

Webster University-Webster Groves Campus Chemical Hygiene Plan



**Prepared by Nora Dunkel, Chemical Safety Officer
Webster University
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Approvals

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Nora Dunkel	Chemical Safety Officer	<i>Nora Dunkel</i>	6/19/19
Author	Title	Signature	Date

Nancy Hellerud	Vice Provost	<i>Nancy Hellerud</i>	6/19/19
Senior Administration	Title	Signature	Date

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From: [Anton Wallner](#)
 To: [Eric Bollenbaker](#); [Stevie Cummings](#); [Thomas Gopfert](#); [Peter Sawatzki](#); [Nancy Hellerud](#); [Nora Dunkel](#)
 Cc: [Marc Probst](#)
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Everyone

Please allow me to virtually introduce Nora Dunkel to the Deans at Webster with this email.

We discussed the Chemical Hygiene Plan at our meeting today. All the Deans present were in full support of the plan to coordinate waste collection & disposal. I understand that Nora has begun her outreach to the various schools and colleges about partnering with our waste collection and disposal processes. The Deans can also provide contact information for units in their areas that would benefit from this ongoing communication and partnership.

We also talked briefly about MSD5 and the potential need to maintain a record of these.

Thanks

Tony

Anton S. (Tony) Wallner, Ph.D.
 Dean, College of Arts and Sciences
 Browning Hall 202
 470 E. Lockwood Ave.
 St. Louis, MO 63119-3194
 (314) 246-7835



Webster University-Webster Groves Campus

Chemical Hygiene Plan

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1.0 Introduction

Webster University (WEBSTER) is committed to providing safe learning, teaching and working environments for students, faculty and employees. The safe storage, use and disposal of chemicals in the laboratory require policies for the protection of students, employees, and the environment. The purpose of this chemical hygiene plan (CHP) is to provide the chemical user with basic safety information regarding the use of chemicals. The guidelines set forth in this chemical hygiene plan form the foundation of the safe use of chemicals in the laboratory and other spaces on campus.

This chemical hygiene plan applies to Webster University, Webster Groves (Main) Campus.

2.0 Responsibilities

It is the responsibility of all administrators, faculty, staff, supervisors, employees, and students to promote safety in the laboratories.

Faculty and staff are directly and primarily responsible for the safe operation of the laboratory. Their knowledge and judgment are critical in assessing risks and appropriately applying the recommendations in this Plan. Safety is a shared responsibility among all laboratory, teaching and support staff. Some resources that exist to assist with these responsibilities include the Chemical Hygiene Committee and the Chemical Safety Officer.

Academic and Administrative Directors

The University Provost and the Chairpersons of departments which handle chemicals have the primary responsibility for the health and safety of the faculty, staff, and students. Specifically, members of Chemical Hygiene Committee (HC) will be selected by the Department Chairpersons from faculty and staff (of those departments which handle chemicals) to review and revise annually a Chemical Hygiene Plan (CHP) that includes lab-specific guidelines. These individuals are to serve as the hygiene officers of their respective areas and ensure faculty and staff comply with the Chemical Hygiene Plan.

Webster Chemical Hygiene Committee

The Webster University Chemical Hygiene Committee (HC) is responsible for recommending to the Provost, Deans, and Department Chairs (those who oversee departments which handle chemicals) the minimum requirements of the CHP that all laboratories and/or chemical use spaces must follow. This committee is to be made up of at least one member from each department covered by the plan. Members of the committee will be appointed for two years. This committee will meet *at least* once a semester to: review lab incidents, approve permits to use particularly hazardous substances, and collaboratively suggest annual revisions to the CHP. The HC will review the CHP at least annually.

Laboratory Supervisors

A "Laboratory Supervisor" is any person (faculty, instructors, staff, research supervisors, managers, etc) who is responsible for/supervises other people (whether students, employees or a combination thereof) in a laboratory setting.

Laboratory Supervisors are responsible for maintaining compliance with the CHP and each Lab Supervisor has the overall responsibility for compliance with the CHP within his or her laboratory. This responsibility may **not** be shifted to inexperienced or untrained personnel.

Each Lab Supervisor must assure that anyone entering the laboratory during their lab time: knows and follows the chemical hygiene rules, wears appropriate protective equipment, has been appropriately trained, and reports any unsafe acts, conditions, or inadequacies to the instructor. Each Lab Supervisor will train lab students, employees, and interns in laboratory safety during their first lab class or first day of work and have each student sign a laboratory accident prevention contract (see Appendix H: Laboratory Accident Prevention Contract.) Individual laboratory users are responsible for planning and conducting each laboratory module in accordance with the standard procedures outlined in this CHP, wearing safety glasses in the laboratory when appropriate (*nearly always*), developing good laboratory hygiene habits, and reporting unsafe acts or conditions.

Lab Supervisors must be in the vicinity of the laboratory while students are working in the lab.

Additional Responsibilities of Lab Supervisors

Lab supervisors are responsible for proper storage and inventory of chemicals in their areas. They must maintain the following records: updated chemical inventory including amounts and dates of procurement (update at least annually), waste inventories, and (M)SDS for incoming chemicals.

Lab Supervisors are also responsible for flushing eyewash stations, ensuring spill kits are available, arranging for service/calibration of laboratory instruments, and maintaining a log of emergency equipment testing.

Certain of these tasks may be delegated to student employees at the discretion of the student employee's work supervisor.

Chemical Safety Officer (CSO)

The Chemical Safety Officer is a resource responsible for working with faculty, staff, students, and others to develop and implement appropriate chemical hygiene practices and procedures. The Chemical Safety Officer will also establish procedures to monitor use and disposal of chemicals used in laboratories. The Chemical Safety Officer will periodically audit the implementation of the plan to assure that appropriate laboratory chemical hygiene practices are conducted and that records are maintained. The Chemical Safety Officer also advises laboratory instructors in order to develop precautions when handling hazardous chemicals. The Chemical Safety Officer will ensure facilities are adequate for the work performed in addition to knowing the current legal requirements for hazardous materials.

Maintenance

In general, lab users (both students and non-students with access to lab spaces) are responsible for the daily maintenance of their areas. Maintenance workers are not expected to be present in lab areas on a daily basis. Lab Supervisors shall maintain records on, inspect and arrange for repair of the following safety equipment: Fume hoods, Eyewash stations, Safety showers, Fire Blankets, and Fire extinguishers.

The scope of cleaning by custodial workers shall be limited to floors, windows, blackboards / dry erase boards, and the removal of non-hazardous trash. Cleaning of counters and shelves shall be conducted by lab employees.

When outages of non-emergency water or electricity are expected to occur, Facilities shall provide one week's notice to Lab Supervisors when such notice is possible.

