

CHEMICAL HYGIENE PLAN

University of Wisconsin - Superior
Superior, Wisconsin

Original: February 1, 1995

Last Revised December 2012

If you need additional assistance with any of the information included in this Plan, please refer to the references cited in Section I or contact the Chemical Hygiene Officer.

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SECTION A

PROGRAM ADMINISTRATION AND MANAGEMENT

INTRODUCTION

PURPOSE

This Chemical Hygiene Plan has been developed for the University of Wisconsin-Superior and has the following purposes:

- To provide a safe working environment for laboratory staff, students and frequenters, free from the health and physical hazards associated with the laboratory use of chemicals.
- To limit chemical exposures to laboratory staff and students to below the permissible exposure limits (PELS) as defined by OSHA in 29 CFR 1910 Subpart Z, or alternately, the ACGIH TLVs or NIOSH RELs.
- To comply with OSHA Laboratory Standard as required by Wisconsin Administrative Code Chapter SPS 332, and 29 CFR 1910.1450, and the Employee Right to Know requirements of Wisconsin (Wis. Statute 101.58) and OSHA (29 CFR 1910.1200).

REGULATORY AUTHORITY

In January, 1990, OSHA's new Laboratory Standard became a law. Officially known as 29 CFR 1910.1450, Occupational Exposures to Hazardous Chemicals in Laboratories, the standard is written to regulate laboratories in the private sector. The law became effective May 1, 1990, and all private-sector employers are expected to have a Chemical Hygiene Plan developed and implemented by January 31, 1991.

In the State of Wisconsin, State facilities are regulated by the Department of Safety and Professional Services (DPSP) Safety and Building Division. The Wisconsin DPSP adopted the OSHA Laboratory Standard as of April 1, 1991, and has the authority to regulate the OSHA Lab Standard, the Wisconsin Employee Right to Know Law (Wisconsin statute 101.58) and the Federal Hazard Communication Standard (Federal Employee Right to Know) 29 CFR 1910.1200 under Wisconsin Administrative Code SPS 332, Public Employee Safety and Health.

It is mandatory that all University laboratories comply with this standard. All faculty, staff, student employees, frequenters (university support staff who frequent the labs, students in academic laboratories) and outside contractors are covered by this Laboratory Standard and hazard communication standard.

SCOPE

The Lab Standard applies to all University of Wisconsin-Superior laboratories that meet the following criteria:

- Chemical manipulations are carried out on a laboratory scale (the containers are easily and safely handled by one person).
- Multiple chemical procedures are used.
- Procedures are not part of a production process.
- Protective lab practices and equipment are in use.

The use of commercially prepared "kits" (includes all reagents and materials, such as pregnancy or water test kits) or chemically impregnated test media such as dip-and-read strips, are excluded from the requirements of the Lab Standard. Any process that does not meet the above criteria is regulated by SPS 332 or OSHA General Industry Codes, 29 CFR 1910 rather than the Laboratory Standard.

At UW-Superior, the following laboratories will comply with this Chemical Hygiene Plan:

- All academic Biology, Chemistry and Physics laboratories.
- All research laboratories, including field, remote or temporary labs. The laboratory aboard the LL Smith is included.
- All laboratory courses using chemicals offered through extension or by special arrangement with the University.

At UW-Superior, the following activities do not meet the criteria of a laboratory under the Laboratory Standard and are excluded from the requirements of this Chemical Hygiene Plan:

- All University Darkrooms, excluding those used for the Biology, Chemistry, Physics or LSRI. Darkrooms consist of a process and are covered by the General Industry Standards.
- The Fine Arts "laboratories" or studios do not meet the criteria of a laboratory and are best covered by the General Industry Standards.

PROVISIONS OF THE LAB STANDARD

To comply with this standard, DPSP/OSHA has defined 7 conditions the lab must meet.

- The lab will determine if employees are exposed to any chemicals regulated by a standard that requires monitoring. If so, the UW-Superior Chemical Hygiene Officer must determine the levels of exposure, and take corrective actions.
- A Chemical Hygiene Plan (CHP) must be developed and implemented.
- Employees and frequenters must be informed of the hazards in the workplace and must be trained to recognize the hazards and their effects.
- Employees who have been exposed to chemicals above acceptable limits must have the opportunity to seek medical attention or consultation at the employers expense.
- Hazards in the laboratory must be clearly identified.
- Respirators may be used to control exposures.
- The employer must maintain accurate records of any measurements of employee exposures and any medical exams or consultations.

REQUIREMENTS OF A CHEMICAL HYGIENE PLAN

The Chemical Hygiene Plan (CHP) is a detailed plan of operation for the laboratory. The Lab Standard requires the CHP to contain the following:

- UW-Superior has developed and implemented a written plan which is capable of protecting employees from health hazards associated with hazardous chemicals in the laboratory. This plan must be capable of keeping exposures below the limits specified in 29 CFR 1910 subpart Z.
- Standard operating procedures relevant to safety and health.
- Criteria used to determine if hazards exist and methods to implement appropriate control of the hazards.
- Fume hoods and other protective equipment must be performing properly and checked at regular intervals.
- Provision must be made for employee training and information.
- There must be a written procedure defining circumstances under which a lab operation will require authorization before proceeding.
- There must be provisions for medical consultations and exams.

- A Chemical Hygiene Officer must be designated and the level of authority established.
- Provisions must be made for additional employee protection when working with particularly hazardous substances, including carcinogens and reproductive toxins.
- The Plan must be readily available to all employees.
- The Plan should be reviewed at least annually, and updated as necessary. (see Section A, Appendix B)

On the University of Wisconsin-Superior Campus, there will be one Master Chemical Hygiene Plan that includes the Standard Operating Procedures relevant to safety and health for all departments. This will be maintained by the University Chemical Hygiene Officer.

