an annual chemical hygiene and housekeeping assessments using the Hazard Assessment for Laboratories checklist (see Attachment A)

- Monitor the chemical fume hoods by visual and auditory means to ensure they are operating and contact the Department Chairperson or Director and Plan Administrator to report problems.
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2.4 Plan Availability and Evaluation

The Plan is available on-line at Union's EHS website (insert web page link) and a hard copy is available in Room S316, Science & Engineering. The Plan Administrator will annually review and evaluate the effectiveness of the Plan and update it as necessary, and whenever new processes, chemicals or equipment are implemented.

3.0 EMPLOYEE TRAINING AND INFORMATION

Faculty and Staff will be provided with information and training by the Environmental Health and Safety (EHS) Department to ensure they are aware of the hazards of chemicals present in their work area and know how to control or avoid such hazards. EHS will also provide information about OSHA's Hazard Communication Standard. A Laboratory Safety course is available on Nexus and must be completed by new Faculty and Staff who will be working with laboratory chemicals. EHS will also provide periodic training for Faculty and Staff with regards to changes and updates to OSHA's Hazard Communication standard.

Faculty and Staff will provide information and train students about potential hazards specific to their work area and methods to reduce exposure to the hazards.

3.1 Information

The following information will be provided to Faculty and Staff by EHS:

The contents of the Occupational Exposure to Hazardous Chemicals in Laboratories regulation (29 CFR 1910.1450).

The location and availability of this Plan

The Permissible Exposure Limits (PELs) for regulated substances or recommended exposure limits where there is no applicable PEL. PELs are provided in Section 8, Exposure Controls/Personal Protection, of the Safety Data Sheet for each chemical. (Note-not all chemicals have PELs).

Signs and symptoms associated with exposures to hazardous chemicals used in the laboratory.

The location and availability of known reference material on the hazards, safe handling, storage, and disposal of hazardous chemicals found in the laboratory, including Safety Data Sheets received from the chemical supplier.

3.2 Training

All Faculty and Staff members should review the Hazard Communication slide show on Nexus on an annual basis. Contact the Plan Administrator to enroll. The following topics are provided in the slide show:

- Methods and observations used to detect the presence or release of a hazardous chemical, such as monitoring conducted by the employer, types of continuous monitoring devices, and the visual appearance or odor of hazardous chemicals when being released.
- Physical and health hazards of hazardous chemicals.
- The measures Faculty and Staff can take to protect themselves from these hazards, including the appropriate work practices, emergency procedures, and PPE needed to protect themselves from exposure to hazardous chemicals.
- Shut off procedures in case of an emergency.

3.3 Refresher Training

Refresher training and information will be provided by EHS to Faculty and Staff whenever laboratory processes or chemicals change, or whenever Faculty or Staff request refresher training.

4.0 HAZARD IDENTIFICATION

4.1 Hazard Assessment

Faculty and Staff will conduct a hazard assessment on an annual basis to identify conditions, chemicals, and equipment that may cause exposure or injury. A hazard assessment can be conducted by completing the Hazard Assessment for Laboratories checklist (see Attachment A insert web link when final). Identified hazards should be reviewed with the Department Chairperson or Director to implement control measures for safe chemical handling. The Plan Administrator is available to assist with assessments.

Completed or updated hazard assessments must be attached to this Plan and kept on file for each laboratory; electronic files are acceptable. Results from the hazard assessment will be used to develop safe work practices for each hazardous material or procedure found in the lab.

Before using new equipment or chemicals, or implementing changes to procedures, potential hazards should be assessed by Faculty and Staff by answering three questions:

1) What are the hazards?

2) What can be done to protect from these hazards?

3) What should be done if something goes wrong?

For a variety of physical and chemical reasons, reaction scale-ups may pose special risks and merit additional review and precautions.

Even for substances of no known significant hazard, exposure should be minimized. When working with substances that present special hazards, special precautions should be taken. Reference should be made to the safety data sheet (SDS) that is provided for each chemical. Unless otherwise known, assume any mixture will be more toxic than its most toxic component and that all substances of unknown toxicity are toxic.

Determine the physical and health hazards associated with chemicals before working with them. This determination may involve consulting literature references, laboratory chemical safety summaries (LCSSs), SDSs, or other reference materials. Consider how the chemicals will be processed and determine whether the changing states or forms will change the nature of the hazard. Review your plan, operating limits, chemical evaluations and detailed risk assessment with other researchers, especially those with experience with similar materials and protocols.

4.2 Standard Operating Procedures (SOPs)

For procedures that involve hazardous chemicals or equipment use; and are performed routinely or are conducted by students independently, a Standard Operation Procedures (SOP) document must be prepared and provided to students. The SOP should include procedure steps and identify the potential physical and chemical hazards, as well as methods to mitigate the hazards. The SOP should also include required PPE and emergency contact information.

4.3 Physical Hazards

Physical hazards in the laboratory include chemicals that have one or more of the following hazardous effects: combustible dust, compressed gas, corrosive to metal, explosive, flammable, organic peroxides, oxidizers, pyrophoric, self-heating, unstable (reactive) or water reactive. Other non-chemical physical hazards include high pressure/energy procedures, sharp objects, and moving equipment. Injuries can result from bodily contact with rotating or moving objects, including mechanical equipment, parts and devices. Loose clothing, jewelry or unsecured long hair are physical hazards around machinery or moving parts.

Physical hazards must be identified in the laboratory Hazard Assessment checklist; and Standard Operating Procedures (SOPS) must include guidelines to minimize exposure to these hazards.

4.4 Exposure Monitoring

Exposure monitoring is required if the following substances are used by Faculty and Staff in a manner where the action level for that substance is routinely exceeded (for example, used routinely without a ventilation system): Vinyl chloride, Inorganic arsenic, Lead, Hexavalent Chromium, Cadmium, Benzene, 1,2-Dibromo-3-chloropropane, Acrylonitrile, Ethylene Oxide, Formaldehyde, Methylene Chloride and Asbestos.

