

EMERGENCY PROCEDURES

Reporting Emergencies

All emergencies should be reported directly to Campus Security. "Code Blue" phones are located throughout campus and dial directly into the Campus Security emergency line. A special phone number has been designated for reporting emergencies on campus.

FOR EMERGENCIES ONLY: Dial 4-2911

Provide the following information:

- a. Your location (Building, room number, etc.);
- b. Your Name; and
- c. Nature of emergency (fire, medical, chemical spill, etc.)

Medical Emergency (Life threatening or serious)

1. Dial **4-2911**. Give Campus Security your name and exact location, i.e., building, room number, lettered parking lot and telephone number where you can be reached.
2. Briefly describe the medical condition of victim and if possible, victim's name.
3. Return to the injured party and make them as comfortable as possible. (Do not move a seriously injured person unless it is a lifesaving situation.)
4. If possible, have someone meet Campus Security or Emergency Medical personnel at parking lot or building entrance.

Chemical Exposures to Eyes or Skin

1. If an exposure of chemicals to the eyes or skin has occurred, **flush affected areas with copious amounts of water for at least 15 minutes**. Remove affected clothing. *Flushing the victims eyes or skin is a traumatic event. Have someone remain with the patient (if at all possible) during the entire procedure, and accompany them to follow-up medical attention.* The eyes must be forcibly held open to wash, and the eyeballs must be rotated so that all surface areas are rinsed. Contact lenses should be removed while rinsing. Obtain MSDS for chemical individual is exposed to. Have the victim's escort deliver this document to the medical personnel.
2. After flushing, prompt medical attention is recommended **regardless of severity**.

For **minor exposures**, medical assistance is available from Student Health Services, 8:00 a.m. - 5:00 p.m., Monday through Friday.

If serious or life threatening, Campus Security will call for a rescue squad.

3. Inform your supervisor of the injury.

First Aid

1. Medical assistance is available for minor injuries at UNO Health Services (MBSC).
2. If you require transportation to Health Services or to a medical facility or need first-aid treatment at the scene, contact Campus Security. (If the injury or condition is serious or potentially life-threatening, Campus Security will call Omaha Fire and Rescue for transport.)
3. Inform your supervisor of your injury. (Supervisors must complete an Injury Report for all work related injuries and instructors must complete a similar report for student injuries.) Contact EHS, 4-2568, for report forms.

Small (Minor) Chemical Spill (*Does NOT pose a hazard to human health or the environment, and is capable of being absorbed or otherwise controlled by the persons in the immediate release area.*)

1. Alert people in immediate area of spill.
2. Wear protective equipment including chemical splash goggles, appropriate gloves and lab coat.
3. Avoid breathing vapors from spill. (Individuals using respiratory protection must comply with requirements of the Respiratory Protection Program.)
4. Confine spill to small area. Use appropriate spill kit to absorb the spilled material.
5. Bag residue and cleanup material and tag with a Chemical Collection Tag (CCT). Forward completed tag to EHS for evaluation and disposal.
6. Call EHS for advice as needed - **4-3921 (4-2648 after hours)**.

Large (Major) Chemical Spill (*Poses a hazard to human health or the environment, or cannot be controlled by persons in the immediate release area.*)

1. Alert people in the laboratory and evacuate. Close doors to affected area.
2. Dial **4-2911** and provide the following information:
The exact location of the spill (building and room number);
Chemical involved (spell it out if possible);
Quantity of material; and
Call-back number where you can be reached.
3. Attend to injured or contaminated persons and remove them from exposure.
4. Campus Security will contact EHS and the UNO Emergency Coordinator and they will determine what action steps are necessary. UNO has agreements with the UNMC Spill Response Team and the Omaha Fire Department's Haz-Mat unit to respond to chemical emergencies at UNO.

Fire and/or Explosions

1. Pull the nearest fire alarm pull station.
2. Evacuate the building. If you are conducting class, make sure all students have cleared the room. Provide assistance to anyone with special needs. Do NOT use elevators. Those with disabilities should proceed immediately to the designated stairwell area where emergency personnel will assist them.

3. Dial **4-2911** to verify that a fire emergency exists in your building.
4. Proceed to rally point. The rally point for each building is for faculty and staff only. Students are not required to assemble at the rally point but must leave the building. You should stay at the rally point until you have been excused by the emergency personnel.
5. Do NOT re-enter a building unless informed it is safe to do so by emergency personnel.

A. Introduction and Responsibility

The Chemical Hygiene Plan (CHP) is designed to protect employees from health hazards associated with hazardous chemicals in the laboratory and keeping exposures below Permissible Exposure Limits (PEL) of Occupational Safety and Health Administration (OSHA) regulated substances. This plan is designed to meet the requirements of OSHA Standard 29 CFR 1910.1450, "Occupational Exposure to Hazardous Chemicals in Laboratories."

Administrative Responsibilities

Environmental Health and Safety (EHS)

EHS is responsible for management of the chemical use and disposal programs at UNO. EHS prepared the CHP and will oversee its adoption and implementation throughout the campus community. The Environmental Safety Specialist is designated as the Chemical Hygiene Officer (CHO) and assumes the responsibility for carrying the plan to the campus. The CHO will ensure this plan is reviewed with applicable department representatives at least annually.

Campus Units

Each campus unit (academic, administrative, and service area) is responsible for identifying a Departmental Laboratory Safety Officer (LSO), developing Laboratory-Specific Standard Operating Procedures (SOP), training, and implementation of the CHP. Overseeing these functions is the responsibility of the campus unit's department head, chair, manager, or supervisor. This CHP is expected to assist campus units developing written standard operating procedures for hazardous materials/chemical use, enforcing safety practices, establishing emergency responses, recommending appropriate safety apparel, providing employee training, overseeing hazardous waste disposal, reporting hazardous conditions to the appropriate supervisor or unit safety manager, and maintaining adequate records to demonstrate that training and development of safety standards have been accomplished.

Employees

It is each employee's responsibility to follow and observe all appropriate practices and procedures contained in the CHP, including required attendance at training sessions and reporting unsafe conditions to their supervisor. Each employee must also adhere to the Laboratory Specific SOPs developed under the CHP.

Applicability

The Chemical Hygiene Plan applies only to employees in those areas considered laboratories (such as those found in teaching and research environments). Non-laboratory users of chemicals must comply, instead, with the Hazard Communication Program (HAZCOM). To determine if your area is considered a laboratory, consult the definitions given below:

Laboratory means a facility where the "laboratory use of hazardous chemicals" occurs. It is a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis.