Each department will maintain a copy of the Chemical Hygiene Plan that includes department-specific Standard Operating Procedures relevant to safety and health.

AVAILABILITY OF THE PLAN

A copy of this UW-Superior Chemical Hygiene Plan will be made available to all UW-Superior employees upon request. Employees should direct their requests to the Department Chemical Safety Officer. Copies will be made available upon written request for non-employees of UW-Superior and the representatives of any employee through the Environmental Health & Safety Director, Chemical Hygiene Officer or University Safety Officer.

AVAILABILITY OF THE STATE AND FEDERAL STANDARDS

Copies of the Laboratory Standard (SPS 332/1910.1450), Wisconsin Employee Right to Know Statute (Wis. Stat. 101.58), Hazard Communication Standard (SPS 332/1910.1200) and the Wisconsin "Safe Place Statute (Wis. Stat. 101.11) can be found in Section A Appendix C.

MANAGEMENT STRUCTURE

The Chancellor of the University of Wisconsin-Superior campus, (as the employer) will appoint a Chemical Hygiene Officer (**CHO**) to act as his/her representative in all matters pertaining to the laboratory use of chemicals.

The Chemical Hygiene Officer will be under the supervision of the Vice Chancellor.

Chemical Safety Officers (**CSO**) will be appointed by the Department Chair or Dean of the College for each department that uses chemicals on a laboratory scale.

The Chemical Hygiene Committee will be a sub-committee of the University of Wisconsin Environmental Health and Safety Committee.

See Section A, Appendix A for identification of the Chemical Hygiene Officer and Chemical Safety Officers.

CHEMICAL HYGIENE OFFICER

The University of Wisconsin-Superior Chemical Hygiene Officer (CHO) will have the responsibility of developing, implementing and maintaining a written Chemical Hygiene Plan. The CHO will interact with staff at all levels to promote a safe and healthy laboratory environment for staff and students.

To accomplish this, the CHO will have the following level of authority:

- To immediately suspend an operation or practice that poses an imminent threat to the health or safety of the staff, students or visitors in the area or the physical structure.
- To limit the purchase of chemicals in excess quantities or if surpluses are presently inventoried.
- To remove from use any equipment or processes that present a severe safety hazard.
- To discuss the actions of staff, students with their supervisors for corrective actions.

The CHO will attempt to remedy any conflicts between department personnel in regard to health and safety concerns and attempt to find solutions to existing problems.

However, repeated and deliberate disregard for safe work practices or the health and safety of others will not be tolerated. If the situation cannot be effectively remedied through mutual discussions, stronger actions will be taken at the next highest supervisory level.

The duties of the UW-Superior CHO shall include (but will not be limited to):

- Develop, maintain and implement a Master Chemical Hygiene Plan.
- Maintain records of:
 - employee training
 - employee exposure monitoring, and medical consultations
 - chemical inventory and MSDS archives
 - safety equipment servicing and testing.
- Provide guidance, training and information to the CSO's
- Identification and correction of chemical and physical hazards.
- Assess employee chemical exposure potential and conduct personal monitoring as needed.

- Conduct laboratory safety audits.
- Review training and procedures used by the departments.
- Assist with hazardous waste identification and the laboratory bio-safety program.
- Review equipment purchases for safety concerns.
- Retains the overall responsibility for maintaining chemical inventories at reasonable levels.
- Provide for the measurement of hood face velocities.
- Chair the UW-Superior Chemical Hygiene Committee.
- Conduct accident and chemical spill investigations in cooperation with the University Safety Officer.

DEPARTMENT CHEMICAL SAFETY OFFICERS

The Chemical Safety Officer (**CSO**) will oversee the day-to-day management of the Chemical Hygiene Plan within the department, interact between the Chemical Hygiene Officer and the department and be a member of the UW-Superior Chemical Hygiene Committee. The CSO retains the responsibility even if duties are delegated to other personnel.

The responsibilities of the CSO include:

- Maintain an accurate chemical inventory that is updated at least annually. Copies are submitted to the CHO.
- Work with the department staff and the CHO in the development of SOP's to be used within the department.
- Maintain the departments MSDS file.
- Provide staff/student training as needed.
- Identify chemical and physical hazards and take corrective actions, if necessary with the aid of the CHO.
- Oversee the department's hazardous waste collection.
- Ensure that staff and students work within the scope of the Chemical Hygiene Plan developed for the department.
- Ensure that personal protective equipment is used as needed.
- Attend meetings of the Chemical Hygiene Committee.

Conflicts between the staff and the CSO may be taken to the Department Chair, Dean of the College or to the Chemical Hygiene Officer for resolution.

SUPERVISORS

Laboratory supervisors will have the following responsibilities:

- Ensure that training has been conducted prior to the initiation of the work.
- Identify potential hazards and take corrective actions.
- Enforce the use of appropriate personal protective equipment and safe work practices.
- Ensure that work is conducted within the scope of the CHP.

STAFF AND STUDENTS

Each laboratory employee and student has the following responsibilities:

- Attend training sessions as recommended.
- Conduct the work in a manner that will not threaten the health and safety of the employee or of others.
- Use the personal protective equipment where and when required.
- Identify laboratory and health hazards and bring them to the attention of the laboratory supervisor or CSO.
- Conduct work within the scope of the SOPs and CHP developed for the department or lab.