The need for regular monitoring of airborne contaminants in the laboratory is not usually justified or practical assuming fume hoods and other appropriate methods of containment are used properly, and safe work practices are followed carefully.

Contact the Plan Administrator for assistance when a concern arises over potential exposure to a laboratory chemical or specialized monitoring and/or chemical exposure determination is required.

4.5 Chemical Inventory

The Plan Administrator or designee will provide a list of hazardous chemicals used on campus. The list will be updated annually and whenever new hazardous chemicals are introduced in the laboratory. The list will include

chemicals that are classified as hazardous by either:

- The Hazard Communication Standard (29 CFR 1910.1200), Appendices A and B (includes the Department of Transportation and the Environmental Protection Agency classifications); *or*
- A rating of 2 or greater on the National Fire Protection Association (NFPA) chemical hazard label.

Safety data sheets (SDSs) for chemicals used or stored at the College can be used to assist with the hazardous classification process.

The hazardous chemical list is provided in MSDSonline, the electronic Safety Data Sheet database for Union College.

Faculty and Staff members should review the chemical list for their lab, which is provided in the SDS database at the end of each academic year and compare with the actual inventory. Any discrepancies should be reported to the Plan Administrator, who will adjust the chemical list in the SDS database.

4.6 Container Labeling

Each hazardous chemical container delivered to or used in the laboratory must be labeled by the manufacturer with the name of the chemical as it appears on the SDS, the name and address of the manufacturer, and the appropriate hazard warnings.

Container labels must be maintained in a legible condition. A Manufacturer's label must not be defaced or removed unless the container is immediately labeled with the required information. Any container without a label or with an illegible label must be reported to the Plan Administrator immediately.

All chemical containers with solutions prepared in the laboratory must be labeled with the following information:

- The name of the chemical or stock solution
- The date of preparation
- Concentration
- The user's initials

4.6.1 Secondary Containers

For laboratory operations that require the transfer of chemicals from the original labeled container to a secondary container, and if the following conditions apply:

1) The material in the secondary container is not entirely used during the time the individual who made the transfer is working in the laboratory ; or
2) The individual who made the transfer leaves the area; or
3) The container is moved to another work area and is no longer in possession of the individual who made the transfer; then the following information must be included on the secondary container label:

- Name of chemical
- Primary health and/or physical hazards, which can be conveyed through words, symbols or a combination of these elements
- Name of Manufacturer
- The information on the label must be legible and permanently displayed.

4.6.2 Hazardous Waste Containers

For hazardous waste that is generated in accumulation areas, which are areas near where the waste is generated, the following information must be provided on the hazardous waste container label:

- Words "Hazardous Waste"
- Chemical content written out (no formulas)

No more than 55 gallons of hazardous waste or 1 quart of acutely hazardous waste can be stored in an accumulation area. The container must be closed when it's not being used and the container type must be compatible with the waste.

4.7 Safety Data Sheets

Prior to working with hazardous chemicals, review the Safety Data Sheet for each chemical to learn the associated hazards (Section 2) and the recommended Personal Protective Equipment (Section 8).

SDSs are available on Union's website. Use a Union computer and click on the MSDS database tab, which is located under Safety, Wellness on the Faculty & Staff page. Safety Data Sheets can be searched by chemical name, product code or building/room location.

4.8 Chemical-Sensitive Employees

Faculty and Staff who are sensitive to chemicals may have concerns about working with specific chemicals. Such concerns should be discussed with the Department Chairpersons and Directors and/or the Plan Administrator.

5.0 STANDARD OPERATING PROCEDURES FOR THE USE OF HAZARDOUS CHEMICALS

Before working with chemicals, Faculty and Staff should know Union's policies and procedures to address a chemical spill or fire, and the location of all safety equipment, the nearest fire alarm and telephone. Emergency telephone numbers should be posted in a prominent area.

Faculty and Staff must ensure all students under their direction possess knowledge, training, and education to safely handle hazardous chemicals in the laboratory. Faculty and Staff are responsible for following the work practices listed below when using hazardous chemicals. (These are also listed in the Union College Laboratory Safety Rules-see Attachment B insert web link here):

1. Before working with laboratory chemicals, you must complete the Laboratory Safety course on Nexus. Contact Liz Dobson-Davis, EHS at dobsonde@union.edu to enroll.

2. Be prepared. Read all assigned laboratory procedures and associated materials prior to conducting lab work. Review the Safety Data Sheets (SDSs) for the chemicals you'll be using and be aware of all hazards before beginning any lab.

3. All procedures should be performed as directed. Do not do anything that is not part of the assigned lab procedure, or has not been advised by your instructor. Never use equipment prior to receiving proper instruction.

4. Wear personal protective equipment required for the procedure you are performing to reduce the risk of chemical exposure. This includes items such as safety glasses/goggles, lab coats and gloves. Your instructor will specify the type of personal protective equipment that is required for each procedure.

5. Splash goggles and lab coats must be worn when using acids or bases with a concentration of 6 Molar or greater, and when procedures have a splash hazard such as pouring or transporting bulk quantities.

6. Remove gloves before touching personal items and door handles. Gloves should be removed so the outer part does not touch your skin.

7. Appropriate clothing shall be worn in the laboratory. Shoes should cover the entire foot. Avoid loose fitting clothing or dangling jewelry and tie back long hair.

8. Working alone in a laboratory should be avoided. Work in pairs, however if you must work alone, advise a faculty member of your location and the time you'll be in the lab.

9. If feasible, keep the door to the lab closed; an open door can decrease fume hood performance. However, if you're working alone, keep the door open in case assistance is needed in an emergency.