Laboratory use of hazardous chemicals means handling or use of such chemicals in which all of the following conditions are met:

- i) Chemical manipulations are carried out on a "laboratory scale;"
- ii) Multiple chemical procedures or chemicals are used;
- iii) The procedures involved are not part of a production process, nor in any way simulate a production process; and
- iv) "Protective laboratory practices and equipment" are available and in common use to minimize the potential for employee exposure to hazardous chemicals.

Laboratory scale means work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by one person. "Laboratory scale" excludes those workplaces whose function is to produce commercial quantities of materials.

Protective laboratory practices and equipment means those laboratory procedures, practices and equipment accepted by laboratory health and safety experts as effective, or that the employer can show to be effective, in minimizing the potential for employee exposure to hazardous chemicals.

- With these in mind, the following are considered "**Laboratories**", and subject to the CHP:
- Biology and Chemistry Laboratories;
- Biology and Chemistry Storerooms;
- Geology/Geology (labs) where chemicals are used;
- Fine Arts Lithography;
- Photography Darkrooms; and
- Other areas designated by the CHO

The following are considered "**Non-laboratories**", and therefore subject to the Hazard Communication (HAZCOM) Plan:

- Geology/Geography (labs) where only physical equipment (cutters, grinders & other non-chemistry related equipment) is used;
- Fine Arts Paint, Ceramics, Sculpture and Bookmaking Studios;
- Physics Labs (except those where chemicals are used);
- Grounds Services; and

- Other areas designated by the CHO

For help in determining if the Chemical Hygiene Plan applies to you, contact the Chemical Hygiene Officer at 4-3921.

G. Laboratory-Specific Standard Operating Procedures - File all Laboratory-Specific Standard Operating Procedures immediately after this section

B. Hazardous Chemicals

1. Hazardous Material Determination

In most cases, the label on a chemical container will indicate if the chemical is a health hazard. Key words to look for may include, but are not limited to: *danger, caution, hazardous, toxic, poison, corrosive, irritant, or carcinogen*. Also, some chemicals present a collective health and physical hazard. Regarding combined health and physical hazards, key words to look for are *flammable, combustible, pyrophoric, unstable (reactive), water reactive, oxidizer, or organic peroxide*. Standard Operating Procedures (SOP) for chemicals with these properties are found in Chapter C. Not all potential hazards are listed on every container. Refer to Material Safety Data Sheets (MSDS) for detailed information.

Note: Employees should be aware there are different levels of hazards for each category listed below. It is expected that all employees: minimize exposure to all chemicals when possible; use installed engineering controls (i.e., fume hoods) when practical; and consult MSDS sheets and SOPs to become familiar with all hazards and their relative scale. All employees should maintain their chemical exposures as low as reasonably achievable (ALARA) to minimize potential health hazards.

2. Types of Health Hazards (some compounds may fall under *several* categories)

a. **Corrosives** - are materials that destructively attack organic tissues (most notably the skin), but also mucous membranes or lungs if inhaled, or the stomach if taken internally.

Examples: Acetic anhydride, Hydrochloric acid, Sodium hydroxide, Glacial acetic acid.

b. **Irritants** - are materials that cause inflammation of the body surface with which they come in contact. The inflammation results from concentrations below those that cause corrosion.

Examples: Alkaline dusts and mists, Phenolphthalein, Ozone.

Irritants can also cause changes in the mechanics of respiration and lung function.

Examples: Sulfur dioxide, Acrolein, Formaldehyde.

c. **Hepatotoxins** - cause damage to the liver. Examples: Carbon tetrachloride, Nitrosamines, Tetrachloroethane

d. **Nephrotoxins** - damage the kidneys. Examples: Halogenated hydrocarbons, Uranium Compounds

e. **Neurotoxins** - damage the nervous system. The nervous system is especially sensitive to organometallic compounds and certain sulfide compounds. Examples: Carbon disulfide, Parathion, Tetraethyl lead, Manganese, Thallium, Methyl mercury

f. **Hemototoxins** - act on the blood or hematopoietic system. The blood cells can be directly affected or the bone marrow can be damaged. Examples: Aniline, Nitrobenzene, Benzene

g. **Carcinogens** - commonly describes any agent that can initiate or speed the development of malignant or potentially malignant tumors, malignant neoplastic proliferation of cells, or cells that possess such material. Examples: Benzene, Ethylene oxide, Chloroform

A **select carcinogen** is any substance that meets one of the following criteria:

Regulated by OSHA as a carcinogen. (29 CFR 1910.1003) http://www.osha-slc.gov/OshStd_data/1910_1003.html

Listed under the category "known to be carcinogenic" in the National Toxicology Program (NTP), "Annual Report of Carcinogens." <http://ntp-server.niehs.nih.gov/>

Listed under Group 1, "carcinogenic to humans" by the International Agency for Research on Cancer Monographs (IARC). <http://193.51.164.11/monoeval/crthgr01.html>

Listed under Group 2A or 2B by the IARC or under the category "reasonably anticipated to be carcinogenic" by the NTP and causes statistically significant tumor incidence in experimental animals. <http://193.51.164.11/monoeval/crthgr02a.html> for Group 2A or <http://193.51.164.11/monoeval/crthgr02b.html> for Group 2B.

The most current listing of these substances can be obtained from the Uniform Resource Locators (URL) listed above. If unable to locate these documents, contact EHS at 4-3921 for assistance.

h. **Reproductive Hazard** - substances that affect the reproductive capabilities, including chromosomal damage (mutagens) and effects on the fetus (teratogens). Examples: Ethylene dibromide, Dibromochloropropane

i. **Mutagen** - affects the chromosomes of exposed cells. The effect may be hereditary and becomes part of the genetic pool passed on to future generations. Examples: Dimethyl sulfate, Ethidium bromide

j. **Teratogen** - an (embryotoxic or fetotoxic) agent that interferes with normal embryonic development without damage to the mother or lethal effect on the fetus. The effects are not hereditary. Examples: Toluene, Carbon disulfide

k. **Sensitizer** - causes a majority of the exposed population to develop an allergic reaction in normal tissue after repeated exposure to the chemical. The reaction may be as mild as a rash (contact dermatitis) or as serious as anaphylactic shock. Examples: Formaldehyde, Diazomethane

l. **Acutely Toxic Chemicals** - substances falling into the following categories:

A chemical that has a median lethal dose (LD50) of 50 milligrams or less per kilogram of body weight, when administered to albino rats weighing 200g to 300g each.

A chemical that has a median lethal dose (LD50) of 2000 milligrams or less per kilogram of body weight, when administered by continuous contact for 24 hours (or less, if death occurs within 24 hours) to the bare skin of albino rabbits weighing between two and three kilograms each.

A chemical that has a median lethal concentration (LC50) in air of 200 parts per million or less by volume of gas or vapor or 2 milligrams or less per liter of mist, fume, or dust when administered by continuous inhalation for one hour (or less, if death occurs within one hour) to albino rats weighing 200g to 300g each.