Departments, the CSO, and lab supervisors are all responsible for the safety of outsiders in lab areas. Lab Supervisors shall assure that contractors are informed of the hazards in the lab and that precautions have been taken to protect the contractors against any hazards present.

Students, employees, and interns

Students, employees and interns must: follow all health and safety standards and rules set forth by this Chemical Hygiene plan and by the Laboratory Supervisors. They are to:

- *Wear or use prescribed protective equipment;*
- Report any lab-related injuries or illness to the Laboratory Supervisor and seek treatment immediately by contacting Public Safety if the student or employee is affiliated with WEBSTER UNIVERSITY;
 - Note: The Laboratory Supervisor shall report all lab-related injuries or illnesses to the Chemical Safety Officer in addition to Public Safety
- Refrain from the operation of any equipment or instrumentation without proper instruction and authorization;
- Request information and training when unsure how to handle a hazardous chemical or procedure;
- Indicate, by their signature, that they have read and understood the Chemical Hygiene Plan, and are willing to comply with the applicable tenets to the best of their ability.

3.0 Standard Operating Procedures

Below are rules and procedures for chemical and physical hazards commonly found in Webster University labs. These procedures define the minimum prudent handling and use rules permitted at Webster. Adherence to the procedures by all Webster lab users is mandatory. It is the responsibility of the instructor of each laboratory to review the procedures and assure that the protective equipment and procedures outlined are in place prior to beginning work in the lab.

3.1 General Rules and Procedures

- Minimize all chemical exposures
- Check potential hazardous reactions caused by mixing chemicals in laboratory modules. Minimally, check either: the reactivity chart in **Appendix C: Chemical Reaction Chart**, *Bretherick's Handbook of Reactive Chemical Hazards*, or an electronic database such as *Cameo Chemicals* (<http://cameochemicals.noaa.gov/>). Safeguards against reactions must be in place prior to performing the experiment.
- Lab coats and aprons are not to be worn outside of the laboratories to prevent the chance of contaminating non-lab areas
- Skin contact with chemicals shall be avoided at all times.
- Wear appropriate eye protection at all times. Safety glasses must be worn any time chemicals, glassware or heat are used in the laboratory. Splash goggles must be worn any time there is a significant splash hazard.
- Promptly clean up small spills (less than 100 ml) using appropriate protective apparel and equipment.
- Never allow practical jokes or other behavior which might confuse, startle or distract others
- Do not leave operations unattended
- As a rule of thumb, use a hood or other local ventilation device when working with any appreciably volatile substance with a PEL/TLV of 50 ppm or less

- Ensure floors are clean and dry
- Keep all aisles, hallways, and stairs, and exits free of obstructions.
- Access to emergency equipment, utility controls, showers, eyewashes and exits should never be blocked
- Wastes and broken glassware should be kept in appropriate containers and labeled properly
- Any unlabeled container must be labeled if it is not under direct supervision
- Do not discharge anything to the sewer without a permit- Check with Chemical Safety Officer about what is permitted to be discharged to the sewer.
- Never use flammable or combustible materials near any source of ignition, spark or open flame.
- Never perform a first-time chemical demonstration in front of your class. Always perform first-time demonstrations in front of other instructors to evaluate the safety of the demonstration
- Only allow authorized personnel in storage areas
- Know the locations for all personal safety and emergency equipment, eye wash, shower, fire extinguisher and spill control materials
- Train all students, interns, and employees on how to use all safety devices in the laboratory (i.e. eyewash, shower, etc.) and teach all students, interns, and employees to find the safety devices quickly in an emergency
- Do not smell or taste chemicals
- Read all chemical labels prior to use
- Know and understand the hazards of the chemical as stated in the (M)SDS and other references prior to use
- Know how to properly store all chemicals in their compatible chemical families
- Know proper disposal procedures for chemicals
- Use hazardous chemicals and all laboratory equipment only as directed or for their intended purpose
- Inspect equipment, apparatus, personal protective equipment, etc. for integrity or proper functioning before use. Do not use damaged equipment. Malfunctioning laboratory equipment should be labeled or tagged "out of service" so that others will not inadvertently use it before repairs are made
- Handle and store laboratory glassware with care to avoid damage; do not use damaged glassware. Use extra care with Dewar flasks and other evacuated glass apparatus; shield or wrap them to contain chemicals and fragments should implosion occur

3.2 Personal Hygiene Guidelines

- Remove contaminated clothing and gloves before leaving the laboratory
- Wash hands before leaving the laboratory
- Avoid direct contact with any chemical. Keep chemicals off your hands, face, and clothing, including shoes. Never, smell, inhale or taste a chemical. Wash thoroughly with soap and water after handling any chemical
- Do not eat, drink, chew, or use tobacco or cosmetic products in the laboratory or storage areas

3.3 Particularly Hazardous Substances and Processes

When laboratories require the use of Particularly Hazardous Substances (allergens, embryotoxins, carcinogens, pyrophorics, etc) OR a Particularly Hazardous Process, additional special precautions shall be implemented and documented on a permit by the Chemical Hygiene Committee. Please see **Appendix B** for a permit. The user shall fill out the permit and submit to the Chemical Hygiene Committee for review. Alternative chemicals and processes should be substituted whenever possible. Laboratory Supervisors will assist in substituting experiments that do not require such chemicals or processes if possible. All questions regarding the use of the permit system should be addressed to the Chemical Safety Officer. Minimally, the Chemical Safety Officer and chemical hygiene committee members of the affected department must sign the permit prior to acquiring the substance.

Particularly hazardous substances are defined to include pyrophoric chemicals, water reactive substances, select carcinogens, reproductive toxins and substances that have a high degree of acute toxicity (such as cyanides and dimethyl mercury).

Select carcinogens include any substance that is included on any of the following lists of carcinogens:

- **OSHA Carcinogen List**
- **Annual Report on Carcinogens** published by the National Toxicology Program (NTP), including all of the substances listed as "known to be carcinogens" and some substances listed as "reasonably anticipated to be carcinogens"
- **International Agency for Research on Cancer (IARC)**, including all of Group 1 "carcinogen to humans" and some in Group 2A or 2B, "reasonably anticipated to be carcinogens"

Reproductive toxin includes any chemical that may affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis).

Particularly hazardous processes are defined to include processes generating pressure in closed containers, ones with the potential to form toxic products or byproducts, scaling up a process by a factor of 2 or more, heating a more than 1 Liter of a flammable liquid above its flashpoint, or a process involving heat or pressure that will run overnight. Some routine overnight processes (such as running analytical instrumentation) do not need a hazard permit, but the operator must obtain written approval from the Chemical Safety Officer prior to beginning the process. The Chemical Safety Officer may review the room and process to determine whether a permit is required.