10. Keep food, beverages, cosmetics and medications out of the designated lab work zone. Do not store coats, backpacks and other personal items on the bench tops.

11. Use an operating chemical fume hood for opening, pouring or handling hazardous chemicals. Transport hazardous chemicals using bottle carriers or suitable carts.

12. Know the location and proper operation of the nearest exit and emergency equipment, including eyewash, safety shower, fire extinguisher, first aid kit and spill kit. Only use a fire extinguisher if you have been trained

13. Absolutely NO horseplay will be tolerated in the laboratory. When moving about the laboratory, be mindful of your surroundings and potential hazards.

14. All accidents, spills, injuries or breakage should be reported to your instructor immediately. All spills should be contained and cleaned up. Materials used to clean a spill should be disposed of properly. Broken glass should be disposed in a designated container.

15. All chemical waste must be disposed of properly, according to your instructor. Chemical waste labels must have the words "hazardous waste" and the chemical waste name(s) fully written out. Keep waste containers capped when not in use.

16. Never remove chemicals, biohazards, supplies or equipment from the laboratory without prior permission from you instructor.

17. All medical conditions that may require special precautionary measures (allergies, color blindness, pregnancy, etc.) should be reported to your instructor.

18. Properly clean up your work area before leaving the lab. This includes returning all supplies, cleaning the workbench and washing your hands.

In addition Faculty and Staff are responsible for the following work practices related to hazardous chemicals:

- Post a copy of Union's Laboratory Safety Rules (see Attachment B provide web link here) in the lab work zone and have students review as part of their safety training.
- Follow the established procedures for the decontamination and safe movement of scientific equipment.
- Maintain proper oversight of inexperienced personnel working with potentially hazardous chemicals.
- When a request is made by Facilities Services to conduct maintenance or repair tasks in a laboratory, Faculty and Staff are responsible for the clearance of chemicals and materials to reduce exposure hazards for the maintenance personnel.
- Remove hazardous materials from equipment or facilities to be serviced and forewarn service personnel of the need for PPE or work practices.
- Decontaminate equipment when possible; notify the Department Chairpersons and Directors if equipment cannot be properly decontaminated.
- Follow spill procedures immediately in the event of a hazardous chemical spill; see Section 7.

5.1 Purchasing Hazardous Chemicals

- Purchase what you can reasonably expect to use during the academic year.
- If available, purchase chemicals in plastic containers and avoid glass containers; if this is not possible, consider purchasing ones that are shatter resistant plastic coated.
- Rotate the chemical inventory. Indicate the date received, the date opened, and pay particular attention to the expiration date. Stored chemicals should be inspected periodically for deterioration and container integrity.
- Prior to placing an order for a chemical that may be classified as particularly hazardous, Faculty and Staff or their designee must notify the Plan Administrator, who will determine if the chemical meets

this classification.

5.2 Hazardous Chemicals Storage Procedures

Requirements for storage of flammable chemicals are provided in Section 6.5, Fire Safety.

- Hazardous chemicals must be kept in a designated storage area.
- Chemical containers are in good condition and are clearly labeled.
- Temperature-sensitive chemicals must be kept in a designated refrigerator (no food or beverages allowed)
- If a chemical is both temperature sensitive and flammable, it must be stored in a flammable materials rated refrigerator/freezer (no food or beverages allowed).
- If practical, hazardous laboratory chemicals should be stored below eye level. This will reduce the likelihood of causing eye and/or other injuries if a container falls & breaks.
- Avoid placing any chemical container in direct sunlight, underneath a sink, or near heat sources.
- While chemicals may be kept on the lab bench or fume hood while in use, do not use laboratory bench tops or chemical fume hoods for storage longer than one (1) academic year.
- Segregate chemicals into their respective hazard categories: e.g. corrosives, flammable, water reactive, toxic, peroxide formers, carcinogens, pyrophoric; and physically separate incompatible chemicals.

5.3 Hazardous Chemicals Disposal Procedures

- Consider practical ways to reduce chemical waste generation.
- Do not dispose chemicals down the drain or by evaporation.
- Label chemical waste containers with words “hazardous waste” and full chemical waste name.
- Keep chemical waste containers closed and sealed when not in use.
- Store waste containers in secondary container trays to prevent spills.
- The quantity of hazardous waste in an accumulation area is limited to 55 gallons and 1 quart for acutely hazardous waste.
- Contact the Plan Administrator for removal of chemical waste from the laboratory for disposal.

6.0 CONTROL MEASURES TO REDUCE EMPLOYEE EXPOSURE TO HAZARDOUS CHEMICALS

Hazardous chemicals may be used only in laboratory facilities specifically designed and engineered for such work. They may not be used or stored in areas where their use is prohibited, including offices, storage rooms, shared equipment areas, warm and cold rooms, and other areas lacking the required hazard control facilities and ventilation.

Select appropriate controls to minimize risk, including use of engineering controls, administrative controls, and personal protective equipment (PPE) to protect employees from hazards. The controls must ensure the

OSHA Permissible Exposure Limits (PELs) are not exceeded. Prepare for contingencies and be aware of the college procedures in the event of emergencies and incidents.

If an incident occurs where an employee is exposed to hazardous chemicals, this must be reported immediately to Campus Safety at 6911 and EHS at 6340.

6.1 Ventilation Systems

The best way to prevent exposure to airborne substances is to prevent their escape into the working atmosphere by the use of hoods and other ventilation devices. Laboratory chemical fume hoods are important components used to protect laboratory employees from exposure to hazardous chemicals.

Before work begins, Faculty and Staff must be provided with proper training by EHS that includes how to use the ventilation equipment, how to ensure that it is functioning properly, the consequences of improper use, what to do in the event of a system failure or power outage, special considerations, and the importance of signage and postings.