Examples: Sodium azide, Hydrogen Fluoride, Osmium Tetroxide

m. **Asphyxiants - Simple asphyxiants** deprive the tissue of oxygen. Examples: Carbon dioxide, Helium, Nitrogen, Nitrous oxide

Chemical asphyxiants render the body incapable of maintaining an adequate oxygen supply. They are active at very low concentrations (few ppm). Examples: Carbon monoxide, Cyanides

n. **Primary anesthetics** - have a depressant affect upon the central nervous system, particularly the brain. Examples: Alcohols, Halogenated hydrocarbons, Ethyl ether

o. **Lacrymators** - Materials that are strongly irritant to the eyes. Examples: Ammonium Hydroxide, Formaldehyde

3. Types of Combined Health and Physical Hazards

a. **Flammables and Combustibles.** Flammables and combustibles are materials which, under standard laboratory conditions, can generate sufficient vapors to cause a fire in the presence of an ignition source. Materials which generate sufficient vapors to ignite at temperatures below 100 °F (38°C) are "flammables" (Examples: Acetone, Xylene), whereas materials which require temperatures above 100°F (38°C) to provide sufficient vapors for ignition are "combustibles" (Examples: Benzaldehyde, Phenol).

b. **Oxidizers** - These chemicals are fire and explosion hazards when they are in contact with organic compounds or strong reducing agents. Examples: Hydrogen peroxide, Nitric acid.

c. **Reactives** - These chemicals can release energy quickly and forcefully, depending on various environmental conditions. In some cases the release of energy may result in a detonation.

i. **Water Reactives** These chemicals react with water to form heat and flammable or explosive gases (hydrogen). Examples: potassium and sodium metals and many metal hydrides.

ii. **Pyrophorics** In contact with air, these chemicals ignite spontaneously. Examples: finely divided or activated magnesium powder, activated zinc dust metal alkyls.

iii. **Peroxide-Forming Chemicals** Organic peroxides are a class of compounds with unusual stability problems and, as such, are one of the most hazardous classes of chemicals regularly handled in the laboratory. Examples: Ethyl ether, Vinyl pyridine

4. Special Types of Hazardous Materials

a. **Hydrofluoric acid/Hydrogen fluoride (HF).**

Persons unfamiliar with hydrofluoric acid often mistake or confuse it with hydrochloric acid. Although hydrofluoric acid (HF) and hydrochloric acid (HCl) sound similar, the toxicity of these two acids is very different. To decrease or avoid confusion, EHS recommends that when speaking, *HYDROFLUORIC ACID* and *HYDROGEN FLUORIDE* be referred to as "HF". (Labeling of these compounds still requires using the full and proper chemical names.) ***Burns with concentrated HF are usually very serious, with the potential for significant complications due to fluoride toxicity. Concentrated HF, liquid or vapor, may cause severe burns, metabolic imbalances, pulmonary edema and life threatening cardiac arrhythmias. Even moderate exposures to concentrated HF may rapidly progress to a fatality if left untreated.***

Because of the special hazards involved with this material, the following additional requirements must be met:

- All persons working with or in close proximity to HF must be trained on the associated hazards, and that training documented and maintained by the appropriate department. Contact EHS for appropriate training information.
- HF antidote gel must be available in the immediate work area where HF is used. It must be clearly marked, easily visible, and replaced as shelf life requires.

b. **Perchloric acid**

In addition to its characteristics as an oxidizer, **Perchloric acid crystals can accumulate and become an explosion hazard.** Perchloric acid should only be used in specially designed hoods (see Section D.2.b, "Perchloric acid fume hoods").

C. Standard Operating Procedures (SOP) for the Safe Use of Chemicals

This section provides examples of common SOPs. Each laboratory supervisor should review this section and adopt and train employees on all SOPs which pertain to the chemicals and

procedures used in the Laboratory. Any laboratory operation which may result in: exposure exceeding Permissible Exposure Limits (PEL) of OSHA Regulated Substances, work with particularly hazardous chemicals, and/or procedures not covered by the SOPs listed below, requires prior approval from the LSO and/or the CHO prior to this operation. In this case, the Principle Investigator (PI), with assistance from the LSO and/or laboratory supervisor, must develop SOPs (using the SOP development form, Appendix 4). After approval, file these in Section G.

1. Ordering Chemicals. Good chemical management and safety practices begin with the purchasing of chemicals. The following procedures can assist in ensuring responsible chemical procurement.

- Preplan all laboratory and work activities and carefully estimate the amount of each chemical required.
- Determine whether proper storage is available.
- Establish adequate ventilation for each chemical selected.
- If adequate information is unavailable before ordering new or unusual chemicals, contact the manufacturer for needed information.
- Order chemicals in the **smallest quantity necessary** to fulfill the estimated need. All too often, large and/or excess quantities of a chemical must be disposed of at a high cost.
- Request Material Safety Data Sheets (MSDS) from vendors when chemicals are ordered and forward copies (if not previously done) to EHS when they are received.

2. Receipt and Distribution of Chemicals.

Observe all warnings on the receiving package. If the chemical is not properly labeled, do not accept the chemical.

Review and observe information on the safe handling and storage of the chemical.

Whenever possible, transport chemicals on freight-only elevators to avoid potential exposure to passengers.

When transporting gas cylinders, use an appropriate hand truck and strap the cylinder down. Never drag or roll cylinders. Leave the valve cover cap on until the cylinder is located and secured in its area of intended use.

3. Safe Storage of Chemicals

a. **General** - Some general procedures for chemical storage are listed below.

- Ensure that all containers are in good condition, tightly capped, and properly labeled. There should be no unlabeled containers. Containers of used substances should be labeled "USED..." and NO container should be labeled using the word WASTE or SPENT (unless labeled by EHS).

- Store incompatible chemicals separately. Segregate chemicals according to hazard class (e.g., flammable liquids, organic acids, oxidizers, etc.).
- Ensure that storage areas are dry and adequately ventilated. Good safety practices require not storing chemicals above eye level.
- Secure gas cylinders away from heat sources.
- Store highly reactive or corrosive liquids in spill trays.

b. **Flammable Liquids** - Flammable and/or combustible liquids stored in the open in a laboratory work area or inside any building shall be kept to the minimum necessary for the work being done. (NFPA 45, 7-2.3)

- Use only flammable material refrigerators and freezers for the storage of flammable liquids requiring refrigeration.
- No container for Class I or Class II liquids shall exceed a capacity of 4 L (1.1 gal). Exception: Safety cans shall be permitted to have an 8 L (2.1 gal) capacity. (NFPA 45, 7-2.1.3).
- Do not exceed the storage limits of Tables 1 or 2 (NFPA 45 - Fire Protection for Laboratories Using Chemicals):
- Maximum quantities of Class I liquids when combine with Class II and Class IIIA liquids shall not exceed the maximum quantities specified in Table 3 (NFPA 45, 2-2.23).