3.3.1 Working with Allergens and Embryotoxins (special precautions)

- Suitable gloves to prevent hand contact shall be worn when exposed to allergens or substances of unknown allergen activity
- All persons of child-bearing age will handle embryotoxins only in a hood with confirmed satisfactory performance and will use protective equipment to prevent skin contact.
- Embryotoxins will be stored in adequately ventilated areas in unbreakable secondary containers.
- The Chemical Safety Officer and Lab Supervisor will be notified of spills and other exposure incidents. A physician will be consulted when appropriate.

3.3.2 Working with Chemicals of Moderate Chronic or High Acute Toxicity (special precautions)

- Applies to chemicals with an LD₅₀ of below 50 mg/kg.
- The chemicals and hood shall be labeled with special warning signs.
- Gloves and long sleeves shall be worn. Hands and arms will be washed immediately after working with these chemicals.
- Two people will always be present during work with these chemicals.

3.3.3 Working with Chemicals of High Chronic Toxicity (special precautions)

- Examples of chemicals in this class are lead and formaldehyde
- All transfer and work with these substances shall be in a designated, labeled area.
- Approval of the department chair will be obtained before use.
- Any contaminated equipment or glassware will be decontaminated in the hood before removing them from the designated area.
- For powders, a wet mop will be used for cleanup, and all materials used will be disposed of as hazardous waste.
- The designated area will be marked with warning signs while the work is being conducted.
- Containers will be stored in a ventilated, limited access area in labeled, unbreakable, chemically resistant, secondary containers.

3.3.4 Working with Highly Reactive Materials: Water-Reactive Substances (special precautions)

Water-reactive materials are liquids and solids (such as Sodium, Potassium, Calcium, and Lithium metals, as well as dithionite salts) which ignite or release gas on contact with water. Training is the key to safely working with these materials. Those using highly water-reactive materials must be proficient in their handling and must not work with these materials alone or during off hours. Read the relevant (Material) Safety Data Sheets ((M)SDS) and technical bulletins to understand how to mitigate hazards. The (M)SDS should be reviewed before using an unfamiliar chemical and periodically as a reminder.

- Know the location of the eyewash, shower, fire extinguishers, fire alarm pulls, and emergency exits.
- Always wear appropriate personal protective equipment. Use a non-combustible lab coat, goggles / face shield, and gloves
- Always minimize the quantities of water-reactive chemicals stored in the laboratory
- Water-reactive materials should be stored under an atmosphere of inert gas or kerosene, as appropriate. Ensure that sufficient protective solvent, oil, kerosene, or inert gas remains in the container while the material is stored

- Remove all excess and non-essential chemicals and equipment from the chemical fume hood where water-reactive chemicals will be used. Keep all combustible materials, including paper towels and Kimwipes, away from water-reactive reagents.

3.4 New Chemicals and Novel Processes

When laboratories require the use of chemicals not present in the chemical inventory, or when a process is scaled up by 200% or more, a safety review is required prior to ordering the material. The permit in **Appendix B: Permit for New Chemicals, New Processes, Particularly Hazardous Substances and Particularly Hazardous Processes** shall be provided to the Chemical Hygiene committee to review the hazards posed by the new chemical or process.

The user shall fill out the permit and submit to the Chemical Hygiene Committee for review. Alternative chemicals should be substituted whenever possible. Lab Supervisors will assist in substituting experiments that do not require such chemicals if possible. All questions regarding the use of the permit system should be addressed to the Chemical Safety Officer. Minimally the Chemical Safety Officer and the committee members of the affected department must sign the permit prior to acquiring the substance.

3.5 Review of Safety Procedures

All people working in the laboratory ("Lab Users") should be alert to the existence of hazards even in routine, familiar tasks. Hazards are often not fully recognized when a process has become routine, but can be just as dangerous. Certain indicators (procedural changes) should cause the Lab User to stop and review the safety aspects of their procedure. These indicators include:

- A new procedure, process or test, ***even if it is very similar to older practices.***
- A change or substitution of any of the ingredient chemicals in a procedure.
- A substantial change in the amount of chemicals used (scale up of experimental procedures); usually, one should review safety practices if the volume of chemicals used increases by 200%.
- A failure of any of the equipment used in the process, especially safeguards such as chemical hoods.
- Unexpected experimental results (such as a pressure increase, increased reaction rates, unanticipated byproducts). When an experimental result is different from the predicted outcome, a review of how the new result impacts safety practices should be made.
- Chemical odors, illness in the people working in the lab that may be related to chemical exposure or other indicators of a failure in engineered safeguards.

The occurrence of any of these conditions should cause the Lab User to pause, evaluate the safety implications of these changes or results, make changes as necessary and proceed cautiously.

The Lab Supervisor and/or the Chemical Safety Officer and/or a faculty member familiar with the process should be consulted to obtain another opinion prior to resuming the operation.

3.6 Personal Protective Equipment (PPE) /Clothing

Personal protective devices are to be used only where engineering and administrative controls cannot be used or made adequate, or while controls are being instituted.

Engineering and administrative controls to reduce or eliminate exposures to hazardous chemicals include:

- **substitution** of a less hazardous substance
- **substitution** of less hazardous equipment or process (e.g., safety cans for glass bottles)
- **isolation** of the operator or the process
- **local and general ventilation** (use of fume hoods)

The (M)SDS will list the personal protective equipment recommended for use with the chemical. The (M)SDS addresses "worst case" conditions. Therefore, not all of the equipment shown may be needed for a specific job.

Personal protective equipment (PPE) should be selected on a per-task basis, and checked prior to each use to ensure it is in good condition.

3.6.1 Respirators

The policy of the Chemical Hygiene Committee is that if a respirator is required for a process, that process shall either be redesigned to eliminate the need for respirator use or not performed at all.

3.6.2 Eye Protection

Eye and face protection must be worn whenever its use will reduce or eliminate injury. It is mandatory that eye protection be worn in the laboratory whenever chemicals, heat, glassware, or other operations that can eject dusts or particles are in use

The need for adequate eye protection is fundamental to the use of chemicals, including housekeeping materials. Eye protection is required for all personnel and visitors in areas using chemicals and housekeeping materials.

Ordinary (street) prescription glasses do not provide adequate protection. Adequate safety glasses meeting the requirements of the standard ANSI Z87.1-2003 and equipped with side shields shall be worn by all employees and students when anyone in the room is handling chemicals.

Safety glasses with side shields do not provide adequate protection from splashes, therefore, when the potential for a splash hazard exists, other eye protection and/or face protection must be worn such as goggles or a face shield.

Face shields afford protection to the face and neck. Face shields should be worn if there is an explosion or implosion (pressure or vacuum) hazard and when transferring cryogenic liquids.