A laboratory ventilation system should meet the following requirements:

Heating and cooling should be adequate for the comfort of personnel and operation of equipment. Before modification of any building HVAC, the impact on laboratory or hood ventilation should be considered, as well as how laboratory ventilation changes may affect the building HVAC.

A negative pressure differential should exist between the amount of air exhausted from the laboratory and the amount supplied to the laboratory to prevent uncontrolled chemical vapors from leaving the laboratory.

Local exhaust ventilation devices should be appropriate to the materials and operations in the laboratory. The air in chemical laboratories should be continuously replaced so that concentrations of odoriferous or toxic substances do not increase during the workday.

Ventilation systems should be inspected and maintained on a regular basis. There should be no areas where air remains static or areas that have unusually high airflow velocities. Chemical fume hoods must be certified annually and Biosafety cabinets must be certified every 2 years.

6.1.1 Chemical Fume Hood Safe Practices

- Conduct all work within the chemical fume hood at a distance of at least 6 inches behind the sash opening and position the vertical sliding sash at the height specified on the certification sticker.
- Avoid blocking the airfoil, baffles, and rear ventilation slot.
- Support large items with legs to minimize airflow disruption across the work surface.
- Do not store unnecessary chemicals or equipment in the hood to avoid blocking air flow.
- Chemical waste should not be disposed of by evaporation in a chemical fume hood.
- Keep chemical hood areas clean and free of debris at all times.
- Solid objects and materials, such as paper, should be prevented from entering the exhaust ducts as they can reduce the air flow.

- Chemical hoods should be maintained, monitored and routinely tested for proper performance.

Heating of Perchloric acid in chemical fume hoods is strictly prohibited at Union College. Heated Perchloric acid can form shock sensitive crystals in the fume hood duct work that can explode.

All fume hoods at Union are inspected and certified on an annual basis. A certification label on each fume hood designates the sash height and the associated air flow rate. Certification reports are kept on file by EHS and Facilities Services.

Any alteration affecting a local exhaust ventilation system or associated ductwork must be approved by Facilities Services and EHS before the system is modified.

6.2 Personal Protection Equipment

Personal Protection Equipment (PPE) is an essential means of hazard protection and will be used in combination with physical containment devices such as fume hoods.

PPE, including chemical resistant gloves, lab coats, aprons, eye and face protection, must be provided by Departments to their employees,

6.2.1 General PPE Practices

Faculty and Staff should:

- Follow all project or area specific PPE requirements.
- Wear gloves whenever there is a potential for direct skin contact with blood, hazardous chemicals, or infectious materials.
- Wear lab coats for conditions described below in the designated laboratory work zone and button the lab coat to protect skin and clothing.
- Before leaving a lab or designated lab work zone, remove PPE, place disposable PPE contaminated with hazardous chemicals in a sealed plastic bag that is labeled “Hazardous Waste” and list type of chemical(s).
- Wear masks and eye protection or chin-length face shields to prevent contamination from splashes or sprays of blood, infectious materials, or hazardous chemicals whenever there is a potential for eye, nose, or mouth contamination.
- Wash hands before leaving a lab or designated lab work zone.

6.2.2 Laboratory Coats

Laboratory coats must be worn when using acids or bases with a concentration of 6 Molar or greater for procedures that increase splash hazards, such as pouring or transporting; or when Faculty decides lab coats are necessary. Laboratory coats may be cloth or disposable.

6.2.3 Gloves

Disposable gloves are one of the most commonly used types of PPE. The proper use of disposable gloves provides protection to the wearer by providing a barrier to potential hazards. Select gloves that are impervious to the chemicals being used and is the correct thickness; a link to a chemical handling glove guide is available on the EHS website.

All Faculty and Staff are responsible for following appropriate work practices when using disposable gloves. Example practices include:

- Remove gloves by turning them inside out, being careful to avoid touching contaminated portions of the gloves.
- Do not touch uncontaminated surfaces such as door handles or cell phones when wearing gloves.
- Thoroughly wash hands and forearms upon completion of work and before leaving the laboratory or designated work zone within the lab.
- Do not reuse disposable gloves.
- Disposable gloves that become visibly contaminated or are suspected of being contaminated with hazardous materials must be replaced as soon as possible.
- Used gloves that have not come in contact with hazardous materials may be disposed as regular trash and gloves that are in contact with hazardous materials must be disposed as hazardous waste.
- Gloves must not be worn in common-use areas except in emergency situations when conditions warrant their use.

6.2.4 Eye & Face Protection

All protective eye and face devices must comply with ANSI Z87.1-2010, "American National Standard Practice for Occupational and Educational Eye and Face Protection" and be marked to identify the manufacturer.

The (Z87.1-2010) standard mandates that eye safety products are either non-impact or impact-rated. Impact-rated protectors must meet the authenticated high velocity and high mass tests, and, most importantly, defined, continuous lateral coverage is now mandatory. The products satisfying these requirements will carry the Z87+ mark on both the frame or housing and the lens. Prescription products meeting this standard will be marked with Z87-2+.

CHEMICAL SPLASH AND DUST

New test methods and product requirements have been instituted for eye and face protectors intended to provide protection against chemical splash, dust, and fine dust particles. Products meeting the designated requirements will be marked D3, D4, or D5, respectively, on the housings or frames. Those products providing more than one use category will be marked accordingly.

OPTICAL RADIATION

Classifications and marking requirements are now added for lenses to delineate their radiation filtration properties and the hazards for which they are intended to provide protection.

The following shade/scale numbers indicate the levels of protection based on the intensity of the hazard:

Welding Filters W – Shade #, i.e. W10

Ultra-violet (UV) Filters U – Scale #, i.e. U6

Infra-red (heat) Filters R – Scale #, i.e. R4

Visible Light (Glare) Filters L – Scale #, i.e. L2.5

An example of the markings: The marking BDZ87+U6D3D4 indicates an impact-rated goggle that provides superior UV filtration and protection against dust and splash hazards.