DEPARTMENTAL REQUIREMENTS

Each department will be required to develop and document the following standard operating procedures relevant to safety and health:

- A description of the procedures used to update the inventory, including the frequency. A copy of the most current chemical inventory for the department shall be kept in the Chemical Hygiene Plan.
- Identification of processes and conditions that will require prior approval before initiation. This must include who will review the process.
- Documentation of the training and frequency to be conducted for employees and students.
- Chemical ordering procedures.
- Identification of chemical storage areas and high hazard areas within the department.
- Outline the procedure for procuring MSDSs, and their accessibility to students and staff.
- A description of the required laboratory apparel for the department employees.

Section A

Appendix A

Identification of Chemical Hygiene Officer and Chemical Safety Officers

**CHEMICAL HYGIENE OFFICER AND CHEMICAL SAFETY OFFICERS
University of Wisconsin-Superior**

Effective Dates: From: 1/1/1995 To: Present

The individual identified below has been appointed as Chemical Hygiene Officer for the dates listed above.

Name: Carol Lindberg, CIH
 Environmental Health and Safety Director

Phone: 715-394-8073 (ext. 8073)

Department Chemical Safety Officers are not named in this web version.

SECTION A

APPENDIX B

ANNUAL CHEMICAL HYGIENE PLAN REVIEW

ANNUAL CHEMICAL HYGIENE PLAN REVIEW

The University of Wisconsin-Superior Chemical Hygiene Plan is required to undergo at least an annual review. The complete edit record is not available in this web version. Please see the summary below. For more information contact the Chemical Hygiene Officer.

Summary of Revision History

The February 1, 1995 version of the UW Superior Chemical Hygiene Plan replaced the previous May 1, 1993 version. The February 1, 1995 version contains minor revisions to some of the text entries and incorporates changes that result from (a) converting from a Division administrative structure to the College of Arts and Sciences and (b) expanded sections that apply to frequenters and students in academic programs. The Plan has had minor updates as needed since this 1995 version, including:

Edited sections of this document through December 2012 include:

- Changed any references of “industrial hygienist” (IH) to Environmental Health and Safety and changed any associated phone numbers by either eliminating them or a change to ext. 8073. (2002)
- Changed any references to (campus) Security to Campus Safety and their phone number to ext. 8114. (2003)
- Changed references to Wisconsin Department of Industry, Labor and Human Relations (DILHR) (also Department of Commerce-2004) to Wisconsin Department of Safety and Professional Services (2012).
- Changed code references from ILHR 32 (Comm 32) to SPS 332 Public Employee Safety and Health (2012)
- Created a web version that omits personal information and specific department information (December, 2012).

SECTION A

APPENDIX C

WISCONSIN AND FEDERAL STANDARDS

Wisconsin and Federal Regulations Affecting Laboratory Safety
Web Version

[Wisconsin Public Employee Safety and Health](#), Chapter 332 of the Wis. Administrative Code

[Occupational Exposure to Hazardous Chemicals in Laboratories](#) (Laboratory Standard).
Occupational Health and Safety Administration, 29 CFR 1910.1450

[Hazard Communication Standard](#). Occupational Health and Safety Administration, 29 CFR
1910.1200

[Personal Protective Equipment](#). Occupational Health and Safety Administration, 29 CFR 1910
Subpart I.

[Wisconsin Safety Eyewear Statute](#) Wisconsin Statute 255.30

[Wisconsin Permissible Exposure Limits](#) (PELs)

[Wisconsin Employee Right to Know Statute](#) (Wis. Stat. 101.58),

[Wisconsin "Safe Place Statute](#) (Wis. Stat. 101.11)

SECTION B

EMPLOYEE/STUDENT INFORMATION AND TRAINING

HAZARD COMMUNICATION

UW-Superior staff and student employees are subject to the training and information requirements of the Wisconsin Employee Right-to-Know standard (Wis. Stats. 101.58), the OSHA Hazard Communication standard (SPS 332/1910.1200) and the OSHA Laboratory Standard (SPS 332/1910.1450) as these occupational standards have been adopted by the State of Wisconsin under Wisconsin Administrative Code Chapter SPS 332. Students, guests and other frequenters of our campus are subject to the Wisconsin "Safe Place" statute (Wis. Stats. 101.11).

REQUIREMENTS OF THE STANDARDS

The occupational standards require the employer to inform employees of the hazards of the chemicals used by them or used in their work place. The standard applies to any chemical which is known to be present in the work place under normal use or in a foreseeable emergency. This information is presented to the employees in a program that includes:

- A written hazard communication program.
- A labeling system that indicates the hazards.
- Availability of material safety data sheets (MSDS).
- Training of employees to recognize the hazards and to prevent exposures.

A chemical listed in one of the following sources is considered to be a hazardous chemical and is subject to the requirements of the Hazard Communication Standard:

1. Wisconsin Permissible Exposure Limits
2. ACGIH TLV's for Chemical Substances and Physical Agents in the Work Place (latest edition).
3. NTP Annual Report on Carcinogens (latest edition).
4. IARC Monographs (latest edition)

The written hazard communication program must address the following:

1. The program must be readily available to employees.
2. The program must contain a list of hazardous chemicals known to be present.
3. Include the methods the employer will use to inform and train employees for non-routine tasks.
4. Describe the system of labeling and warnings used.
5. Describe the management and availability of material safety data sheets.
6. Describe employee training and information.

EMPLOYEE/NON-EMPLOYEE TRAINING REQUIREMENTS

EMPLOYEE TRAINING

All staff and student employees will receive a general training in the recognition of the chemical hazards they will encounter in the campus laboratories. This general training will encompass chemical hazards in terms of general classes of compounds that may be encountered in any laboratory. Specific training will be given when new or unusual chemicals are introduced to the laboratory. Additional training will be provided on the applicable details of the Chemical Hygiene Plan.