3.6.3 Gloves

Before each use, gloves should be checked for integrity. Reusable gloves should be washed prior to removal whenever possible to prevent possible skin contamination.

Disposable nitrile gloves do not provide adequate protection against accidental hand contact even with small quantities of most laboratory chemicals. These gloves, while providing a chemical resistant barrier between the worker's hand and the reagent, are not designed for prolonged use and have breakthrough times of a minute or less for many common solvents and reagents. Lab workers who contaminate their gloves should immediately remove them, wash their hands and don new gloves. If the (M)SDS specifies that nitrile gloves are inadequate then the glove material in the (M)SDS must be worn. Gloves should not be worn outside of the lab.

If there will be prolonged exposure to reagents then the selection of the proper glove requires knowledge of the health and physical hazards of the chemical that is used, familiarity with the glove manufacturer's test data (permeation rate and breakthrough time) and the length of the hand exposure. A useful glove compatibility chart can be found at: https://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf However, each manufacturer's gloves will have different permeabilities. Checking with the manufacturer directly is the best way to ensure your gloves are suitable for the proposed process.

3.6.4 Aprons/Lab Coats

Chemical resistant aprons are available in certain labs within Browning Hall. Aprons and lab coats should not be worn outside of the lab.

3.6.5 Lab-Appropriate Attire

Fully-enclosed, non-permeable shoes shall be worn by all persons entering laboratories. Pants/skirts shall be at minimum knee-length but ideally ankle length (long enough to cover the gap between shoe and pant hem). Short sleeves are permissible (tank tops are not), but if significant reaching and pouring are to be performed, longer sleeves and/or a lab coat should be worn to protect the arms from chemical exposure.

3.7 Personal Contamination and Injury

3.7.1 General Information

Do what is necessary to protect life. Remain calm. The (M)SDS for the chemical may contain special first aid information.

Do not move an injured person unless they are in further danger. A blanket should be used immediately to protect the victim from shock and exposure. Get medical attention promptly by calling:

- Public Safety 314-968-6911
- 911 (give location as Webster University)

- Poison Information Center 1-800-222-1222

For specific instruction regarding personal contamination, contact your supervisor, instructor, or Chemical Safety Officer.

3.7.2 Chemicals Spilled over a Large Area of the Body

Quickly remove all contaminated clothing, especially the shoes, while using the safety shower or other available source of water. Immediately flood the affected body area in cold water for at least 15 minutes. Wash off chemical with water but do not use neutralizing chemicals, unguents, creams, lotions, or salves. Report all events (including identity of substance spilled on skin) to Public Safety and to Chemical Safety Officer. Get medical attention promptly.

3.7.3 Chemicals on the Skin in Confined Areas

Immediately flush with cold water. If there is no visible burn, gently scrub area with warm water and soap. Remove all jewelry to facilitate removal of any residual material. Report all events (including identity of substance spilled on skin) to Public Safety and to Chemical Safety Officer. If a delayed action is noted (often the next day), immediately seek medical attention and explain carefully which chemicals were involved.

If there is any doubt, seek immediate medical attention.

3.7.4 Chemicals in the Eyes

Irrigate with plenty of cool water for at least 15 minutes. Simultaneously, check for and remove contact lenses. If a delayed action is noted (often the next day), immediately seek medical attention and explain carefully which chemicals were involved. Report all events (including identity of substance spilled in eyes) to Public Safety and to Chemical Safety Officer.

3.7.5 Smoke and Fumes

Anyone overcome with smoke or chemical fumes should be removed to uncontaminated air and treated for shock. Contact Public Safety. If trained, begin CPR protocols (Note: Public Safety is trained on CPR). Get medical attention promptly.

Do not enter the area if a life threatening condition still exists, such as the presence of:

- explosive vapors
- oxygen depletion
- cyanide gas, hydrogen sulfide
- nitrogen oxides, carbon monoxide

3.7.6 Burning Clothing

Extinguish burning clothing by dousing with cold water, use the safety shower, or the drop-and-roll technique as appropriate. Remove contaminated clothing. If possible, send clothing with the victim. Wrap injured person to prevent shock. Get medical attention promptly.

3.7.7 Ingestion of Hazardous Chemicals

Identify the chemical ingested and call Public Safety (314-968-6911). After calling Public Safety, call 911. If instructed by Public Safety or external 911 dispatcher, call poison control (1-800-222-1222). Wrap the injured person to prevent shock.

Provide the ambulance crew and physician the chemical name and any other relevant information.

3.8 Chemical Spill and Accident Procedures

3.8.1 General Information

Chemical spills will inevitably occur in the lab and staff should be properly trained to recognize hazards associated with the spill, mitigate the spill within their ability, and to notify response authorities where necessary. Initial response to a spill shall always be to evacuate the immediate area until the scope of the hazard is assessed.

Small spills (less than 100 mL; material doesn't pose a fire, toxicity, or reactivity hazard) may be cleaned up by laboratory staff. Use an absorbent material that will neutralize the spill if available.

A spill kit should be used and gloves and goggles should be worn during the cleanup. Decontaminate area with soap and water after clean-up. Place residue in a labeled container for waste collection and notify the Chemical Safety Officer and Public Safety.

No staff member or student shall respond to a chemical spill unless they are properly trained to do so. All lab staff must be trained to recognize hazardous conditions associated with spills in the laboratory.

3.8.2 Hazardous Spills

The following compounds are very hazardous. Only the Chemical Safety Officer or a Lab Supervisor may clean these up.

- aromatic amines
- nitro compounds
- bromine
- mercury
- ethers
- carbon disulfide
- hydrazine

- cyanides
- nitriles

If a large spill of hazardous or unknown material is observed, immediately evacuate the surrounding area and contact a responsible party for your department. If, in the judgment of the individual, the spill may be life threatening, immediately pull a fire alarm to initiate building evacuation and proceed to the nearest safe location and contact Public Safety (314-968-6911), then 911.

3.9 Fire and Related Emergencies

If you discover a fire or fire-related emergency, such as abnormal heating of material, hazardous gas leaks, hazardous material or flammable liquid spill, smoke, or odor of burning, immediately follow these procedures:

- Activate the building alarm (fire pull station)
- Shut down equipment in the immediate area (if possible)
- Pull the fire alarm
- Close doors to isolate the area and evacuate the building unless controlling a small fire
- Contact Public Safety and 911 from a safe location
- **IF THE FIRE IS SMALL AND YOU ARE TRAINED TO DO SO, Use a portable fire extinguisher to: assist oneself or another to evacuate, or control a small fire. (Never put yourself in harm's way!)**

Identify yourself as the person who notified the authorities and provide the fire and police teams with the details of the problem upon their arrival. Special hazard information you may know is essential.