(From Texas America Safety Company Safety Glasses ~ ANSI Z87.1 2010 Standards**)**

When choosing proper eye protection, be aware there are a number of different styles of eyewear that serve different functions. Section 8 of the Safety Data Sheet for each chemical being used in the lab should be reviewed to determine the recommended eye protection. Shared protective eyewear should be disinfected before each use.

Prescription Safety Eyewear

OSHA regulations require employees who wear prescription lenses while engaged in operations that involve eye hazards shall wear eye protection that incorporates the prescription in its design, or must wear eye protection that can be worn over the prescription lenses (goggles, face shields, etc.) without disturbing the proper position of the prescription lenses or the protective lenses. Any prescription eyewear purchase must comply with ANSI Z87.1-2010.

Note: Contact lenses by themselves are not considered protective eyewear.

Safety Glasses

Safety glasses provide eye protection from moderate impact and particles associated with grinding, sawing, scaling, broken glass, and minor chemical splashes. Side protectors are required when there is a hazard from flying objects. Safety glasses do not provide adequate protection for processes that involve heavy chemical use such as stirring, pouring, or mixing. In these instances, splash goggles should be used.

Splash Goggles

Splash goggles provide adequate eye protection from many hazards, including potential chemical splash hazards Laboratory work must be evaluated by Faculty and Staff to determine if splash goggles are required. Splash goggles must be worn when using acids or bases with a concentration of 6 Molar or greater for procedures that increase splash hazards, such as pouring or transporting, or when Faculty decides splash goggles are necessary. Other conditions where splash goggles should be worn include bulk chemical transfer, use of glassware under reduced or elevated pressure and/or high temperature operations, air or water reactive chemicals, known skin or eye irritant chemicals and handling potentially explosive compounds (particularly during distillations).

Goggles are available with clear or tinted lenses, fog proofing, and vented or non-vented frames. Be aware that goggles designed for woodworking are not appropriate for working with chemicals. These types of goggles can be identified by the numerous small holes throughout the face piece. In the event of a splash, chemicals could enter into the small holes, and result in a chemical exposure to the face. Ensure the goggles you choose are rated for use with chemicals.

Welder/Chipper Goggles

Welder goggles provide protection from sparking, scaling, or splashing metals and harmful light rays. Lenses are impact resistant and are available in graduated lens shades. Chipper/Grinder goggles provide protection from flying particles.

Face Shields

Face shields provide additional protection to the eyes and face when used in combination with safety glasses or splash goggles. Face shields consist of an adjustable headgear and face shield of tinted or clear lenses or a mesh wire screen. They should be used in operations when the entire face needs protection and should be worn to protect the eyes and face from flying particles, metal sparks, and chemical/biological splashes. Face shields with a mesh wire screen are not appropriate for use with chemicals. Face shields must not be used alone and are not a substitute for appropriate eyewear and must always be worn with a primary form of eye protection such as safety glasses or goggles.

Welding Shields

Welding shields are similar in design to face shields but offer additional protection from infrared or light exposure burns, flying sparks, metal splatter, and slag chips encountered during welding, brazing, soldering, resistance welding, bare or shielded electric arc welding, and oxyacetylene welding and cutting operations. Safety glasses must be worn with welding shields.

Equipment fitted with appropriate filter lenses must be used to protect against light exposure. Tinted and shaded lenses are not filter lenses unless they are marked or identified as such.

LASER Eye Protection

A universal type of safety glasses is not available for protection from all LASER outputs. The type of eye protection required is dependent on the spectral frequency or specific wavelength of the laser source. If you need assistance on the type of eyewear that should be worn with your specific LASER, contact the Laser Safety Officer at 518-388-6340.

6.3 House Keeping

All food, beverages, cosmetics and medication must be kept out of the laboratory work zone. If glass chemical containers are stored on the floor, these must be in a secondary containment tray. Store minimal amounts of glassware on bench tops and in fume hoods; and keep sinks clear. Appropriate receptacles for broken glassware and sharps should be available in the laboratory work zone, and sharps containers should be properly disposed when they are ¾ full. Floor space should be clear for walking with no slip or trip hazards. All employees who handle chemicals, with or without wearing gloves, should wash their hands before leaving the laboratory work zone.

6.4 Mechanical & Electrical Safety

Mechanical equipment should have guards around moving parts. Electrical wall panels must be accessible and electrical plugs, cords and outlets in good condition. If extension cords are used, these should be for temporary use and taped down so they are not a trip hazard. Keep liquids away from power strips and do not have power cords under doors, carpets or snaked through ceiling tiles.

6.5 Fire Safety

Flammable chemicals must be stored in a NFPA rated flammables storage cabinet when not in use. Fire code NFPA 45-Standard on Fire Protection for Laboratories Using Chemicals, states the maximum quantity for use and storage of flammable chemicals (classes I, II and IIIA) for educational laboratories is 2 gallons per 100 square feet of laboratory unit space and cannot exceed 150 gallons. Flammable liquids should be stored away from oxidizers and heat or ignition sources such as radiators and electric power panels.

If a flammable liquid requires refrigeration or freezing, it must be stored in a properly rated flammable or explosion proof refrigerator or freezer. Flammable proof refrigerators/freezers have protected internal electrical components, while explosion proof units have both internal and external protected electrical components. Storage of flammable liquids in a standard refrigerator or freezer is hazardous because accumulation of flammable vapors in sufficient quantities could ignite when the compressor or light turns on, resulting in a fire or explosion. Refrigerators and freezers rated for the storage of flammable materials will be clearly labeled by the manufacturer.

When using flammable liquids, keep containers away from open flames. If heating a flammable liquid is required, use heating sources such as steam, water or oil baths or heating mantels. Never use a heat gun to heat flammable liquid.

