CHEMICAL HYGIENE PLAN

OSHA 29CFR 1910.1450

TO INCREASE SAFE ACTIVITIES IN LABORATORIES

REVISED MAY 2024

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The "Lab Standard" of the Occupational Safety and Health Administration (OSHA) is designed to keep employees aware of (and to reduce the exposures to) hazards associated with chemicals used in laboratories. It is an exception from the more universal OSHA Hazard Communication Standard for operations where chemicals are used in a non-routine, non-production manner by workers with at least some education and training in science. The "laboratory use" of chemicals is defined by the Standard as chemical procedures using small quantities of hazardous chemicals on a laboratory scale and not as part of a production process in an environment where protective laboratory practices and equipment are in common use. The Lab Standard also goes beyond the Hazard Communication Standard in requiring a designated responsible employee (the Chemical Hygiene Officer), requiring specific precautions for "particularly hazardous substances"; employer provided medical consultation, and a specific program for ensuring the effectiveness of engineering control measures.

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1. OBJECTIVES

To have in place a working Chemical Hygiene Plan applicable to the needs of all persons involved in laboratory procedures including faculty, adjunct faculty, department technicians, other staff, and students.

To enhance the learning experience by promoting safe laboratory operations.

To reduce exposure to hazardous chemicals through a hierarchy of source reduction, engineering controls, administrative controls, and personal protective equipment.

To be prepared for emergency situations.

To reduce waste generated in laboratories by improving experiment design and including opportunities for reuse and recycling.

To comply with the OSHA Lab Standard and other OSHA regulations pertaining to potential hazards found in the covered laboratories.

2. ACTIVITIES COVERED BY THIS CHEMICAL HYGIENE PLAN

This Plan covers all laboratory activities from the following disciplines. This specifically includes any course, research, or other work associated with: 1) The Chemistry and Biology Departments within the College of Arts and Sciences 2) The Biomedical and Civil/Environmental Departments within the College of Engineering 3) The Neuroscience Department within the College of Arts and Sciences 4) The College of Pharmacy and 5) Acoustical science activities within the Mechanical Engineering Department.

3. ORGANIZATION AND RESPONSIBILITIES

Ensuring compliance with federal, state, and local safety regulations is the responsibility of the University Environmental Health and Safety Manager (EHSM). Plans written for this purpose will be negotiated with all of the affected faculty and staff. Input is welcome from all staff and this plan will be maintained to reflect a consensus of opinion of those parties covered by the Plan. This plan will go into effect when it is posted on the Environmental Health and Safety Manager's web page, accessible from the University's main website.

Specific Responsibilities are as follows:

A. Chemical Hygiene Officer.

The University EHSM will serve as Chemical Hygiene Officer (CHO) for the purposes of this plan. The CHO will be responsible for the following:

- Maintain the master of the University's Chemical Hygiene Plan and draft corrections, revisions, and additions for review by faculty and staff. The CHO will make this Plan and related documents available on the Environmental Health and Safety Manager's web page available through the University's main web site.

- Maintain the University's Safety Data Sheet Master File and on-line E-Binder.

- Provide safety training for all laboratory employees and support staff and maintain records of this training.

- Conduct exposure evaluations and monitoring as necessary.

- Assist faculty and staff in establishing safety procedures relevant to this plan.

- Represent the University in regulatory inspections of the laboratory areas.

- Review reported laboratory accidents and develop recommendations as necessary.

- Conduct a periodic inspection program as to ensure the working condition of laboratory engineering controls and safety equipment.

- Ensure compliance with the regulations regarding hazardous wastes generated in the laboratories.

B. Faculty

- Follow the policies and procedures of this Chemical Hygiene Plan in their laboratories.

- Assess the potential hazards of laboratory work (including research and or coursework) by considering all factors including the hazards of the stock chemicals, potential release of energy from a reaction, equipment hazards, and the hazards of chemicals created by the experiment.