3.10 Electrical Safety

The hazards associated with the use of electricity include electrical shock and electrical fires caused by shorts and overloaded circuits or wiring. In addition, sparks from electrical equipment can serve as an ignition source for flammable or explosive vapors or combustible materials. Most incidents are a result of unsafe work practices, improper equipment use, and/or faulty equipment. Adherence to the following rules and procedures can significantly reduce the electrical hazards one might encounter:

- **Never obstruct electrical panels and disconnect switches. These should be clearly labeled to indicate what equipment or power source they control. A minimum 3-foot clearance must be maintained around electrical panels at all times to permit ready and safe operation and maintenance of such equipment**
- **Do not overload circuits or wiring.** Overloading can lead to overheated wires and arcing, which can cause fires and electrical shock injuries

- Inspect all electrical equipment (hot plates, stirrers, ovens, extension cords, etc.) **before use** to ensure that cords and plugs are in good condition—not worn, twisted, frayed, abraded, corroded, or with exposed wires or missing ground pins. Live parts must be effectively insulated or physically guarded. Equipment with damaged or defective cords or plugs should be taken out of service immediately and repaired by qualified personnel
- Ensure that all electrical outlets have a grounding connection requiring a three-pronged plug. All electrical equipment should have three-pronged, grounded plugs or be double-insulated
- Electrical outlets, wiring, and other electrical equipment integral to the building may only be serviced and repaired by Facilities, qualified trades personnel, or other qualified electricians
- Work on electrical equipment must be done only after the power has been disconnected. On cord and plug connected equipment, the power cord must be unplugged and under the exclusive control of the person performing the work so that the equipment cannot be accidentally turned on by someone else. On hard-wired equipment, the main disconnect device or circuit breaker must be shut off and locked and tagged with a special padlock and tag. Service and/or repair work on hard-wired equipment may only be carried out by authorized individuals who have received Lock-out/Tag-out training
- Limit the use of extension cords—they are for temporary, short-term use only. In all other cases, request the installation of a new electrical outlet. Do not use extension cords as substitution for fixed receptacle outlets
- Ensure that all extension cords used are carefully placed, visible, and not subject to damage. Cords must not run across aisles or corridors where they might be damaged or create a tripping hazard. Cords must not run through doors, walls or partitions, under rugs, or above dropped ceilings. They must not be tied in knots, draped overhead, or attached to walls.
- Ensure that the wire size of an extension cord is adequate for the current to be carried. Failure to do so can lead to electrical fires. Cords used for 110-120 volt service should be UL listed with a polarized three prong plug. Extension cords must never be linked together—use the proper length extension cord needed for the application
- Power strips/surge protectors must never be linked together—use the proper length surge protector needed for the application
- Keep corrosive chemicals and organic solvents away from electrical cord—these can easily erode the insulation on wires
- Keep electrical equipment away from wet or damp locations or potential water spillage, unless specifically rated for use under such conditions.
- Never handle electrical equipment when hands, feet, or body are wet or perspiring or when standing on a wet floor.
- In an electrical emergency, if a person received an electrical shock, do not touch the equipment, cord or person. Call Public Safety to contact the fire department to treat the injured person and evaluate the situation. After contacting Public Safety, call 911. If safe and possible, shut down the main power source.

4.0 Chemical Storage Rules and Procedures

4.1 General

- Before a substance is received, information on proper handling, storage, and disposal should be known to those who will be involved. No container should be accepted without an adequate identifying label. All chemicals shall be opened by trained personnel
- When chemicals are hand carried, the container should be placed in a secondary container or bucket
- Keep an updated inventory of all chemicals, their amounts and location
- Stored chemicals should be examined annually for replacement, deterioration and chemical integrity
- All chemicals should be stored in chemically compatible families
- Store the minimum amount of chemicals needed
- Store corrosives in appropriate corrosives cabinets
- No flammable materials should be stored outside flammable cabinets unless in safety cans or in explosion proof refrigerators designed for the storage of flammable materials
- Do not store chemicals in fume hoods
- Avoid storing chemicals on shelves above eye level. Corrosives, acutely toxic, and flammable liquids are not to be stored above 4.5'
- Shelving sections should be secured to walls or floor to prevent tipping of entire sections
- Chemicals should not be stored on the floor except in approved shipping containers
- Never store food for human consumption in a laboratory refrigerator
- Only authorized personnel are allowed in the chemical storage areas unless under direct supervision
- Chemicals should not be stored in areas exposed to heat or direct sunlight

4.2 Labeling

A label is any written, printed, or graphic material displayed on, or affixed to, containers of chemicals. Labels or other forms of hazard warnings, such as tags or placards, provide immediate warning of potential danger. They are used to warn of a variety of potential physical hazards, or health hazards.

Existing labels on new containers of chemicals or containers in storage shall not be removed or defaced.

Employees and students should not work with any chemical from an unlabeled container. However portable containers intended for the immediate use, by the employee or student performing the transfer, do not need to be labeled provided the container is in the control of the student or employee throughout the transfer and the material is not stored (Held for more than an 8 hour shift) . The labeling requirement does not apply to students assigned unknown chemicals for analysis however a mark with corresponding hazard information should be provided with all unlabeled chemicals in student laboratories in case of emergency.

If a solution is prepared for short term (day/semester) the label must minimally contain:

- The name of the solution
- Hazards of the solution
- Name of person who made the solution
- Date solution was prepared

If a label needs to be reprinted for a container or a product is transferred permanently to a new container:

- Visit <http://www.mysafetylabels.com/custom-ghs-label-small/sku-ghs-3000-c>
- Copy and paste the appropriate element from section 2 of the SDS into the appropriate section on the website.
- Either print the label yourself, using the print your own label option or order labels. Print the labels on self-adhesive label stock or regular paper then apply clear packaging tape over the paper.

4.3 (M)SDS Sheets

The (material) safety data sheet (M)SDS is the hazard communication tool that provides details on all important aspects of chemical use, handling, and storage. Review both the appropriate procedure and the (M)SDS when working with a chemical for the first time or when training staff. The OSHA Hazard Communication standard (29 CFR 1910.1200) requires manufacturers to provide (M)SDSs at no cost to employees.

Safety data sheets that are received with incoming shipments of hazardous chemicals must be retained and be readily accessible to all lab users.

5.0 Hazardous Chemicals

5.1 General Information

Hazardous chemical means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic systems and agents which damage the lungs, skin, eyes, or mucous membranes.

Acute exposure refers to an intense exposure over a relatively short period of time.

Chronic exposure refers to a prolonged exposure occurring over a period of days, weeks or years.