Definitions:

Class I liquid. Any liquid that has a closed-cup flash point below 37.8 C (100 F) and a Reid vapor pressure not exceeding 2068.6 mm Hg (40 psia) at 37.8 C (100 F).

-- Class 1A liquids shall include those liquids that have flash points below 22.8 C (73 F) and boiling points below 37.8 C (100 F).

-- Class 1 B liquids shall include those liquids that have flash points below 22.8 C (73 F) and boiling points at or above 37.8 C (100 F).

-- Class IC liquids shall include those liquids that have flash points at or above 22.8 C (73 F) but below 37.8 C (100 F).

Class IIIA Liquid. Any liquid that has a flash point at or above 60 C (140 F) but below 93 C (200 F).

Class IIIB Liquid. Any liquid that has a flash point at or above 93 C (200 F).

Table 1: Maximum Quantities of Flammable and Combustible Liquids in Sprinklered Laboratory Units Outside of Flammable Liquid Inside Liquid Storage Areas

	<i>Excluding</i> Quantities in Storage Cabinets or Safety Cans	<i>Including</i> Quantities in Storage Cabinets or Safety Cans
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Laboratory Unit Fire Hazard Class	Flammable or Combustible Liquid Class	Maximum Quantity per 9.3 m ³ (100 ft ²) of Laboratory Unit	Maximum Quantity per Laboratory Unit	Maximum Quantity per 9.3 m ³ (100 ft ²) of Laboratory Unit	Maximum Quantity per Laboratory Unit
B	I, II, and IIIA	10 L (2.5 gal) 19 L (5 gal)	570 L (150 gal) 757 L (200 gal)	19 L (5 gal) 38 L (10 gal)	1136 L (300 gal) 1515 L (400 gal)

Table 2: Maximum Quantities of Flammable and Combustible Liquids in Nonprinklered Laboratory Units Outside of Flammable Liquid Inside Liquid Storage Areas

		<i>Excluding</i> Quantities in Storage Cabinets or Safety Cans		<i>Including</i> Quantities in Storage Cabinets or Safety Cans	
Laboratory Unit Fire Hazard Class	Flammable or Combustible Liquid Class	Maximum Quantity per 9.3 m ³ (100 ft ²) of Laboratory Unit	Maximum Quantity per Laboratory Unit	Maximum Quantity per 9.3 m ³ (100 ft ²) of Laboratory Unit	Maximum Quantity per Laboratory Unit
B	I, II, and IIIA	10 L (2.5 gal) 19 L (5 gal)	285 L (75 gal) 378 L (100 gal)	19 L (5 gal) 38 L (10 gal)	570 L (150 gal) 757 L (200 gal)

Table 3: Maximum Allowable Container Capacity

Container Type	Flammable Liquids IA IB IC			Combustible Liquids II IIIA	
Glass	500 ml (1 pt)	1 L (1 qt)	4 L (1.1 gal)	4 L (1.1 gal)	20 L (5 gal)
Metal (other than DOT drums) or approved plastic	4 L (1.1 gal)	20 L (5 gal)	20 L (5 gal)	20 L (5 gal)	20 L (5 gal)
Safety Cans	10 L (2.6 gal)	20 L (5 gal)	20 L (5 gal)	20 L (5 gal)	20 L (5 gal)
Metal drum (DOT Spec.)	N/A	20 L (5 gal)	20 L (5 gal)	227 L (60 gal)	227 L (60 gal)
Polyethylene (DOT Spec. 34, UN 1H1, or as authorized by DOT exemption)	4 L (1.1 gal)	20 L (5 gal)	20 L (5 gal)	227 L (60 gal)	227 L (60 gal)

¹ This table is extracted from Table 4-2.3 of NFPA 30, Flammable and Combustible Liquids Code, except for allowable quantities of flammable liquids in metal (DOT Specification) drums.

² See definitions above of the various classes of flammable and combustible liquids.

³ Glass containers as large as 4 L (1.1 gal) shall be permitted to be used if needed and if the required purity would be adversely affected by storage in a metal or an approved plastic container, or if the liquid would cause excessive corrosion or degradation of a metal or an approved plastic container.

⁴ In instructional laboratory work areas, no container for Class I or Class II liquids shall exceed a capacity of 4 L (1.1 gal). Exception: Safety cans shall be permitted to have an 8L (2.1 gal) capacity.

⁵ Not allowed.

c. **Peroxides** - Indicate the date of receipt on each container of peroxide forming chemical. Dispose of all peroxide forming chemicals (or treat to remove peroxides) within one year of purchase or six months of opening.

4. **Personal and Environmental Protection** - These general working procedures should be followed to maintain a safe working environment and to protect the health of individuals when they are handling chemicals.

- Keep a chemical inventory of material stored and used in the laboratory.
- Know the general properties associated with the materials you are using. Always use the MSDS to determine chemical properties.
- An MSDS is required to be accessible for each chemical used/stored in the work area.
- Always wear appropriate personal-protection apparel, including eye protection, lab coat, and gloves.
- Conduct all processes which may result in the release of hazardous vapors or mists within a functional fume hood or other adequate containment device.
- Wear appropriate respiratory equipment when air containment concentrations cannot be sufficiently restricted by engineering controls. Refer to the Campus Safety Policy on Respiratory Protection for specific requirements. <http://www.unomaha.edu/~wwwehs/>
- Review emergency procedures and ensure that necessary supplies and equipment for spill response are available in the workplace.
- Know the location of safety equipment and evacuation routes. Know the emergency phone numbers and have them posted near the telephone.
- Try to avoid working alone in the laboratory and/or leaving chemical processes unattended.
- Keep work areas clean and uncluttered. Make sure chemicals and equipment are properly labeled and stored. Good housekeeping prevents accidents.
- Do not eat, drink, smoke, apply cosmetics, chew gum, or store food, beverages, tobacco, cosmetics or medications in areas where laboratory chemicals are used or stored. (Except in designated areas.)
- Confine long hair and loose clothing when using chemicals. Always wear shoes. Do not wear sandals or open-toed shoes.
- Always use mechanical pipettes and pipette aids. Never use mouth suction.
- Handle and store glassware with care. Never use cracked or chipped glassware. Properly dispose of damaged or broken glassware in broken glass receptacles, **not** the trash container.
- Always wash hands and other exposed skin areas after using chemicals and before eating or drinking.