Storage clearance from ceilings must be 24 inches if there is not sprinkler system, and 18 inches if a sprinkler system is present. Laboratories with flammable materials must have a fire extinguisher that is accessible, with a sign identifying location, and inspected on a monthly basis. Faculty & Staff should be trained on procedures for using a fire extinguisher.

All laboratory work spaces should be kept free of clutter, which includes aisles, and exits must not be blocked.

7.0 EMERGENCY RESPONSE

To report an emergency, call Campus Safety at (518) 388-6911, or call extension 6911 from campus phones. Faculty and Staff members should also post their emergency contact telephone number in the lab work zone.

All employees working in a laboratory must identify the nearest emergency shower and eye wash station before working with hazardous chemicals. The distance should not be greater than 55 feet from the work zone, and be accessible within 10 seconds. There must be a 16-inch clearance in all directions of the shower/eye wash station and identification signs should be posted.

7.1 Spill Response

When a chemical spill occurs, it is necessary to take prompt and appropriate action. The type of response to a spill depends on the quantity of the chemical spilled and the severity of the hazards associated with the chemical. The first action to take is to alert others in your lab or work area that a spill has occurred. Then you must determine if you can safely clean up the spill yourself.

Many chemical spills can be safely cleaned up by Faculty and Staff without the help of EHS; these are identified as incidental spills. Only attempt to clean up incidental spills if you are trained and have the proper spill cleanup materials available.

Note: the following procedures are intended for spills that occur within a building. A release to the outside environment may require the College to file a report with the NYSDEC. Calling Campus Safety will initiate this determination by EHS.

7.1.1 Incidental Spills

A spill is considered incidental if the following criteria apply:

Physical:

- The spill is a small quantity of a known chemical.
- No gases or vapors are present that require respiratory protection.

Equipment:

- You have the materials and equipment needed to clean up the spill.
- You have the necessary proper personal protective (PPE) equipment available.

Personal:

- You understand the hazards posed by the spilled chemical.
- You know how to clean up the spill and feel comfortable doing so.

7.1.1.1 Incidental Spill Cleanup Procedures

- Notify other people in the area a spill has occurred. Prevent others from coming in contact with the spill (i.e. walking through the spilled chemical). The first priority is to always protect yourself and others.

- Put on the proper Personal Protection Equipment (PPE) such as goggles and gloves before beginning cleanup. Do not unnecessarily expose yourself to the chemical.

- Stop the source of the spill if possible and if it's safe to do so.

- Prevent spilled chemicals from entering building drains by building a dike with absorbent pads, socks or granular material around access points (sink, cup sinks, and floor drains.

- Slowly add absorbent material on and around the spill and allow the chemical to absorb. Apply enough absorbent to completely cover the spilled liquid.

- Sweep up granular absorbed spill from the outside towards the middle.

- Scoop up and deposit in a leak-proof container.

- Wash the contaminated surface with soapy water. If the spilled chemical is highly toxic, collect the rinse water for proper disposal.

- Report the spill to EHS by calling 388-6340 or emailing dobsonde@union.edu.

- Restock any spill cleanup supplies that you may have used from any spill kits.

- Bag all absorbent materials used for a spill cleanup and label with “Hazardous Waste” and the absorbed chemical name(s). Contact EHS for disposal.

7.1.2 Major Spills

A major spill is any chemical spill for which outside assistance is needed to safely clean up a spill. EHS is contacted to assist with a spill cleanup whenever Campus Safety is notified by calling 6911 from a campus phone or 518-388-6911 from a cell phone or off campus phone.

7.1.2.1 Major Spill Cleanup Procedures

When a spill occurs that you are not capable of handling:

- Alert people in the immediate area of the spill and evacuate the room.
- If an explosion hazard is present, do not unplug, or turn electrical equipment on or off – doing so can result in a spark and ignition source.
- Confine the hazard by closing doors as you leave the room.
- Use eyewash or safety showers as needed to rinse spilled chemicals off others or yourself.
- Evacuate any nearby rooms that may be affected. If the hazard will affect the entire building, evacuate the entire building by pulling the fire alarm.
- Notify Campus Safety by calling 6911 or use a Blue Light or Emergency Telephone. Always call from a safe location.

Be prepared to provide Campus Safety with the following information:

- Where the spill occurred (building and room number).
- If there are there any injuries and if medical attention is needed.
- The identity of the spilled material(s); if possible have a copy of the Safety Data Sheet.
- The approximate volume of material spilled.
- How the spill occurred (if you know).
- Any immediate actions you took.
- Who first observed the spill and the approximate time it occurred.
- Where you will meet emergency responders, or a call back number (if available).

Commercial amalgamate powder products are available for mercury spills. Contact EHS after cleaning up a small mercury spill, or if the spill is too large to handle. Mercury spreads easily over surfaces and a vapor analysis must be conducted after a cleanup to ensure all of the mercury has been removed.

7.1.3 Spill Kits

While commercially available spill kits are available from a number of safety supply vendors, Faculty and Staff can assemble their own spill kits to properly clean up chemicals specific to their laboratory. Whether commercially purchased or made in-house, EHS strongly encourages all laboratories to obtain a spill kit for their use.

A useful spill kit can be assembled using a 2.5 or 5-gallon bucket containing the appropriate items. Stock only the absorbents appropriate for your space. Absorbent material should be labeled for which type of type of spills it can be used.

Recommended items for spill kit:

- Wisk broom and dust pan (to sweep broken glass and granular absorbent)
- Absorbent pads
- Neutralizer kits for acids, bases or solvents (if applicable)
- 1 gallon and 5 gallon bags - for collection of spill cleanup material and to enclose leaking containers
- Safety goggles
- Disposable gloves
- Hazardous waste labels

The spill kit should be clearly labeled as “SPILL KIT”, with a list of the contents posted on or in the kit. This list should include information about restocking the kit after use and where to obtain restocking materials.