5.2 Routes of Entry into the Body

Route of exposure describes the way the chemical enters the body. Chemicals may have serious effects by one route, and minimal effects by another. Hazardous chemicals may enter the body by:

- **Inhalation** - absorption through the respiratory tract
- **Absorption** through the skin via dermal contact
- **Ingestion** - absorption through the digestive tract - (Ingestion can occur through eating or smoking with contaminated hands or in contaminated work areas)
- **Injection** - Introducing the material directly into the bloodstream - (Injection may occur through mechanical injury from "sharps")

In the laboratory the primary routes of chemical exposure are through inhalation and dermal contact. Working in a laboratory with good general ventilation and using a chemical fume hood can prevent inhalation exposures. Wearing appropriate chemical protective clothing prevents dermal contact. Good hygiene habits, such as regular handwashing and using tongs or other tools to pick up sharp objects, will prevent exposure through ingestion or injection.

5.3 Chemical Toxicology & Symptoms

Some symptoms of chemical toxic exposure include:

- irritation, coughing, choking, tight chest, shortness of breath
- nausea, vomiting, diarrhea
- back pain, urinating more or less than usual
- headache, dizziness, behavior confusion, depression, coma, convulsions
- anemia (tiredness, weakness)
- rashes, itching, redness, swelling or burning sensation

5.4 Permissible Exposure Limits (PEL) and Threshold Limit Values (TLV)

Permissible Exposure Limits (PEL)

OSHA sets enforceable permissible exposure limits (PELs) to protect workers against the health effects of exposure to hazardous substances. PELs are regulatory limits on the amount or concentration of a substance in the air. They may also contain a skin designation.

PEL may be either a time-weighted-average (TWA) exposure limit (8 hour), a 15 minute short term exposure limit (STEL), or a ceiling (C).

Threshold Limit Value (TLV)

TLVs are airborne concentrations of substances devised by the ACGIH (an industry group) that represents conditions under which it is believed that nearly all workers may be exposed day after day, with no adverse effect. TLVs are advisory exposure guidelines, not legal standards, which are based on evidence from industrial experience, animal studies, or human studies when they exist.

TLV may be either a time-weighted-average (TWA) exposure limit (8 hour), a 15 minute short term exposure limit (STEL), or a ceiling (C).

5.5 Toxic Chemicals

Chemicals are considered toxic if they fall into one or more of the following categories:

- Poisons
- Carcinogens
- Teratogens/Reproductive Hazards
- Heavy Metals
- Mutagens

Generally, when a volatile chemical has a threshold limit value (TLV) or permissible exposure limit (PEL) of 50 ppm or less, an approved fume hood or other containment shall be used to handle the material.

5.5 Flammable Chemicals

In general, the flammability of a chemical is determined by its **flash point**, the lowest temperature at which a liquid gives off enough vapor to form an ignitable mixture and burn when a source of ignition (sparks, open flames, cigarettes, etc.) is present.

Flammable substances can fall into one of the following categories:

- Aerosol
- Gas
- Liquid
- Solid

Flammable liquid means any liquid having a flashpoint at or below 199.4 °F (93 °C). Some flammable chemicals include organic solvents, alcohols and acetone.

An **ignitable waste** is a waste that has a flash point of less than 140°F

Flammables/Ignitable wastes must be stored in flammable cabinets. Vapors of flammable liquids are heavier than air and can travel along bench tops and down drain troughs. Keep sources of ignition away from any flammables/ignitable and use adequate ventilation. Have a fire extinguisher in the near vicinity.

Tips for working with Flammable Chemicals:

- Limit the amount of flammable liquids in use to the smallest practical volume.
- Work with flammable liquids inside a chemical fume hood. Return all flammable liquids to an approved flammable storage cabinet. The doors to flammable storage cabinets must close securely. Self-closing doors are best.

- The maximum quantity of flammable and combustible liquids that can be stored openly or within an approved flammable storage cabinet is defined for each campus by local laws. In Webster Groves, no lab should contain more than 55 gallons of flammable or combustible liquids, whether unused reagents, waste or a combination of the two.
- The purchase of 5-gallon containers of flammable liquids is strongly discouraged. All transfers of flammable liquids from containers of five gallons or more must be performed inside a fume hood. These containers also must be stored in a flammable storage cabinet.
- Segregate flammables from oxidizers and oxidizing acids.
- Most refrigerators/freezers purchased by the labs are designed for non-hazardous materials. **Refrigerators and freezers suitable for flammable material storage are specially labeled "Explosion safe" or "Explosion proof."**

5.6 Reactive Chemicals

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.

Reactivity is a substance's susceptibility to undergoing a chemical reaction or change that may result in dangerous side effects such as explosion, burning, and corrosive or toxic emissions. The conditions that cause the reaction, such as heat, other chemicals and dropping, will usually be specified as "Conditions to Avoid" when a chemical's reactivity is discussed on a (M)SDS.

Some reactive chemicals include organic peroxides, ethers, oxidizers, explosives and water reactive and air sensitive materials. The user should be familiar with the (M)SDS before using the reactive substance. Disposal of reactive chemicals generally requires prior treatment to render the chemical less hazardous.

Ethers are particularly prone to forming explosive peroxides and must be tested every 6 months. Most manufactures recommend ether's shelf life of not more than one year.

5.7 Corrosive Chemicals

A corrosive chemical is a substance that causes visible destruction or permanent changes in human skin tissue at the site of contact or is highly damaging to steel. Corrosive wastes will; have a pH at or below 2 or at or above 12.5.

Corrosive chemicals include strong acids and bases. Corrosive chemicals can be irritants and allergic sensitizers. Personal protective equipment **MUST** be used when working with corrosive substances to protect skin, eyes and the respiratory tract from vapors. Always add corrosives to water to prevent overheating and spattering. Spills must be cleaned up immediately. Corrosive chemicals shall be neutralized before disposal. Corrosives must be stored in corrosive cabinets, separating acids from bases.

5.8 Compressed Gases

Compressed gas cylinders can be extremely hazardous when misused or abused. Compressed gas cylinders present a variety of hazards due to their pressure and/or content. Without proper use and care compressed gas cylinders can explode or become flying projectiles when cylinder valves are damaged or broken off.

All gas cylinders at Webster University must:

- Be equipped with the correct regulator
 - All cylinders not attached to a regulator must have a valve protection cap in place
- Be secured at all times with appropriate chains or straps (2) directly to the wall or non-moveable casework
 - One cylinder per set of two chains
- Be segregated by hazard classes while in storage and in use
 - Oxygen **MUST** be separated from flammable gases
- Empty cylinders must be isolated from filled cylinders

In general, only keep cylinders in your lab that are in current use or waiting for immediate use. Horizontal storage of cylinders is only allowed in racks designed for the purpose. Cylinders must be chained to the rack. Cylinders must not be kept in corridors, hallways, stairways or cold rooms (or any other area with limited ventilation). Large toxic gas cylinders must be in an approved gas cylinder cabinet.