5. Flammables and Combustibles. Depending on density, vapor trails can rise, sink, or traverse horizontally to reach an ignition source, resulting in a flashback fire. Fire can also result from reactions between flammables or combustibles and oxidizers. The following precautions should be observed when using these materials:

- Secure screw caps on containers immediately following dispensing. Do not dispense into beakers and allow to remain unattended at bench top level.

- Flammable and combustibles should be placed under a hood as soon as possible and used up in a reasonable time normally allotted for the particular activity.
- Do not allow flammable liquids to evaporate in a fume hood as a means of disposal. **This is considered unlicensed treatment, and is forbidden by the EPA.**
- Eliminate ignition sources (where practical) such as open flames, hot surfaces, operation of electrical equipment, and static electricity from areas in which flammable or combustible materials are used or stored.
- Segregate flammables from oxidizing acids and oxidizers.
- Refrigerators and freezers used for the storage of flammable and combustible liquids must be specifically designed for this purpose.
- Ensure that there is proper bonding and grounding when transferring between metal containers or dispensing a flammable liquid from a large container or drum.
- Used flammable and combustible liquids should be kept in containers with tight-fitting screw-top lids. Label containers like the original, with an appropriate label describing the composition of container contents. **Containers of used substances should be labeled "USED...". Do not use the words WASTE or SPENT.**

6. Corrosives - Corrosive chemicals are generally acids and bases, oxidizing agents, and some dehydrating agents. Corrosives react with the skin and are particularly damaging to the lungs and eyes. The following precautions should be observed when storing and using these materials:

Segregate acids from bases.

Use bottle carriers for transporting bottles of corrosives.

Store large bottles of acids on a low shelf or in acid cabinets.

Personal protective equipment is important when working with corrosives. Neoprene gloves, faceshield, rubber apron, and rubber boots should be considered.

Always add acid to water (never the reverse) to avoid violent reaction and splattering.

Wherever corrosives are used or stored, be sure that a working safety shower and eyewash are readily accessible. Should there be contact between corrosives and any body tissue, particularly the eyes, immediately flush the area of contact with cool water for **at least fifteen (15) minutes**. Remove all affected clothing and immediately get medical assistance.

7. Reactives - These chemicals can release energy quickly and forcefully, depending on various environmental conditions. In some cases the release of energy may result in a detonation.

a. Oxidizers - should be stored and used in compatible containers with appropriate screw-top lids. Store away from organics, flammable materials, and reducers.

b. Water Reactives - Do not handle in the presence of water. Store in an area free from water contact. Use dry sand to smother fire. Be especially careful in humid weather. Check all apparatus and water hoses for potential leaks.

c. Pyrophorics - Store and use in inert environments.

d. Peroxide-Forming Chemicals - Organic peroxides are a class of compounds with unusual stability problems and, as such, are one of the most hazardous classes of chemicals regularly handled in the laboratory. Many common laboratory chemicals can form peroxides when exposed to air, so even opening the container to remove some of its contents can allow the formation of peroxides to take place. Some compounds form peroxides which are violently explosive in concentrated solutions or as solids. Therefore, they should never be allowed to become dry through evaporation or distillation. Others are polymerizable unsaturated compounds which can initiate a runaway, explosive polymerization reaction.

Note that all peroxidizable compounds should be stored away from heat and light. They should be protected from physical damage and ignition sources. A record must be maintained for all peroxidizable compounds to indicate the date of receipt and the date the container was first opened.

The sections below provide specific examples (lists are illustrative but not exhaustive) of common chemicals that present a serious hazard due to peroxide formation. Time limits from the date when the original container is first opened are given as guidelines for testing or discarding of these compounds.

List A: Severe Peroxide Hazard on Storage with Exposure to Air

Use within 3 months: Diisopropyl ether (isopropyl ether), Divinylacetylene (DVA), Potassium metal, Potassium amide, Sodium amide (sodamide), Vinylidene chloride (1,1-dichloroethylene)

List B: Peroxide Hazard on Concentration

Do Not Distill or Evaporate Without First Testing for the Presence of Peroxides.

Use or test for peroxides within 6 months: Acetaldehyde diethyl acetal (acetal), Cumene (isopropylbenzene), Cyclohexene, Cyclopentene, Decalin (decahydronaphthalene), Diacetylene (butadiene), Dicyclopentadiene, Diethyl ether (ether), Diethylene glycol dimethyl ether (diglyme), Dioxane, Ethylene glycol dimethyl ether (glyme), Ethylene glycol ether acetates, Ethylene glycol mono-ethers (cellosolves), Furan, Methylacetylene, Methylcyclopentane, Tetrahydrofuran (THF), Tetralin (tetrahydronaphthalene), Vinyl ethers

List C: Hazard of Rapid Polymerization Initiated by Internally Formed Peroxides

Normal Liquids

Use or test for peroxides within 6 months:

Chloroprene (2-chloro-1,3-butadiene), Styrene, Vinyl acetate, Vinylpyridine

For additional information, please refer to:

National Research Council *Prudent Practices in the Laboratory*. Washington: National Academy Press, 1995.

8. Chemicals with Acute Toxicity - These chemicals require special handling procedures because of their health and safety risk.

Work with acute toxic chemicals needs to be restricted to employees who have been specifically trained to work with these chemicals.

These chemicals should be used within designated areas in minimum quantities. Prior written approval is required from the Laboratory Safety Officer.

Acute toxic chemicals need to be stored appropriately and securely.

Always refer to the MSDS for information on personal protection and containment devices.

Identify work areas with signs.

Cholinesterase Inhibitors - Workers using pesticides need to be aware of the procedures for personal protection when using these chemicals. Always follow the recommendations of the MSDS or container label.

Carcinogens - There are numerous chemicals that are classified as carcinogenic. It is important to designate appropriate areas for the use of these toxic chemicals. Development of appropriate decontamination procedures in the laboratory is also necessary.

Reproductive Toxins - Chemicals that increase the potential for mutation (mutagens) or tend to cause developmental malformations (teratogens) need to be controlled with specific procedures. Elimination of potential ingestion, inhalation, and skin contact is important. Follow standard laboratory safety practices listed throughout this CHP, including training and information about the specific chemical involved.

9. Compressed Gases in Cylinders - There are over 500 kinds of gases available in compressed gas cylinders. Most of them are available in commercial or lecture size cylinders. The Compressed Gas Association (CGA) publishes monographs for all aspects of operation and safety related to the design, valves, gauge fittings, and labels. Department of Transportation (DOT) regulations cover materials and transportation. General safety procedures for the handling, storage, and use of compressed gas cylinders involves the following:

Do not remove the cylinder cap until the cylinder has been secured at the point of use.

Be sure that the valve and fixture assembly are not damaged.