The methods to be used by the departments to provide training to their employees, students or frequenters will be documented in Appendix A of Section B. Examples of handout materials, training aids, or other materials provided to employees or students is contained in Appendix B of Section B of the Department Chemical Hygiene Plan.

EMPLOYEE TRAINING REQUIREMENTS

Supervisors will be trained by the Department CSO in work place hazard recognition and the methods the employee can use to detect and protect him/her self from unsafe exposures.

Each time a new hazard is introduced into the workplace or upon initial assignment to the work area, the supervisor shall train the employee in the following:

1. How to detect the presence or release of a hazardous chemical. This can include monitoring devices, visual cues, odor detection, etc.
2. The physical and health hazards of the chemicals in the work area.
3. The methods the employee may use to protect themselves from the hazards of the chemical. (safe work practices, personal protective equipment)
4. The details of the Right to know program including an explanation of the labeling system, material safety data sheets and where to find more information.

A general training program that covers a broad range of chemical classes may be used for the initial training. Specific case-by-case training in new hazards should include the following information: (information may be taken from the MSDS)

- A review of the chemical and physical hazards of the chemical.
- A discussion of how the employee can prevent exposure.
- Discussion on where the chemical will be used and by whom.
- Discussion on the personal protective equipment to be used.
- Discussion on waste disposal procedures to be used.
- Discussion of storage procedures.

After completion of a training session, the supervisor should complete a training form, have the employee(s) sign the form acknowledging the training and submit a copy to the department Chemical Safety Officer and the University Chemical Hygiene Officer.

AVAILABILITY OF THE TRAINING PROGRAM

A copy of the training program will be made available to UW Superior staff upon request from the Department Chemical Safety Officer. Copies will be made available upon written request for non-employees of UW-Superior and the representatives of any employee through the Environmental Health & Safety Director, Chemical Hygiene Officer or University Safety Officer.

LIST OF HAZARDOUS CHEMICALS

The chemical inventory of the department will serve as a list of hazardous chemicals that employees can be expected to be in frequent contact with. The chemical inventory may be found in Appendix B of Section D of the Department Chemical Hygiene Plan.

NON-EMPLOYEE STUDENTS AND FREQUENTERS

The hazard communication, employee right-to-know and OSHA laboratory standards are occupational codes that apply only in employer-employee relationships. Since visitors and students on our campus are not employees, these occupational codes cannot be applied. The Wisconsin "Safe Place" statute requires that the University of Wisconsin - Superior provide a safe place for anyone who works or visits on our campus.

Students who are receiving a preparatory training for future careers in the laboratory sciences are more prone to mistakes and injuries than they might be at any other time. Preparing students for future careers not only involves the mechanisms and theories of the science, but also issues such as personal protective equipment used in the trade, proper use of safety equipment, understanding the inherent risks in the career, an understanding of waste generation and management, and how to promote a safe work environment.

Allowing students to engage in hazardous activities without risk communication, proper training or ensuring the use of appropriate personal protective equipment is not an acceptable practice at UW Superior. Curricula will be evaluated by each department that uses hazardous chemicals or biohazardous materials for means in which the department's academic mission can be fulfilled in a safe manner.

Students and other frequenters should be aware that certain activities or career choices will expose them to certain unavoidable risks. The student or frequenter must be made aware of

activities that involve risks and be allowed to choose whether or not he or she is willing to accept the risks.

Risk communication for students or frequenters at UW Superior will be accomplished through the educational process using the following:

- Students and frequenters will be informed on the accessibility of Material Safety Data Sheets and how to seek assistance in interpreting the information.
- Students and frequenters will be instructed on what personal protective equipment and safety equipment will be used and instructed in its use. Students can be required to provide their own personal protective equipment.
- Students and frequenters will be informed of potential hazards through lectures, warning signs or posters, teaching materials, handouts or videos.
- Students and frequenters will be required to use the appropriate personal protective equipment (PPE). If the student or frequenter is unwilling to use the PPE as directed, the student should be directed to leave the laboratory.
- Proper container labeling. Students and frequenters must be able to comprehend the hazards conveyed on the labels.

MATERIAL SAFETY DATA SHEETS

The material safety data sheet, MSDS, is an information sheet prepared by the chemical manufacturer or distributor that contains detailed health and physical hazard information regarding the product.

There are two requirements for MSDSs. The University is required to maintain a master file of MSDSs for all chemical products on campus. This master file is kept by the Environmental Health & Safety Director. In addition, the OSHA Laboratory standard requires laboratories to have MSDSs readily available (in or near the lab) for all the chemicals in use. The MSDSs may be kept in a central stockroom that is readily accessible to all staff and students or a book of MSDSs may be prepared for each lab if a central stockroom is not available.

Material Safety Data Sheets are normally included the first time a product is shipped to the University. Some vendors include the MSDS with each shipment.

If a MSDS is received with the shipment of chemicals, make a copy of the MSDS for your files and forward the original MSDS to the Department Chemical Safety Officer. The Chemical Safety Officer should copy the MSDS for the Department archive and forward the original to the Environmental Health & Safety Director.

Some vendors will send the MSDS either with the invoice or in a separate letter directly to a Campus Office. If the MSDS is not received with the shipment, request a copy of the MSDS from the Environmental Health & Safety Director.