Faculty and Staff must also be properly trained by EHS on:

- How to determine if they can or should clean up the spill, or if they should call Campus Safety at 6911 or EHS x6340.
- Where the spill kit is kept within the laboratory.
- What items are in the kit and where replacement items can be obtained
- How to use the items in the kit properly.
- How to clean up different types of chemical spills.
- How to dispose of spill cleanup material.

EHS can provide assistance in assembling spill kits for laboratories and incident spill cleanup training.

7.1.3.1 Spill Absorbent Materials

The absorbent materials stocked in a spill kit should be related to the types of chemicals used in each laboratory. Review the chemical Safety Data Sheets to identify and obtain the appropriate absorbent materials before using chemicals in the lab. Absorbent pads and socks should be included in each spill kit. Labs with inorganic acids and bases should also have neutralizing kits; Hydrofluoric acid spills require Calcium Carbonate or Calcium Bicarbonate or a commercial HF spill kit.

7.2 First Aid

The College will provide prompt emergency medical services and first-aid support to all employees at the workplace who are injured or become ill.

Ellis Hospital is located in close proximity to the College and all emergencies or injuries sustained by employees will be treated at the hospital. Call Campus Safety at 6911 for life threatening or serious injuries or illnesses.

Any employee, who has a valid certificate in first-aid training from the American Red Cross, or equivalent training, is authorized to provide first aid before emergency medical service personnel arrive.

If First Aid kits are provided in a laboratory, it is the Department's responsibility to keep the kits stocked and to replace items that are past their expiration dates or are in poor condition.

8.0 MEDICAL CONSULTATIONS and EXAMINATIONS

Union will provide all employees who work with hazardous chemicals an opportunity to receive medical attention, including any follow-up examinations that the examining physician determines to be necessary, whenever an employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory. If an employee encounters a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure, the affected employee must be provided an opportunity for a medical consultation by a licensed physician. All medical examinations and consultations must be performed by or under the direct supervision of a licensed physician and must be provided without cost to the employee, without loss of pay and at a reasonable time and place. The identity of the hazardous chemical, a description of the incident, and any signs and symptoms the employee may experience must be relayed to the physician.

9.0 PARTICULARLY HAZARDOUS SUBSTANCES

The College has adopted special rules and safe work practices for Faculty and Staff who use particularly hazardous chemicals. Faculty and Staff are responsible for ensuring appropriate precautions are taken when working with particularly hazardous chemicals.

Substitutes for particularly hazardous substances should be considered and used whenever possible.

Such chemicals include those that have a high degree of acute toxicity, select carcinogens and reproductive toxins, as defined below:

9.1 Highly or acutely toxic chemicals

These are substances with a high degree of acute toxicity that can cause death, disability, or serious injury after a single, relatively low-level exposure. The following denotes the OSHA-defined toxicity designations, for various routes of exposure.

Acute Toxicity Hazard Designations:
Oral LD50[1] (rats, mg/kg): <50
Skin Contact (rabbits, mg/kg): <200 Inhalation LC50[2] (rats, ppm for 1 hr.): <200 Inhalation LC50 (rats, mg/m^3 for 1 hr.): <200

[1] LD50- The amount of a chemical that when ingested, injected, or applied to the skin of a test animal under controlled laboratory conditions will kill one-half (50%) of the animals.
[2] LC50- The concentration of the chemical in air that will kill 50% of the test animals exposed to it.

Carcinogens: Chemicals that are strongly implicated as a cause of cancer are termed *carcinogenic*. Substances defined by OSHA as *select carcinogens* fall into one of the categories listed below:

OSHA Carcinogen: a chemical regulated by OSHA as a carcinogen; each has its own standard in subpart 2 of the OSHA General Industry Standards.

Known Human Carcinogen: Classified as "known to be carcinogens", in the most recent *Annual Report on Carcinogens* issued by the National Toxicology Program (NTP), or listed under Group 1 "carcinogenic to humans" by the International Agency for Research on Cancer (IARC).

Human Carcinogen: Listed under IARC Group 2A "probably carcinogenic to humans" or Group 2B "possibly carcinogenic to humans", or classified as "reasonably anticipated to be a carcinogen" by NTP, and causes statistically significant tumor incidence in experimental animals under any of the following dosage criteria:

- *Inhalation exposure* - chronic exposure (for a significant portion of a lifetime); 6-7 hours/day, 5 days/week; dose <10mg/m^3
- *Skin exposure* - repeated skin exposure of <300mg/kg body weight per week
- *Ingestion* - daily dose <50mg/kg body weight

9.2 Reproductive Toxins

Reproductive toxins are chemicals that can cause problems with male and/or female reproduction. Adverse effects can include: reductions in libido, reduced fertility, embryo lethality, induction of chromosomal damage (mutations), malformations of the developing fetus (teratogenesis), and postnatal functional defects. Some chemicals cause problems for infants if a breast-feeding mother is exposed.

9.3 Chemical Sensitizers (Allergens)

An allergy develops when the immune system reacts to a substance as if it were infectious, triggering the production of antibodies. Subsequent exposures to even very small amounts of the same substance can trigger the allergic response. The individual who has developed an allergy can manifest the allergic response as a skin rash, eye irritation, allergic asthma, or, in severe allergic reactions, anaphylactic shock that can result in death if not treated quickly enough. There are several chemicals and classes of chemicals that can be sensitizers. Examples of the more common sensitizer chemicals are: polyisocyanates, latex rubber, certain metals (such as Beryllium, Nickel, etc.), formaldehyde, acid anhydrides, toluene, coal tar volatiles, and some phenol derivatives.

9.4 Ordering Particularly Hazardous Substances

Prior to placing an order for a chemical that may potentially be classified as particularly hazardous, Faculty and Staff or their designee must notify the Plan Administrator, who will determine if the chemical is classified as particularly hazardous. The Plan Administrator will notify the Faculty member and Department Chair; and if applicable, the safety protocols outlined in the following section must be implemented.