Cylinders, full or empty, should be securely strapped in an upright position.

Mark all empty cylinders as "empty" or "MT."

Do not roll cylinders or permit them to drop. Always transport them on a hand truck, firmly secured.

Be especially careful with cylinders of corrosives (e.g., hydrogen chloride) as the entire valve can come off if improperly maintained.

Provide training on the installation and use of fittings, valves, and regulator mechanisms.

Should there be a suspected leak, it is suggested that all cylinder and regulator valves be closed and the packing nut tightened if applicable. If the leak continues, the supplier should be notified and the following emergency procedures initiated:

If the leak is minor, secure the cylinder next to a fume hood.

If the leak is major, evacuate individuals from the area and call Campus Security (**4-2911**). Perform appropriate procedures for personal injury or fire as described in UNO's Telephone directory.

10. Emergency Response - When a spill or accident occurs involving chemicals, follow Emergency Procedures in the *Chemical Safety Manual*.

a. Accidents Involving Personal Injury - For minor cuts, burns, etc; keep a standard first aid kit available and follow first-aid procedures. If necessary, follow up with care at Student Health Services. **Report all injuries on Report of Injury forms in Appendix 1.** *This includes those injuries treated by first aid even if no other action was warranted.*

For major injury or medical emergencies, call 4-2911. Assist victims and administer first aid. DO NOT attempt to transport victim to hospital. Call 4-2911 and request an ambulance. **Report all injuries on Report of Injury forms in Appendix 1.**

b. Fire and Fire Related Emergencies

Small fires

- Call 4-2911 **even if you think you can put out the fire.**
- attempt to extinguish with the laboratory portable fire extinguisher.

For a large, possibly rapid spreading fire, do the following:

- Call 4-2911 from a safe area.
- Activate the building alarm.
- Evacuate the building, shutting doors and providing assistance to other building occupants on the way out.
- Provide fire and police officials with information about the incident upon their arrival.

c. Small Spill Supplies - In laboratory settings, it is mandatory that appropriate equipment be available for responding to and containing spills as well as for attending to injuries. A first aid kit, emergency eye wash, safety shower, and a specific type of fire extinguisher are required. Recommended materials for containing spills include a smothering and damming material (sand), neutralizing agents (sodium carbonate and sodium bisulfate), and an absorbent (diatomaceous earth). Each laboratory must have ready access to these laboratory spill control items.

d. Large Spill Response - If it is determined that the amount and/or hazardous nature of a spill is beyond the ability of lab workers to respond safely, vacate the area immediately, activate the nearest "fire alarm," and evacuate the building. If there is an emergency telephone available, dial 4-2911 and advise the Campus Security Dispatcher what type of chemical(s) was spilled, amount spilled, exact location of spill/fire/injuries (building, room number, etc.). For more specific information, refer to the section on Chemical Spills in the *Chemical Safety Manual*.

Because chemical spills of varying size must be reported to a regulatory agency, always notify EHS (4-3921) when a chemical spill has occurred.

D. Control Measures

1. Departmental Administrative Controls - UNO units should carry out administrative controls to reduce or eliminate risks associated with the use of chemicals. They include the following:

- Follow standard laboratory procedures and laboratory practices for chemical safety, personal safety, and housekeeping.
- Provide adequate training for working safely with chemicals. (See Information and Training section.)
- Place placards and warning signs to identify hazardous areas.
- If necessary, restrict access to areas where hazardous materials are used.
- Provide adequate labels on all chemicals (in accordance with the Chemical Safety Manual, Section A-3) and maintain the required chemical inventory.
- Allow processes that produce nuisance odors to be done only after typical office hours (when practical), when most of the people have left the building.
- Post Room Labels as directed in the Chemical Safety Manual, Section A-3, on entrances to all areas where hazardous materials are present.
- Post laboratory chemical inventory in the vicinity of the entrance door or annotate location of lists on door label.

2. Engineering Controls - Engineering controls relate to the physical design and operation of laboratory equipment to eliminate hazards associated with the use of chemicals. Engineering control provisions include:

- Local and general exhaust ventilation (chemical fume hood, biosafety cabinet, washdown hood, etc.).

- Physical isolation of the operator or the process (laboratory storage rooms, research room isolation, equipment isolation).
- Equipment and process design.
- Services (water, gas, electricity, etc.) design and operation.
- **Call the Facilities Service Desk (4-3600) for reporting services or maintenance related to utilities or chemical fume hood operation.**

a. Laboratory Fume Hoods - The laboratory chemical fume hood is designed to remove harmful vapors from chemicals and prevent their escape into the general laboratory atmosphere. The chemical fume hood also provides containment of chemicals and their reactions. Procedures for the operation of a chemical fume hood are as follows:

- The hood sash should be as low as practical during use. The hood shield is a limited safety shield, and 18 inches is the maximum opening recommended. EHS will place a label next to the sash to indicate the date the hood was tested.
- In general, fume hoods should not be used with the sash fully open.
- Exhaust rates over 150 feet per minute will cause air turbulence in the fume hood and possible release of vapors into the laboratory.
- The minimum exhaust rate should be at least 80 feet per minute at full open sash to capture and effectively remove harmful vapors in a chemical fume hood, or at 100 feet per minute for radioactive fume hoods. When using a carcinogen, the fume hood exhaust rate should be at least 125 feet per minute. Other special use exhaust hoods will be considered separately.
- All apparatus and chemicals should be kept at least 6 inches from the face of the hood to permit adequate capture of vapors.
- If there is a chance of explosion, always use an effective protective barrier. The sash is not an effective barrier.
- Unless absolutely necessary, do not use the hood as a storage site for chemicals or apparatus. Keep these items in their proper storage areas.
- Take steps to keep airflow unrestricted and effective. Overcrowding and poor apparatus design can reduce the effectiveness of the hood.
- Keep laboratory airflow (fans, air conditioners, etc.) from interfering with the containment of fume hood exhaust. Prevent excessive foot traffic near the fume hood opening.
- Verify, if necessary, with Facilities Management that baffle openings are proper. Do not block airflow through the fume hood's rear, lower baffle.
- Fume hoods are routinely monitored by EHS. If there are indications that a fume hood is not performing properly, call EHS (4-2239) to have the hood tested.

b. Perchloric Acid Fume Hoods - Perchloric acid should only be used in a specially designed wash down hood. Perchloric acid crystals can accumulate and become an explosion hazard. Therefore, it is necessary that only a wash down hood with a wash down exhaust system be used for this chemical. The following procedures are required for the use of perchloric acid:

- Identify perchloric acid fume hoods with proper warning and use signs. Similarly, all perchloric acid exhaust duct work should have appropriate caution and procedural signs.
- Do not use the perchloric acid fume hood as a general chemical fume hood.
- All apparatus and lubricants should be free of oxidizable organic material. No organic material should be used in the hood.
- A wash-down after each use of perchloric acid is required. It may be necessary to remove the lower hood baffle and wash away the residual deposits.
- Perchloric acid containers should not be stored in the hood. Once perchloric acid is opened the container should be placed into a glass container or glass tray so that none of the chemical content drips onto the open shelf.

c. Radiological Hoods - This type of equipment is important in the use of some radionuclides. See the Radiation Safety Manual of the Biology Department for specific requirements.

d. Biological Safety Cabinets - This type of equipment is important in the use of some biological hazards. General information can be found in *Industrial Ventilation*, 22nd (or most current) edition. Contact EHS for further information.

e. Laboratory Utility Services - Laboratory utility services are essential to the proper use, storage, and handling of chemicals. Electricity, water, sewer, ventilation, temperature control, and other utilities are necessary for conducting activities in the laboratory. Design, construction materials, and maintenance are the responsibility of Facilities Management. However, it is important that laboratory personnel follow all procedures for the use of utilities and recognize and report deficiencies.

3. **Housekeeping** - Laboratory units are required to keep their work and storage areas as neat and clean as possible (i.e., non-crowded, non-cluttered, clean areas). Disposal of unused equipment or chemicals should be accomplished promptly. The objective is to ensure proper storage of all items in the laboratory and workplace where chemicals are used.

4. **Laboratory and Working Area Inspections** - Chemical work areas, equipment operation, and safety procedures should be periodically reviewed through a routine departmental unit safety inspection. The inspection should be a formal review of designated items to ensure a safe working environment. The following types and frequencies of inspections are suggested:

- Routine laboratory inspections, which should include chemical and general safety procedures and housekeeping. (LSO - quarterly, CHO - annually)
- Eyewash functioning properly. (LSO - monthly)
- Safety shower function. (LSO - annually, or as necessary to ensure safe operation)
- Respirator fit testing and maintenance. (EHS - qualitative, annually)
- Respirator fit check (positive and negative) before each use. (USER)
- Laboratory fire extinguisher visual and weight. (CONTRACTOR - annually)
- Chemical fume hood tests and certification. (EHS - every six months)
- Utility maintenance. (Facilities Management - as required)
- Occasionally, EHS and Departmental Laboratory Safety Officers will conduct routine safety audits in laboratories and work areas at times other than those listed above. These audits are to assist campus units in complying with the requirements of the CHP. A copy of the audit form(s) used by EHS is included as Appendix 2 at the end of this section.

5. Personal Protective Apparel and Equipment - Personal protective equipment (PPE) is available to employees as described in the *Personal Protective Equipment Program*. Contact the area Safety Committee representative or EHS for details. Descriptions of typical PPE items follows:

- Respirators - Where engineering controls are not sufficient to remove air contaminants in a designated work area, employees/students may be required to wear a respirator. Respirators shall be used as specified in the *Respiratory Protection Program*, including approvals, exams, training, fit testing, etc. Contact the area Safety Committee representative or EHS for details.
- Eye Protection - Safety glasses may be required where there is a risk of flying projectiles. (Working with compressed gasses for example.) If necessary, permanent side shields may be provided.
- Face Shields - Where there is risk from projectiles, chemicals, or radiant energy, a face shield is recommended in addition to goggles.
- Safety Goggles - To protect the eyes from chemical vapors, mists, sprays, splashes, or dusts, it is required to wear eye goggles in the laboratory when any of these hazards exist. It should be noted that it may be necessary to combine various eye protection items to give complete eye protection to the individual working in an environment with multiple risks.
- Hand Protection - There are numerous kinds of physical and chemical environments necessitating a specific kind of hand protection. Many chemicals can be readily absorbed through the skin, so appropriate protection is necessary. Choose the type of glove with the specific chemical in mind. Wash gloves after each use and inspect frequently for wear. Many individuals prefer to throw away used gloves.

- Body Protection - To protect employees from accidental spills, splashes, or other dispersions, body-protection apparel is required. There are specific textured laboratory coats and coveralls designed to provide adequate protection from the risk of working under these conditions. Laboratory coats should be laundered frequently. Most coveralls are disposable and need to be discarded when protection is no longer assured. Rubber suits and some heavier coveralls can be washed after each use.
- Foot Protection - It is mandatory that a shoe which covers the entire foot be worn by personnel in laboratories. Bare feet, sandals, and open-toed shoes are not permitted when working with chemicals.

6. Safety Equipment

a. Safety Shields/Containment - If in an open container, chemicals that volatilize at room temperatures or lower should be used under a fume hood. If spattering or other release is expected, the fume hood sashes should be drawn and the operator should use a face shield, glove box, or other device for protection. Explosive chemicals require specific safety shields and/or containment.

b. Eyewash/Safety Shower - An accessible, working eyewash and safety shower are required for every chemical laboratory. A safety shower must be readily accessible from the laboratory.

c. Fire Extinguishers - Every laboratory must have a working, annually-inspected fire extinguisher (either carbon dioxide or dry chemical or both). Pressurized water extinguishers should not be located in a chemical laboratory.

d. First Aid Kits - A properly stocked first aid kit should be readily accessible to laboratories (kept in chemical storerooms). It is recommended that all laboratory teaching assistants and at least one person in each department/unit be trained in first aid and CPR.

e. Spill Kits - Chemical spill kits should be readily accessible to laboratories (kept in chemical storerooms and Hazardous Waste Accumulation Areas) to contain and clean up spilled chemicals. Commercial spill control kits or specially designed kits are acceptable. Given below is an example of equipment recommended for use in a **general spill kit** for chemical spills of up to 4 liters.

- One plastic five-gallon bucket with lid. The bucket should be labeled "Chemical Spill Kit."
- Twenty pounds (about three gallons) of absorbent (diatomaceous earth) in a sealed plastic bag.
- A plastic brush about five inches wide. (inert, non-sparking)
- A plastic scoop about five inches wide. (inert, non-sparking)
- One or two pair of Silver Shield[®] gloves.
- One or two sets of goggles.
- One heavy poly bag.

7. General Spill Procedures

a. Small Spill - Consult the Material Safety Data Sheet on file in the area for the chemical spilled if the hazards of the chemical are unknown, and determine if the spill can be contained using the spill kit. If the spill cannot be contained, evacuate the area and call EHS (4-3921) or Campus Security (4-2911) for assistance. If the spill can be contained using the spill kit, immediately put on the gloves and goggles. Pour the absorbant from the bag around the perimeter of the spill to prevent the spill from spreading. Use the plastic scoop and brush to work the absorbant into the spilled material. Add more absorbant as needed to contain and clean up the spill. Twenty (20) pounds of diatomaceous earth should be adequate to absorb most 4-liter spills. Use the scoop and brush to collect the contaminated absorbant and place it inside the heavy poly bag. Remove as much air as possible from the bag and seal. Place the sealed bag into the five gallon bucket (if possible). Place any other contaminated items such as glass, gloves, etc., in the bucket. Seal the bucket and call EHS (4-3921) for disposal.

b. Large Spill - Refer to *Chemical Safety Manual*, Section B-7.