SECTION B

APPENDIX A

DEPARTMENTAL TRAINING PROCEDURE

SECTION B

APPENDIX B

SAMPLE TRAINING MATERIALS

SECTION C

LABELING REQUIREMENTS

LABELING OF CHEMICAL CONTAINERS

All containers holding chemicals substances must be labeled appropriately, including those used long term as well as short term storage. All science departments of the University of Wisconsin-Superior will use the same labeling system for containers of chemicals. If the departments implement additional specific labeling procedures for containers or spaces, they will be documented in Section C Appendix A of the department Chemical Hygiene Plan.

1. Containers used by more than one person or that will be stored or left unattended require a label identifying the contents and the hazards associated with its use and storage.
2. Labels on products from the vendor shall not be removed or defaced until the container is empty.
3. Containers to be reused for holding chemicals must have all old labels removed before reusing the container.
4. Label small containers, such as vials, with the information necessary to identify the contents and store within a larger container. Include the hazard labels on the outside of the storage container.
5. Common names may be used on the label (i.e. Gram Stain, or Nessler Reagent) providing the major components are indicated.
6. Containers that hold a carcinogen or potential carcinogen ($>0.1\%$ concentration), must be labeled with a cancer hazard label.
7. The hazard information is available on the label of the original chemical, on the MSDS or chemical catalog.

Purchased supplies of hazard labels are readily available.

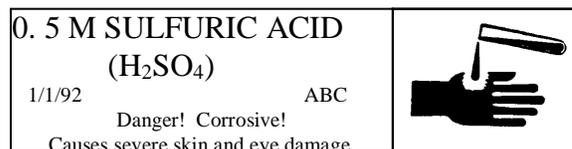
The following information shall be included on all labels:

- A. The **complete chemical name** (no abbreviations). The formula may be added as an option.
- B. **Concentration** & units, if it is not a pure compound.
- C. **Date** of preparation.
- D. **Initials** of the preparer.
- E. **Hazard warnings** to indicate the health and physical hazard(s) of the chemical. Assume that dilutions will have the same hazards as the concentrated material.

Examples of Chemical Labeling

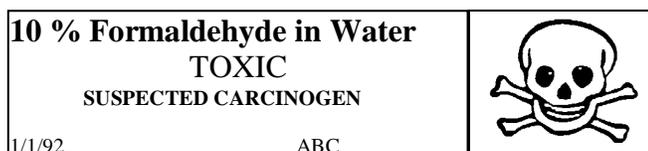
EXAMPLE 1.

Chemical with a single physical hazard.



Example 2.

Chemical with multiple hazards.



IDENTIFYING CHEMICAL STORAGE AREAS

All chemical storage areas should be clearly identified with the appropriate hazard warning labels. Storage areas include:

- Refrigerators and freezers
- Cabinets containing chemicals
- Flammable solvent storage cabinets,
- Acid or base storage cabinets
- Storage rooms

The lettering should be readable for a distance of 20 feet. Diamond-shaped warning signs and symbols may be used in addition to the written designation of the hazard. If the department implements additional specific labeling requirements, they will be documented in Appendix A of Section C. A few specific requirements are listed below.

Refrigerators/freezers

Refrigerators and/or freezers should be labeled as containing hazardous materials or carcinogens. Warnings should be posted as to materials not permitted to be stored in the refrigerator or freezer. Examples are:

**WARNING!
THIS REFRIGERATOR IS NOT APPROVED
FOR FLAMMABLE MATERIAL STORAGE
NO FOOD OR BEVERAGE STORAGE ALLOWED**

**WARNING!
THIS REFRIGERATOR IS APPROVED FOR
FLAMMABLE MATERIAL STORAGE
NO FOOD OR BEVERAGE STORAGE ALLOWED**

Chemical Storage Rooms or Cabinets

**WARNING!
HAZARDOUS CHEMICAL STORAGE
THIS STORAGE AREA MAY CONTAIN CANCER-CAUSING AGENTS**

**WARNING!
CORROSIVE CHEMICAL STORAGE AREA**

Flammable solvents cabinets

FLAMMABLE LIQUIDS NO SMOKING

SECTION C

APPENDIX A

SPECIFIC DEPARTMENT LABELING PROCEDURES

SECTION D

CHEMICAL INVENTORY AND STORAGE

CHEMICAL INVENTORIES

Management of chemical inventories is a critical aspect of the Chemical Hygiene Plan. The presence of a chemical on campus must be managed for ordering, inventorying, disposal, right to know training, employee exposures, and emergencies such as spills and fire.

IT IS AGAINST UNIVERSITY POLICY TO ACCEPT CHEMICALS AS "GIFTS" FROM NON-UNIVERSITY SOURCES WITHOUT THE WRITTEN PERMISSION OF THE UNIVERSITY CHEMICAL HYGIENE OFFICER AND THE DEAN OF THE COLLEGE OF ARTS AND SCIENCES OR OTHER ADMINISTRATIVE OFFICE.

CHEMICAL INVENTORY CONTENTS

All departments will maintain an accurate chemical inventory which is updated at least annually. The procedure(s) used in establishing and maintaining the inventory shall be documented in Appendix A of Section D of the department CHP.

A copy of the chemical inventory shall be kept in Appendix B of Section D of the department CHP. This inventory will represent the list of hazardous chemicals that the employee may have frequent contact with, as required by Wis. Statute 101.58, Employee Right to Know.

At a minimum, each chemical inventory must contain the following fields:

- a. The primary location of the chemical (each area it is stored).
- b. Chemical name
- c. Manufacturer (each manufacturer is inventoried separately.)
- d. Quantity on hand at the time of inventory
- e. Units (pounds, grams, liters, etc.)
- f. Date added to the inventory
- g. Date the chemical is no longer stocked

If a hazardous chemical is no longer stocked, the quantity should be reduced to zero (0) and dated to indicate the last date this chemical was present on the campus. This chemical may be moved to an "inactive" portion of the inventory, but may not be deleted until after the annual submission of the inventory to the CHO.