- Select laboratory practices that reduce the risk of injury or chemical exposure. Chemical substitution, the use of smaller containers, the use of available engineering

controls, and other techniques should be considered when selecting experiment procedures.

- Forward a copy of all Safety Data Sheets (SDS) received to the

Learn the meaning of terms used on safety labels identifying the types of hazards or proper precautions for using a chemical. Become familiar with other resources for chemical information including reference books and catalogs, D'Amour Library resources, and the University's Safety Data Sheet "eBinder" available on the EHSM web page.

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Do not pipette ANYTHING by mouth. Rubber bulbs and pipetteing devices are available.

Eating, drinking, or smoking in any laboratory is not allowed. This includes chewing candy or gum. No food or beverages are allowed to be brought into any laboratory. Note that the mouth is a very susceptible route of entry for chemical and microbiological agents. Personal habits that involve contact with the mouth are strongly discouraged such as chewing on pencils or pens, or the application of cosmetics.

Do not ingest any reagents and do not attempt to breathe them in directly. If an odor sample is necessary, use a cupped hand to move diluted vapor toward the face.

Do not use glassware that is cracked or chipped. Examine all laboratory equipment for defects before beginning work and seek replacement items from the instructor or the stock room manager when a negative condition is discovered. When inserting glass tubing or thermometers into stoppers, lubricate the tubing and the hole in the stopper with glycerol or water. Hold the tubing in a towel near the stopper and insert it while twisting.

Carrying out unauthorized experiments is strictly prohibited.

n. Do

Secure Long hair, loose jewelry, and loose clothing. These items can cause accidents by disturbing chemical containers, contribute to increased exposure by soaking up chemicals, or increase hazards by catching fire or reacting to chemicals.

Keep your lab area as clean and uncluttered as possible.

Leave all personal items (coats, non-essential books, etc.) outside of the laboratory or in an unused portion of the laboratory. Coat racks are available for that purpose. Be certain that these items do not block exit routes or safety equipment. Keep any personal items that may be necessary for an experiment (such as notebooks, pen, etc.) well away from the chemical use area.

Use all of the personal protective equipment required for each chemical manipulation based on written experiment instructions or knowledge of potential hazards.

Inform your instructor or supervisor about any accidents, spills, or potential hazards.

Before leaving the laboratory, wash all glassware, equipment, and lab table tops. Note that if your work involved microbial or poten Ş ═ Ş e q ═ ɟ ƚ n

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Class experiments and other chemical procedures should not be left unattended without proper precautions being taken. Hazardous chemicals and other hazards associated with the procedures (heat, high voltage, etc.) shoul

Egress in and out of laboratories must be maintained at all times. Aisle space must be adequately maintained in **oNdeN to eYsuNe pNopeN eØaÕuatioY.**

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Emergency response procedures have been established in the Western New England University Emergency Handbook. These handbooks give detailed response instructions to a variety of likely emergency scenarios on campus. Included with the procedures is an "Emergency Reference Map" which shows the Emergency Assembly Point (EAP) for individual University buildings. The emergency assembly point for each building is the reporting location for faculty and students in the event of a building evacuation. For convenience purposes, these procedures and map are available on the EHSM's webpage. The CHO will include these topics in the annua

a) Report to an eyewash, drench hose and or safety shower and flush affected areas with copious
amounts of water.
b) Contact (or have someone contact) Public Safety X1411.
- Communicate contamination source.
- Communicate contaminant.

c) Remove any contaminated clothing while continuing to shower.
d) Follow Public Safety instructions.

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If any faculty member or student detects smoke or other signs of fire, they should investigate only if it is safe to do so.
The appropriate response steps are: 1) Pull the fire alarm, 2) evacuate and 3) call Public Safety at X1411. Finally, go directly to the designated Emergency Access Point as indicated in the Emergency Handbook.

Certain **tNaiy'ed** faculty members can attempt to fight fires only if the following conditions exist.