5.9 Cryogenic Fluids

- Cryogenic liquids, such as liquid nitrogen, must be handled only in containers designed for that purpose.
- Full face protection (face shield) including safety glasses and goggles as well as insulated gloves, lab coat, covered shoes must be worn when handling cryogenic liquids.
- When transferring liquid from one container to another, the receiving container must be cooled gradually.

6.0 Chemical Waste Disposal Program

6.1 General Information, Responsibility and Liability

The Resource Conservation and Recovery Act (RCRA) establishes a "cradle to grave" hazardous waste management system, which is administered by the U.S. Environmental Protection Agency (EPA). This system provides for managing, tracking, and regulating wastes at each step of the way, from generation to final disposal. The regulations by the EPA/MO DNR apply to those who generate, transport, treat, and dispose of hazardous wastes. It is the responsibility of each person on campus,

generating hazardous waste to fully understand and comply with the College's Hazardous Waste Management Program.

A general guide when using chemicals is to "reduce, reuse and recycle". Each Lab User and Lab Supervisor should contact the Chemical Safety Officer to find out how to dispose of particular chemicals in their lab. Chemicals are *not* to be disposed of through the sewer system unless allowed by permit issued by MSD (Metropolitan Sewer District).

6.1.1 GENERAL PRINCIPLES FOR MANAGING LABORATORY CHEMICALS

- Less is better. Purchase small amounts that you will use up within a year. Whereas the per-unit cost may be greater—significant savings are realized in reduced disposal costs and safer storage.
- Buy pre-made molar and normal solutions, thereby reducing the likelihood of waste.
- Obtain access to a SDS for each chemical, and consult the SDS before using a chemical.
- Read labels. Handling and storage information is on the manufacturer's label.
- Purchase chemicals in plastic containers to minimize potential breakage. If this is not possible, purchase shatter-resistant plastic coated bottles.
- Manage first-in, first-out! Indicate the date received and the date opened. Pay particular attention to expiration dates.
- Dispose of open, partially used or expired chemicals.
- Peroxide-forming compounds require frequent testing or disposal.
- Keep all chemical containers off floors, carts and electrical equipment.
- Physically segregate your chemicals according to compatibility.
- Label the secondary storage containers or areas in which particularly hazardous chemicals may be used.
- Store hazardous chemicals below eye level. This simple task greatly reduces the likelihood of something falling from above and breaking.
- Cabinets with doors are safer locations than open shelves for hazardous chemicals.
- Safely transport any hazardous chemical. Place in secondary containment such as a bottle carrier.
- Avoid placing any chemical container in direct sunlight, underneath a sink or near heat sources.
- Place volatile or flammable chemicals only in specially designed refrigerators.
- Be especially careful with reactive chemicals. Obtain and read the SDS for each reactive chemical that you may have or may work near.
- Label all containers in the laboratory with the following information (this includes any stock or working solutions):
 - Name of chemical or stock solution
 - Date started
 - Your initials
 - Hazard warning (i.e., flammable, toxic, corrosive, reactive)
- Store chemical by hazard class. Do not store merely by alphabetical order.
- Use and manage your chemical fume hood, wisely. Too many chemical containers or equipment block the air slots and compromise the containment performance.
- Follow all waste disposal guidelines

6.2 Hazardous Waste

Webster University Webster Groves is considered a Conditionally Exempt Small Quantity Generator (CESQG) which produces less than 220 pounds (100 kg) of non-acute hazardous waste within any calendar month and less than 2.2 pounds of acute hazardous waste in any month.

Webster University is dedicated to disposing of chemicals in a safe and environmentally conscious way. Any waste material that may, upon contact, present a hazard to one's health or surrounding environment should be treated as a potentially hazardous waste. This includes spent or unused chemicals, cleaning solutions, oils, etc.

Please see **Appendix J: Hazardous Waste Management Policy** for the full Hazardous Waste Program

7.0 Laboratory Facilities

7.1 General

Each laboratory facility shall have the following:

- An appropriate general ventilation system with air intakes and exhausts located so as to avoid intake of contaminated air
- Fire extinguishers
- Laboratory hoods and sinks where applicable
- Safety equipment including eyewash fountains and safety showers where applicable
- Spill control equipment

7.2 Room Signs

Prominent signs and labels of the following types should be posted:

- Emergency telephone numbers of emergency personnel/facilities
- Location signs for safety showers, eyewash stations, spill equipment, and other safety and first aid equipment
- NFPA704 warnings signs at areas or equipment where special or unusual hazards exist

7.3 Safety Equipment Inspection

Fume hoods, eyewashes and safety shower/drenches, fire extinguishers and other safety equipment shall be inspected on a routine basis. Fire extinguishers shall be inspected by WEBSTER Public Safety personnel who shall maintain inspection and service records.

7.3.1 Fume hoods

Capture velocity will be tested every 12 months by a qualified person using appropriate test methods. The minimum average capture velocity, unless specified differently by the hood manufacture, for fume hoods shall be an average of 80 linear feet per minute at the face of

the hood with the sash at the operating height using at least three measurements. Certification of hood velocity and the height the sash was tested at will be posted on each hood. The flow alarm, if present on the hood, will be inspected and calibrated by a qualified person on the frequency specified by the manufacturer or at least biennially whichever is sooner. At least every 2 years; the sash counterweight system, and baffle control system will be inspected.

7.3.2 Safety Showers and Eye Washes

Emergency eyewash stations and showers will be flushed and checked for operability by the laboratory staff at least monthly. Any repairs will be made under a facilities work order.

7.3.3 Spill Kits

Spill kits will be inspected by the laboratory staff for missing supplies and degrading PPE at least once a semester before students are allowed to perform experiments in the lab.

7.3.4 First Aid Kits

First aid kits will be inspected by laboratory staff for missing and expired supplies at least once a semester before students are allowed to perform experiments in the lab.

7.3.5 Fire Extinguishers and Blankets

Fire extinguishers will be inspected for pulled pins, pressure, corrosion, and blocked nozzles monthly by public safety personnel. A qualified contractor will also inspect the extinguishers annually. The inspections will be documented on the fire extinguisher tag.

7.4 Recordkeeping

- Incident records should be written and retained by the Chemical Safety Officer.
- The Chemical Safety Officer shall establish and maintain an accurate record of any measurements taken to monitor employee exposure to hazardous chemicals in the laboratory.
- Medical records shall be maintained by the Human Resources Department Workers Compensation representative for at least the duration of employment plus thirty (30) years, for each employee with occupational exposure.
- Training records shall include the dates of the training sessions and contents (or a summary) of the training. The training records shall be maintained for three (3) years from the date on which the training occurred. These files will be maintained by the Chemical Safety Officer.