UPDATING OF THE INVENTORY

The CSO will update the inventory at least annually, and submit a paper copy of the inventory to the CHO on an annual basis.

The CHO will archive a copy of each annual chemical inventory for a period of thirty (30) years as required by the Wisconsin Employee Right to Know code (Wis. Statute 101.58).

AVAILABILITY OF THE INVENTORY

The department's chemical inventory shall be readily available to the CHO. The inventory shall be available to staff members to prevent the excess purchases of chemicals.

CHEMICAL ORDERING

Specific written procedures detailing the process of chemical ordering should be included in Appendix C of Section D of the department chemical hygiene plan.

At minimum, the following steps should be followed prior to the purchase of any chemical:

1. Determine the chemical, quantity and grade required.
2. Determine if a less hazardous substitute is available.
3. Check available inventories to determine if the chemical is currently stocked.
4. Order only the quantity of chemical that will be used within a reasonable length of time, 6 months is recommended, 2 years is acceptable.

RECEIPT OF CHEMICALS

Upon receipt of the chemical, it should be transported to either the chemical storage room in Barstow Rm. 10, or a storage area in the point-of-use laboratory. Storage should be arranged according to hazard class.

Prior to use of the chemical, all Employee Right to Know requirements must be met and proper disposal routes determined.

Upon receipt, apply a stocking label indicating the date of receipt, the quantity received, and the storage code.

Any accompanying material safety data sheets (MSDS) should be photocopied and submitted to the department's Chemical Safety Officer. The original should be sent to the Environmental Health & Safety Director.

CHEMICAL STORAGE BY HAZARD CLASSIFICATION

Chemicals are to be stored according to hazard class in all chemical storage areas. The uniform color-code system developed by the J. T. Baker Chemical Company will be amended for use by all departments. Individual modifications of the color code system used within departments

should be described in Appendix D of Section D of the department Chemical Hygiene Plan.

Many suppliers use a color coding system for chemical storage classification. All of the companies use the color red for flammability, blue for health, and yellow for reactivity as taken from the National Fire Protection Association (NFPA) color code system. Most chemical suppliers use white for contact hazard. Colors for general storage conditions and unusual requirements will vary between manufacturers. A chemical may not always be assigned to the same hazard classes by different suppliers. The J. T. Baker system uses orange to signify general storage. UW Superior will use the color green to indicate general storage conditions.

The goal of any chemical storage classification system is to prevent accidental combination of 2 or more incompatible materials in the same space. Chemicals must be separated by space and even physical barriers to prevent an unwanted reaction. Chemical storage areas should be appropriately labeled.

At a minimum, each department will assign the following color codes to represent the appropriate hazard class of the chemical:

Red	Flammable, flash point of $\leq 100^{\circ}$ F. Store away from ignition sources and corrosive and reactive materials.
Yellow	Reactive. Store separately and away from combustible or flammable materials.
Blue	Health Hazard. Poisonous.
White	Contact hazard. Generally corrosive, but may include skin absorption and irritants.
Green	General Storage. Substances with a rating no higher than 2 in any hazard category.

Storage code colors by other companies should be converted to this system. Each chemical should be labeled with a color code to avoid confusion of colors assigned by other manufacturers.

A department may elect to further segregate incompatible materials within the same storage class by using a striped label of the same color. The materials should be segregated within the storage area.

When a color code has not been assigned by a chemical company, a determination must be made based upon the available information. This may include:

1. Using the highest rating issued by the NFPA or a hazardous material information (HMIS) system as the primary storage code. (NFPA address acute hazards, such as may occur during storage). Ratings of 2 or less in all categories would be considered general storage (Green)
2. Department of Transportation (DOT) classifications are available for most chemicals, and generally reflect acute hazards associated with transportation.
3. Use available reference materials to derive the most appropriate storage code.
4. All flammable materials (flash point $\leq 100^{\circ}$ F) shall be given a red (or red stripe) color code.
5. All oxidizers and reducing agents shall be given a yellow or (yellow stripe) color code.

TRANSPORTATION OF MATERIALS

Materials transported outside of laboratories presents a potential hazard to everyone using the public areas. Should an incident or spill (even water) occur in a public area, needless exposure, injuries and concern may result to an unprotected individual.

TRANSPORTATION BETWEEN LABORATORIES or BUILDINGS:

All chemicals or materials (including water) transported between laboratories or storage areas must be enclosed in a spill-proof chemically compatible secondary container. Coolers and specially designed containers may be used.

The transport container should be:

- able to retain all of the material should a spill occur.
- labeled for "Chemical Use Only" (coolers, boxes, tubs).
- marked with the primary hazard class of the contents.

If the material is not transported in a spill-proof container, then appropriate spill control materials should accompany the material each time it is transported.

Large volumes (greater than 1 gallon) and heavy materials (greater than 40 pounds) should be transported using carts to prevent back injuries and to provide greater protection for the material.

Materials should be transported at a "low traffic" periods (ie not during class changes) whenever

possible. Elevators rather than stairs should be used when transporting materials between floors (freight elevators should be used when possible).

TRANSPORTATION IN MOTOR VEHICLES ON PUBLIC ROADWAYS

The transportation of hazardous materials or hazardous wastes in public roadways is governed by the Department of Transportation (DOT). All materials being transported must be packaged according to DOT regulations, and may require placarding of the vehicle and a DOT license to transport materials. The scope of detailing the requirements of hazardous materials transportation on public roadways is too great to be covered in this Chemical Hygiene Plan. If hazardous materials are to be transported off site on public roadways, case-by-case information should be sought from the Campus Safety Officer, Chemical Hygiene Officer or Environmental Health & Safety Director.