1. alarm has been pulled.
2. escape route present
3. fire is small and contained.
4. no flammable chemicals in immediate area

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d. Safety Showers and or Drench Hoses
e. Eye Wash Stations
f. Hoods
g. PPE
h. Spill Control Supplies
i. Chemical Hygiene Plan

2. Equipment Inspection

Each of these pieces of equipment serves an individual function in worker protection. Outside of fire extinguishers and PPE, all of the above equipment is inspected, tested, flushed and or restocked by the CHO. The following outlines the inspection schedule.

a. Monthly (during the academic year)

- Plumbed Eye/Face Washes and Drench Hoses; Activate valve to confirm operation and sanitize.

- Plumbed Safety Showers: Activate valve to confirm operation and sanitize.

- Bottled Eye Washes: Check date and replace if necessary.

- Fire Blankets and Spill Clean-up Supplies. Inspect and restock as necessary.

- First Aid Kits. Inspect and restock as necessary.

- Fire Extinguisher. Ensure charged and at location.

- Chemical Storage Refrigerators: Check temperature, dated items, and inappropriate items.

b. Pre-Semester

- Safety Showers, Plumbed Eye/Face Washes, and Drench Hoses; Inspect to ANSI Z358.1

- Fire Blankets and Spill Clean-Up Supplies; inspect condition and restock as necessary,

- Fume Hoods: Quantitative and Qualitative inspection as detailed in this plan.

c. Annual

- Chemical Hygiene Plan: review and revise as necessary.

- Coordination of fume hood and Bio-Safety Cabinet certification. These are completed by a third-party vendor and funds are secured through each Department.

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3. Personal Protective Equipment (PPE)

Please note that a variety of PPE apparel and safety equipment are commercially available.
The faculty member must investigate the properties of each chemical he or she is working with in order to ensure they have the appropriate PPE. Note that PPE will always serve as the <u>last</u> line of

experimental hazard defense and follow established administrative and engineering controls. The CHO is available to discuss or advise on appropriate PPE upon request. A variety of PPE is readily available for student and faculty use. Below are some of the more common items likely to be needed in the University laboratories:

- **Safetè Doggles:** various types of safety goggles are available in the Department stock rooms. Others can be ordered directly from distributors. Goggles are intended for use when splashing or flying particles are a potential hazard.
- **Safetè Dlasses:** glasses are for use during routine laboratory operations. While glasses offer some protection against flying objects and splashes, goggles should be worn in conjunction with glasses when a splash is a likely occurrence.
- **Caŏe Shields:** full face shields are required when there is a danger of violent chemical reaction, or splash work involving highly corrosive or caustic agents.
- **DloØes:** skin contact is a major source of exposure to toxic chemicals. Proper gloves must be worn when such a hazard exists. Since gloves are made from a wide variety of materials, one must be careful to select the appropriate type for the material they are working with. The CHO has a copy of the glove selection guide. This guide is available to Faculty as to select appropriate gloves based on chemical use.
- **Laō /oats:** Faculty should assess the experiment as to determine the necessity of a lab coat. Highly toxic, flammable and microbial agents are a few insta $ afl t

- Average face velocity of 70 fpm at the full open sash position.
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- Labels must be in place on every chemical container. This labeling must be done according to the following:

1. Original Containers: All of the hazardous chemicals arriving at the University should be labeled by their manufacturer (or distributor) with the identity of the chemical(s) and the health or physical hazard associated with the product. Regardless of the format used, at a minimum, original manufacturer label will identify the following:

    1. Source of the chemical – Manufacturer Name.
    2. Product or chemical name.
    3. A health and or physical hazard (i.e., Flammable, or corrosive or toxic, etc…) - prominently (usually in all bold or all caps or both) displayed in conjunction with a warning (hazard) statement (i.e., keep away from flame, may burn the skin, etc….) - to help further c

Labels from this system should be printed with black on yellow stock. These labeling stations will also be stocked with pictographic warning labels and labels for OSHA Particularly Hazardous Substances.