8. **Storage** - Flammable-liquid storage cabinets must be provided when volumes of flammable liquids between 4 liters and 40 liters cannot be stored in an approved safety container. Volumes greater than 40 liters must be stored in a flammable liquid storage cabinet. Large quantities of chemicals must be stored in specifically designed rooms that meet health, safety, and fire regulations. Refrigerators for the storage of chemicals must be designed for flammable materials.

9. **Mercury Handling and Spill Procedures** - There are various mercury containing instruments throughout the campus and some mercury compounds are used in laboratory work. Accidentally released/spilled mercury will continually give off vapors that can be absorbed through the skin. The absorbed mercury is a poison and effects the central nervous system. The poisoning can be progressive unless the mercury is removed from the environment. EHS has one electrical vacuum and one hand pump designed specifically for cleaning up mercury spills. It is important that individuals involved in a mercury spill quickly isolate the area so that no exposure or tracking from the spill occurs. Please adhere to the following procedures when a mercury spill occurs:

Isolate the area of the spill by placing chairs, or other items, and tying tape or string in between to interrupt traffic. A make shift sign to note "mercury spill" is suggested. Call EHS immediately at 4-3921 and continue to monitor the area of the spill until clean up activities begin.

- Place all broken apparatus that contains mercury in a sealed container for pick up by EHS.
- Mercury is a metal that can be reclaimed and recycled, however the clean up of the spilled mercury constitutes a health risk.

Note: It is suggested that mercury instruments or mercury chemicals not be used in carpeted areas. Spilled mercury on carpet cannot be vacuumed. Always keep mercury in tightly closed containers and stored in secondary containers. Occasionally, mercury compounds are used in

fungicides. These mercury compounds are likewise a long term health risk and areas of application should be well ventilated before entrance.

E. Employee Information and Training Topics

1. Required Employee Information and Training Topics - UNO requires that individuals working with hazardous materials be informed of the types and levels of hazards of these materials. In addition, they must receive practical training in all aspects of the safe use of these substances, including the response to emergencies. Persons working in the proximity of (but not directly with) hazardous materials or other dangers should be trained to a level of awareness commensurate with use (i.e., employees should be trained about the dangers of mutagens stored in a common fridge, even if they don't use the material themselves.) The information and training must be provided when individuals are initially assigned to an area where chemicals are present and prior to assignments involving new hazardous chemicals and/or new work procedures. Departments, and, ultimately, the supervisor(s) are responsible for providing the following required information and training to their employees, and although not specifically required by OSHA, to students:

- The Hazard Communication Standards (29 CFR 1910.1200).
- The location and availability of the Chemical Hygiene Plan.
- The location and availability of known reference materials, including Material Safety Data Sheets (MSDS), on the hazards and associated safety practices (safe handling, storage, and disposal).
- The permissible exposure limits (PELs) of OSHA-regulated chemicals and recommended exposure limits to nonregulated materials. (Available through EHS.)
- The signs and symptoms associated with exposure to chemicals.
- Measures that employees can take to protect themselves (including PPE, SOPs, emergency procedures, and control measures).
- Physical and health hazards of chemicals in the workplace.
- Methods to detect the presence or release of chemicals.

Although not required by regulation, it is recommended that annual training include items discovered during routine audits. Inclusion of this information will ensure value added annual training.

2. Training Documentation - For training that is specified under this plan, those departments' supervisors will be responsible for documenting the training. The documentation must be retained for various regulatory purposes. The UNO CHP Training Form, Appendix 3 at the end of this section, may be used for documenting training within the department.

3. Hazard Communication - It is important that a means of transmitting health and safety information on chemicals be provided. The Material Safety Data Sheet (MSDS) is included as the key document in the OSHA Hazard Communication Standard, along with the container label, to provide information to users of chemicals.

a. Material Safety Data Sheets - Material Safety Data Sheet (MSDS) is a readily available source of information for individual hazardous chemicals and is the basis for obtaining information and serves as a supplement to the training program. The MSDS must be available for employees and students to review before beginning each chemical use activity. MSDSs are readily available from each location on campus using hazardous chemicals. If it is not available, campus units must notify the manufacturer of the chemical to obtain an MSDS. If unable to secure a MSDS, contact EHS (4-3921) for assistance.

b. Precautionary Labels - A precautionary label is concise information that must be affixed to each container of hazardous material. The Hazard Communication Standard requires the use of warning labels where hazardous substances are used.

Note: Specific mandatory chemical labeling guidelines are available in the *Chemical Safety Manual*, Section A-3.

F. Medical Consultation and Medical Evaluations

1. Examinations

All employees who work with hazardous chemicals are provided 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 develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory, the employee 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 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 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 employee, without loss of pay and at a reasonable time and place.

2. Information provided to the physician

The responsible campus unit (with assistance from EHS) shall provide the following information to the physician:

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

3. Physicians written opinion

For examination of consultation required under this standard, the employer 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 at increased risk as a result of exposure to a hazardous chemical found in the workplace; and
- A statement that the employee 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 or diagnoses unrelated to occupational exposure.

4. Where to go and what to report

Employees who suspect or who indicate signs or symptoms from possible exposure will be initially referred to UNO Health Services for medical surveillance (if exposure was not acute).

- If there is an acute exposure/accidental injury, employees should be transported directly to the Emergency Room for care.
- In all cases where employees who may have been exposed have sought medical care, the UNO "Supervisor's Report of Employee Injury" must be filled out.

If an employee reports to UNO Health Services for medical surveillance other than in an emergency situation, the following information must be provided as a supplement to the UNO Supervisor's Report of Employee Injury and given to the physician for review:

- Identify chemicals being used by the individual and specify those suspected to be involved in the exposure incident.
- A copy of the MSDS for each chemical suspected to be involved in the exposure incident is helpful.
- Measurements from EHS monitoring or other information should be included in the report to indicate how the exposure may have occurred.

- A description of the signs and symptoms as they relate to the exposure. The duration of time, onset of symptoms, and other supporting information about the incident is helpful.

[Blank SOP Forms](#)

[Appendix 1: Report of Injury Appendix](#)

[Appendix 2: Lab Safety Survey Appendix](#)

[Appendix 3: Chemical Hygiene Training Form Appendix](#)