If materials are transported in a vehicle, they should be stored in the trunk, away from the drivers compartment. The materials should be within a spill proof sealed container labeled with its contents and quantity and the appropriate spill control materials should accompany the transfer.

The driver should be aware of procedures to be followed in the event of an accident involving the hazardous material, including emergency procedures and the notification of officials of a hazardous materials release.

SECTION D

APPENDIX A

DEPARTMENT CHEMICAL INVENTORY PROCEDURES

SECTION D

APPENDIX B

DEPARTMENT CHEMICAL INVENTORY

SECTION D

APPENDIX C

DEPARTMENT CHEMICAL ORDERING PROCEDURES

SECTION D

APPENDIX D

AMENDMENTS TO CHEMICAL STORAGE CLASSIFICATION

SECTION E

PROTECTIVE EQUIPMENT

LABORATORY HOODS

Hoods are probably the most frequently used and often the most abused pieces of safety equipment found in the laboratory. If used properly, the hood can significantly reduce employee exposures.

The required face velocity for a laboratory hood, as specified by SPS 332, is 100 feet per minute (fpm) with the sash completely open if the hood is not equipped with a face velocity monitor. If the hood is equipped with a face velocity monitor, the face velocity must be 100 fpm at the sash operating height.

RECOMMENDED USE OF THE HOOD

1. A hood must be used when working with a volatile chemical with a PEL (or TLV) of less than 50 ppm.
2. Before use, check the indicator on the hood to determine if the hood is functioning. If the hood is not functioning, alert the physical plant staff to institute repairs.
3. Hoods should not be used as storage areas for chemicals or apparatus.
4. The sash is valuable protection from chemical splash and projectiles. The normal working position for a sash is 18 inches above the bench surface. For greatest protection, the sash should be positioned as low as possible between the worker and the process inside the hood.
5. If the hood has a "Sash Operating Height" Indicator posted on it, lower the sash to that working height (or lower) any time the hood is in use. If hoods are equipped with electronic face velocity monitors, maintain the sash at the lowest position that will permit a comfortable working height, personal protection and a face velocity at 100 fpm. See Appendix B in Section E for user instructions for individual face velocity monitors.
6. Do not block the vents in the hood with equipment or containers. Avoid excessive traffic and the placement of large equipment immediately in front of the hood. The obstructions and traffic can cause inefficient operation and possible dangerous eddy currents that may sweep contaminants back into the breathing zone of the worker.
7. All apparatus or procedures conducted within the hood should be placed at least 6 inches from the face of the hood. All apparatus should be firmly secured to the hood support frames or bench top before use.
8. The hood should be on whenever toxic materials are present within the hood or whenever inadequate ventilation is detected within the lab.
9. Keep the hood clean.
10. Do not use the hood for disposal of hazardous volatile chemicals.

HOOD MAINTENANCE

The CHO will establish a calibration schedule for each hood based upon the type and toxicity of chemicals used and the frequency of use. Each hood shall be tested at least annually for face velocity and shall undergo a general assessment of condition.

The CHO will keep copies of all calibration (face velocity) measurements and arrange for the calibration to be conducted.

Hood maintenance is performed by the physical plant on a periodic basis. If the hood does not seem to be functioning properly, and is not the result of the current use, the physical plant should be called immediately.

PROTECTIVE EYEWEAR

Protective eyewear conforming to ANSI Z87.1 standards should be worn at all times in the laboratory as warranted by the activities. The requirements for protective eyewear for employees is established by the Wis. Administrative code SPS 332\1910.133 Eye and Face Protection standard. Suitable protective eyewear will be provided by UW Superior to employees without cost. If prescription eyewear is provided, the University will pay for the basic level of protection according to the state purchasing contract. The employee will be responsible for payment of certain options.

The requirements and use of protective eyewear for students of all levels in educational institutions is specified in Wis. Statute 255.30. This statute and referenced material is contained in Appendix A of Section E for all academic departments affected by this Chemical Hygiene Plan. The departments have the option of providing protective eyewear for their students or requiring the students to purchase protective eyewear at a reasonable cost. Protective eyewear is available for purchase at the Yellowjacket Union Bookstore.

The type of protective eyewear required is dictated by the conditions:

Safety glasses conforming to the ANSI Z87.1 standard shall be worn to protect against projectiles. Safety glasses do not provide adequate chemical splash protection.

Impact protection goggles conforming to the ANSI Z87.1 standard have direct ventilation in the sidewalls of the goggles to provide maximum comfort. They may be used only for the protection from projectiles and are a suitable substitute for Safety Glasses. Impact goggles do not provide adequate protection for chemical splash.

Chemical splash goggles conforming to the ANSI Z87.1 standard are the only approved safety eyewear for chemical splash. The chemical splash goggle shall be worn to protect against all chemical splashes and can be used to provide protection against projectiles. Chemical splash goggles have covered vents to prevent the introduction of liquid within the goggle.

Protective face shields conforming to ANSI Z87.1 standards should be worn in conjunction with safety glasses or goggles. Protective face shields should be worn when chemicals with acute hazards, such as corrosive chemicals, are in use in quantities large enough where a splash could cause skin absorption or damage upon contact with the face.

Safety glasses do not provide adequate protection against chemical splashes even if side shields are used. Glasses allow for unprotected areas where they do not fit snugly against the face, particularly above and below the frame. Small splashes landing on the forehead or hair may drip into the eyes resulting in an injury. For this reason, the only approved protection for chemical splashes is chemical splash goggles that fit tightly against the face.