Reaction vessels: The containers used for a chemical reaction do not need to be labeled if they are in the use and under control of the person who transferred the chemical into the container and if that person remains responsible for the container until its waste has been collected and the container cleaned. Titration setups or other stock preparations left unattended or for use by more than lab section should be labeled.

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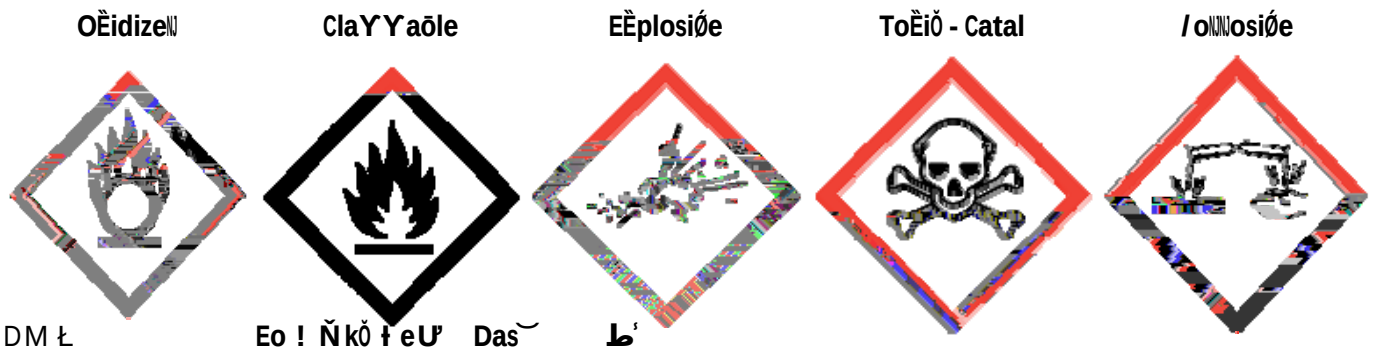

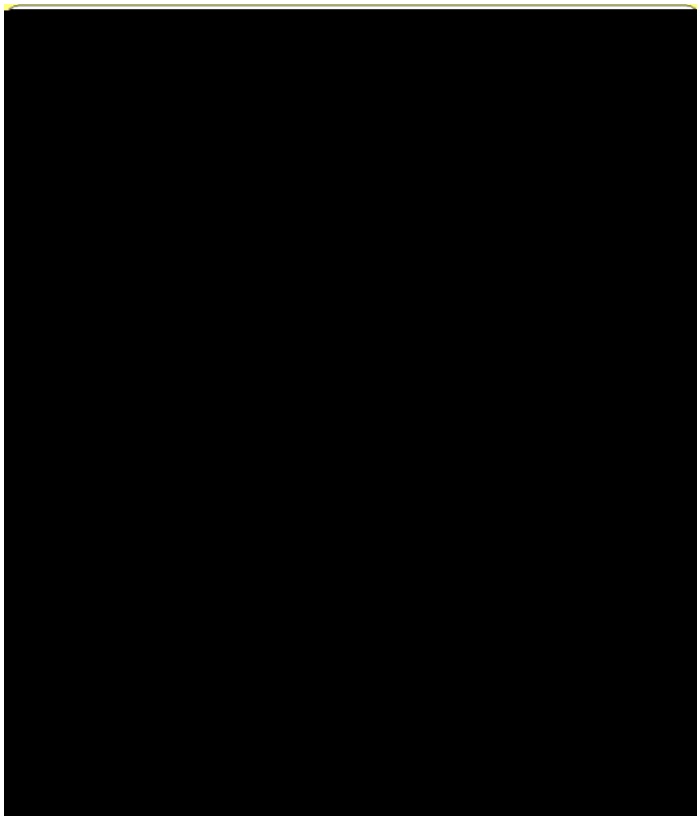

7. Emergency Gas Panels

These panels provide natural gas service to individual laboratories. By activating the switch to

fú Separate Acids from Bases and provide secondary containment when necessary
gú Store all flammable and combustible liquids in Flammable Cabinets
hú Perform an evaluation to determine if chemicals are still needed on a regular basis