8.0 Employee Training and Information

8.1 Overview

Lab Supervisors shall provide Lab Users with information and training to ensure that they are apprised of the hazards of chemicals present in the laboratory area.

Such information shall be provided at the time of an initial assignment to a work area where hazardous chemicals are present and prior to assignments involving new exposure situations.

Lab Users shall be informed of:

- The contents of this CHP
- The permissible exposure limits for OSHA-regulated substances or recommended exposure limits for other hazardous chemicals where there is no applicable OSHA standard
- 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, but not limited to, (Material) Safety Data Sheets received from the chemical supplier.

8.2 Employee Rights

Employees who may be exposed to hazardous chemicals shall have access to the following information where appropriate:

- chemical exposure information
- workplace chemical lists (aka, chemical inventory for their workspace)
- (material) safety data sheets

In addition, all lab users (employees, interns and students) shall receive training on the hazards of chemicals and on the measures they can take to protect themselves from those hazards.

8.3 Protective Equipment

Webster University must assess the laboratory workplace to determine whether hazards are present, or are likely to be present, which necessitate the use of personal protective equipment. The Chemical Safety Officer fulfills this responsibility by completing a safety audit periodically.

The Laboratory Supervisor is responsible to select and provide employees with routine personal protective equipment appropriate for laboratory work (e.g. disposable gloves, safety glasses, face shields, lab coats and other similar items).

Students are to purchase their own safety glasses and safety goggles. Disposable gloves will be provided to students by the Laboratory Supervisor.

Laboratory Supervisors shall assure that training in the use of routine laboratory personal protective equipment is provided.

8.4 Training Programs

Webster University will provide a training program for Lab Users using or handling chemicals. Additional instruction is required whenever the potential for exposure to hazardous chemicals is altered or whenever new information concerning a chemical is received. New or newly assigned Lab

Users must be provided training before working with, or in a work area containing hazardous chemicals. For students, training may be required for each course. Training programs shall include, as appropriate, the following:

- interpreting labels and (M)SDSs
- location of hazardous chemicals
- a description of the acute and chronic effects of chemicals
- safe handling procedures
- personal protective equipment
- cleanup procedures
- waste disposal
- The physical and health hazards of chemicals in the work area
- The measures to take in order to protect themselves from these hazards, including specific procedures implemented to protect from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used
- Methods and observations that may be used to detect the presence or release of a hazardous chemical (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.)
- The applicable details of the employer's written Chemical Hygiene Plan

In an area or laboratory where a large variety of hazardous chemicals are stored or used, Webster University may provide general safety training ("Lab Safety Overview Training") to all users of the room. (The contents of this Chemical Hygiene Plan meet the requirements of 29 CFR 1910.1450). Laboratory Supervisors are still responsible for providing lab-specific and chemical-specific training to their Lab Users in multi-user spaces. See the Chemical Safety Officer for access to the Lab Safety Overview Training

Webster University is required to keep a record of training sessions provided. The Chemical Safety Officer will maintain training records for the Lab Safety Overview Training.

9.0 Chemical Exposure Assessment

Exposure to any substance regulated by a standard which requires monitoring must be monitored, if there is reason to believe that exposure levels for that substance routinely exceed the action level (or in the absence of an action level, the PEL). At lab scale, unless a substance is left open for over three days outside of a hood, it is not reasonable to assume the PEL will be exceeded. Substance monitoring may be performed in response to concerns raised by employees and/or students.

If the initial monitoring discloses exposure over the action level (or in the absence of an action level, the PEL), additional exposure monitoring will be performed in accordance with the provisions of the relevant standard.

Monitoring may be terminated when exposure fall below the action levels.

Within 15 working days after the receipt of any monitoring results, the individual will be notified of these results in writing. If area monitoring was performed the results will be posted in an appropriate location that is accessible to employees.

10.0 Medical Evaluations

Medical consultation means a consultation which takes place between an employee (or student) and a licensed physician for the purpose of determining what medical examinations or procedures, if any, are appropriate in cases where a significant exposure to a hazardous chemical may have taken place.

Webster University shall provide all employees and students who work with hazardous chemicals an opportunity to receive medical attention, including any follow-up examinations which the examining physician determines to be necessary, under the following circumstances:

- Whenever an employee or student develops signs or symptoms associated with a hazardous chemical to which the employee or student may have been exposed in the laboratory, the employee or student shall be provided an opportunity to receive an appropriate medical examination.
- Where exposure monitoring reveals an exposure level routinely above the action level (or in the absence of an action level, the PEL) for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements, medical surveillance shall be established for the affected employee or student as prescribed by the particular standard.
- Whenever an event takes place in the work area such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure, the affected employee or student shall be provided an opportunity for a medical consultation. Such consultation shall be for the purpose of determining the need for a medical examination.
- All medical examinations and consultations shall be performed by or under the direct supervision of a licensed physician and shall be provided without cost to the employee, without loss of pay and at a reasonable time and place.

The Lab Supervisor shall provide the following information to the physician:

- The identity of the hazardous chemical(s) to which the employee or student may have been exposed
- A description of the conditions under which the exposure occurred including quantitative exposure data, if available
- A description of the signs and symptoms of exposure that the employee or student is experiencing, if any

For examination or consultation required under this portion of the CHP, the Lab Supervisor shall obtain a written opinion from the examining physician which shall include the following:

- Any recommendation for further medical follow-up
- The results of the medical examination and any associated tests

- Any medical condition which may be revealed in the course of the examination which may place the employee or student at increased risk as a result of exposure to a hazardous workplace
- A statement that the employee or student has been informed by the physician of the results of the consultation or medical examination and any medical condition that may require further examination or treatment

The written opinion shall not reveal specific findings of diagnoses unrelated to occupational exposure.

11.0 Incident Investigation

Reporting

Incidents involving laboratories are to be reported immediately. Public Safety and the Chemical Safety Officer are to be notified for any laboratory accidents that involves fire, spill (greater than 100 ml), or injury.

Investigation

The Chemical Safety Officer will initiate investigations on reported accidents involving injury. The hygiene committee will participate in the investigation of all reports. The purpose of the investigation will be to determine opportunities to prevent future incidents.

Chemical Hygiene Plan updates

Post-investigation, the chemical hygiene plan will be updated with recommendations to changes to practices from the investigation. If no incidents occurred within the year, the hygiene committee will review the procedures in the chemical hygiene plan to ensure they are still applicable and revise the plan as needed. If no revisions are required, a note to file, signed by the committee, will be kept on file that the plan was reviewed and no revisions were required.