9.5 Safety Protocol

This oversight process is followed when the proposed work involves hazardous substances that meet one or more of the following criteria:

- Meets one or more of above definitions of particularly hazardous substances;
- Highly unstable or, when combined with other compounds in the procedure, explosive;
- May undergo chemical or physical changes during routine use and generate by-products that may overcome standard control measures or may penetrate available PPE to cause severe acute or lethal injuries.

When one or more of the criteria above are met, the Plan Administrator and Faculty or Staff must develop a specific written safety protocol and submit it to the Department Chair and the Academic Affairs Safety Committee.

The safety protocol should include:

- A thorough description of the chemical(s) to be used, including the potential physical and health effects
- Area where particularly hazardous substance will be used and stored
- A step-by-step description of the work to be performed
- A list of the available engineering controls and PPE
- Provisions for proper labeling, storage, and waste disposal
- Decontamination procedures
- Expected actions in the event of an emergency

9.6 Training

Faculty and Staff are responsible for training anyone under their supervision who will be working with particularly hazardous substances with regards to the written safety protocol. Training documentation should be filed with the Plan and include names of trainees and date of training.

9.7 Safe Work Practices

Faculty or Staff will implement the following safe work practices for particularly hazardous substances used, handled, or stored at the laboratory:

- Control access to the laboratory through the use of appropriate signs that warn of the hazards and indicate the precautions or approvals necessary for entry.
- Contact the Plan Administrator to determine if medical surveillance may be warranted if toxicologically significant quantities of a particularly hazardous substance are used on a routine or frequent basis.

- Maintain an accurate record of the employees who use these substances and the amounts used and stored in the laboratory.
- Contact the Plan Administrator for assistance with specialized waste disposal.
- Protect work surfaces from contamination through the use of disposable, absorbent, plastic-backed paper. Replace paper when contaminated (plastic side down) and handle as hazardous waste.
- Use additional containment devices, such as shielding or protective filters, to safely handle, store, or protect equipment and employees when using these chemicals.
- Attach a suitable hazard warning label to the primary container to alert others of the chemical contained therein and the need for special precautions: for example, “Warning—Cancer Hazard” or “Highly Toxic.”
- Open primary container only inside a chemical fume hood.
- Keep primary containers with particularly hazardous substances in a secondary container to help prevent breaks and spills.

9.8 Personal Protective Equipment

- Wear required PPE and remove carefully when chemical use is complete. All contaminated disposable PPE should be disposed as hazardous waste.
- Remove all protective apparel and thoroughly wash hands and forearms upon completion of work and before leaving the laboratory.

10.0 NANOMATERIALS

Nanomaterials have different reactivities and interactions with biological systems than bulk materials. The risks and hazards associated with exposure to engineered nanomaterials are not well known. Because this is an area of ongoing research, consult trusted resources for the most up to date available information. The higher reactivity of many nanoscale materials indicates they should be treated as potential sources of ignition, accelerants and fuel that could result in fire or explosion. Easily dispersed dry nanomaterials may pose the greatest health hazard because of the risk of inhalation and should not be handled without ventilation controls. Operations involving dry nanomaterials require more stringent controls than those where nanomaterials are embedded in solid or suspended in liquid matrices.

All possible routes of exposure to nanomaterials must be evaluated by Faculty or Staff who are using nanomaterials, including inhalation, ingestion, injection and dermal contact (including eye and mucous membranes). The Plan Administrator is available to assist with evaluations.

Whenever possible, store dispersible nanomaterials in tightly sealed containers. Nanomaterials that are encapsulated in a solid or a nanocomposite typically will not require engineering controls, unless cutting or grinding occurs. If a synthesis is required to create nanomaterials, the hazardous properties of the precursor materials, as well as the final product, must be evaluated.

Conduct any work that could generate airborne nanoparticles in an enclosure that operates at a negative pressure differential compared to the breathing zone.

11.0 COMPRESSED GASES

Compressed gases may expose Faculty and Staff to both chemical and physical hazards. Cylinders must be monitored for leaks and be properly labeled. Leaking gas cylinders can cause serious health hazards that may require immediate evacuation of the area and activation of the emergency response system. Only appropriately trained Hazmat responders should stop a leaking gas cylinder in a critical situation.

All compressed gas cylinders in service or storage shall be secured to prevent falling or rolling. If a gas cylinder is not being used, the valve protection cap must be securely in place.

Gases are classified based upon their chemical and physical hazards. Faculty and Staff handling or using compressed gases, or working in areas where they are exposed to gas containers must have adequate knowledge of the container contents to maintain safe operating conditions.

12.0 NEAR-MISS INCIDENTS

A near-miss incident is an unplanned event that did not result in injury, illness or damage, but had the potential to do so. A faulty process or management system typically is the root cause for the increased risk that leads to the near-miss incident and should be the focus of improvement. Reporting of a near-miss incident provides an opportunity to prevent an actual incident from occurring.

A near-miss incident should be reported to the Plan Administrator, who will meet with the reporting Faculty and Staff. The following information should be reported: date, location, description of the near-miss incident, the most likely cause and proactive measure to be implemented to prevent another near-miss or actual incident.

13.0 RECORDKEEPING

The Plan Administrator or designee will maintain all of the following records:

- Chemical inventories
- Safety Data Sheets
- Hazardous waste inventories
- Waste disposal manifests and records
- Accurate records for each employee who undergoes environmental exposure monitoring, medical consultations, and examinations, including all tests and the written opinions of physicians
- Training records for Faculty and Staff
- Exposure monitoring records that are not related to specific employees
- Records of safe work practices, safety protocols, and prior approvals related to particularly hazardous chemicals