4. Flammable and Combustible Liquids

When talking about laboratory safety, of significant importance is the management of flammable and combustible liquids. Solvents, Alcohols, Dyes and fuels are an important part of many experiments and therefore can be found in any laboratory stockroom. The safe storage, handling and usage of these materials will minimize the potential for accidents. It is important to understand that there are several different classes of flammable and combustible materials depending on applicable flashpoints and boiling points. A materials flashpoint (FP) is the temperature at which vapors are given off in sufficient concentration to support combustion in air. A material boiling point (BP) is the temperature at which the vapor of the material is equal to atmospheric pressure. These chemical properties can be located within a particular substances SDS sheet. The classes of flammable liquids are as follows:

aú	Class IA	**CP** <73(F)	**.P** <100(F)
ōú	Class IB	**CP** <73(F)	**.P** >100(F)
Ŏú	Class IC	73(F) < **CP** < 100(F)	
dú	Class II	100(F) < **CP** < 140(F)	
eú	Class IIIA	140(F) < **CP** < 200(F)	
fú	Class IIIB	**CP** > 200(F)	

The storage of flammable and combustible liquids is highly regulated by the Springfield Fire Department. A very specific quantity of each flammable liquid class is permitted within educational buildings. Furthermore, all flammable liquids must be stored within a specifically constructed “control area” on a particular building floor and within flammable liquid cabinets. The CHO routinely inspects storage areas to ensure that flammable liquid storage is within regulations. If there are any questions concerning the storage of flammable liquids, please contact the CHO.

Œ The dispensing of flammable liquids is to be done under fume hoods. [illegible]

6. Particularly Hazardous Substances.

In addition to a general definition of “hazardous chemical”, the OSHA Lab Standard identifies a more select group of chemicals that warrant more specific management practices. It is important to note that this list is subject to revision due to regulatory changes by OSHA or by a change in chemical status by other organizations. The following categories are:

- Categories of Particularly Hazardous Substances

  - “Select Carcinogens” is an attempt by OSHA to classify for special treatment (as cancer causing agents only) t

- An explanation of the hazard associated with this chemical including information on target organ and route of entry.
- Designated work area including use of engineering controls.
- Requirements for personal protective equipment.
- Waste handling procedures.
- Decontamination procedures.

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All containers containing any portion of a Particularly Hazardous Substance must be labeled with an additional label provided by the University. These lab

DEA and DPH. Local DEA and DPH officials will coordinate an inspection of controlled substance use locations prior to authorization. The Faculty must ensu Ł substance use

2. Non-Hazardous Waste

If the chemical waste does not fall under any of the categories outlined above, it is non-Hazardous Waste. Non-Hazardous Waste must be compared with local Sewer (if liquid) and local Landfill (if solid) regulations in order to ensure it is acceptable for disposal. Please contact the EHSM for sewer or trash disposal questions.

aú Materials that CANNOT be disposed down the DRAIN:

- Any Liquid or Solid Hazardous Waste (See Above)
- Solid Material
- Oils and or greases
- Unknown materials
- Solution with high organic load (i.e. glycol solution)
- Solution with 5.5>pH>9
- Solution with oil or grease sheen
- Solution with high solids
- Solution with trace amounts of lead, arsenic or other heavy metal
- Solution with Copper, Nickel, Zinc
- Solution with infectious material
- Solution of Chlorinated Solvents

õú Materials that CANNOT be disposed in the trash:

- Any liquid or solid Hazardous Waste (See Above)
- Solids laden with solvents and or oils (i.e. fail one drop test)
- Aerosol cans that are not truly empty
- Spill clean up materials.
- Reactive Chemicals
- Blood or Biologically laden material

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- Bloodborne Pathogens- For work with blood or other potentially infectious materials

Questions concerning additional training applicable to specific work can be addressed with Environmental Health and Safety.

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