CONTACT LENSES

Contact lenses may be worn in the laboratory with care. There is a risk that material may become trapped behind the lens resulting in prolonged contact with the surface of the eye. Safety showers must be available, and safety eyewear must be utilized as for other hazards.

PURCHASE OF PROTECTIVE EYEWEAR

Safety eyewear will be provided by the employer at no cost to employees. Students in academic laboratories will purchase chemical splash goggles or approved safety glasses (ANSI Z87.1 approved) from the department or at the Yellowjacket Union Bookstore.

Non-prescription eyewear with side shields may be purchased on the state contracts for laboratory supplies or safety glasses. Eyewear will be replaced as necessary. The department will determine if prescription eyewear will be provided to student employees or if suitable goggles will be provided.

For those employees requiring prescription eyewear, the following procedure will be used:

1. The employee completes the order form for the prescription eyewear.
2. The employer will provide a basic pair of safety glasses with side shields, including bifocal or trifocals.
3. The employee may select designer frames and pay the difference in price between the base pair and the designer frames.
4. Prescription eyewear can be replaced at the employer's expense every two years. Prescription changes within the 2 year period are the employee's responsibility.

EYEWASH STATIONS AND SAFETY SHOWERS

The eyewash and safety shower stations within a laboratory must be clearly marked and completely accessible. **NEVER** store anything in front of the station.

Safety showers should be tested periodically to determine if the correct volume of water is being delivered and to flush the water lines of deposits. The Chemical Hygiene Officer will ensure that the safety showers are tested at the appropriate intervals. The test dates will be recorded on the test record attached to the safety shower.

Eyewash stations (plumbed) are preferred to portable units because the volume of water in the portable units is generally not enough to flush the eye for 15 minutes. Eyewash stations should be run each week by the laboratory staff or CSO to flush the water lines of deposits. The test date should be recorded on the test record attached to the eyewash.

GLOVES

Before selecting a glove, the intended use and hazards must be evaluated. Cut-resistant gloves of metal or metal-fabric should be worn when handling blades, glass or objects with sharp edges. Fabric, Kevlar®, Nomex®, Zetex® and leather provide good protection against temperature extremes, but provide no protection from chemical hazards. When liquids, chemicals and other contact hazards are present, fluid resistant, leakproof gloves should be worn. When more than one hazard is present, it may be necessary to double glove with gloves of different materials.

Leakproof fluid-resistant gloves are available as disposable and utility (re-usable) forms. Disposable gloves are light-duty gloves used where fine manual dexterity is needed but they do not withstand abrasion well and are easily torn. The thin layer of glove material offers less chemical protection than the utility glove counterparts. Disposable gloves should be changed frequently and discarded after each use.

Utility (re-usable) gloves are more abrasion-resistant and provide better chemical resistance because they are a heavier gauge material, which requires a longer time for a chemical to permeate the glove material. Utility gloves should be cleaned after each use.

There is no one glove material that will provide protection against all chemicals, nor will gloves made of the same material by different manufacturers provide equal protection. Glove manufacturers provide charts upon request that rate their gloves for the permeation and degradation of the glove material with specific chemicals. Select gloves with a low permeation rate and long breakthrough time for the chemical. Selected glove permeation charts can be found in Appendix A of Section E. If additional information is required, contact the Chemical Hygiene Officer.

Before putting on the gloves, always check for holes and tears and discard torn, cracked or brittle

gloves. Some glove materials, especially latex, can cause allergic or uncomfortable skin reactions. If this occurs, discontinue their use and contact your supervisor or instructor for alternative glove materials. Avoid the use of hand creams or emollients when wearing gloves - the hand cream may degrade the glove material and make it more permeable.

RESPIRATORS

Respirators may be issued to employees when it is not possible to control exposures through other means. Respirators will be issued at no cost to the employee. Employees must receive training, respirator fit testing and medical assessment according to the UW-Superior Respirator Program prior to the issuance of a respirator.

The respirator used shall be NIOSH or MSHA approved for the material in use. All respirator usage shall be assessed by the department CSO or University Chemical Hygiene Officer prior to use in order to determine the proper requirements and respirator type. The Chemical Hygiene Officer will contact the University Safety Officer or Environmental Health & Safety Director for assistance in training and selection of the appropriate respirator.

LABORATORY APPAREL

Laboratory Coats

Laboratory coats (or other protective apparel such as gowns, hats, booties, etc.) shall be worn at all times in the research laboratories when lab functions are performed.

Clean lab apparel will be provided to employees by the department. Academic laboratory instructors must evaluate the conditions within the laboratory to determine if a lab coat is required for personal protection. Non-employee students will not be required to wear laboratory coats, however, the use of protective aprons may be recommended by the lab instructor.

Under no conditions should lab coats be worn in the offices. Each lab should have a designated area for the hanging of lab coats when not in use.

Lab coats are not to be taken home by staff for cleaning. The lab coats will be cleaned through a contract with a local launderer. Generally, pick up and delivery will occur twice a week. Place the coats in the bag at the pick-up point to be cleaned. Clean coats will be returned to the same area.

Disposable protective apparel such as gowns, hats, booties, etc. that are contaminated with infectious agents shall be deposited in a container designated for the disposal of biohazards.

Long or Baggy Sleeves

Long or baggy sleeves should be rolled up above the elbows to prevent contact with chemicals or entanglement in equipment.

Hair

Hair should be styled so the hair does not repeatedly fall into the face. Long hair shall be tied back to prevent contact with chemicals and entanglement in equipment.

Shoes

No opened-toed or high heel shoes are allowed. The employer shall provide shoe covers where required. Shoes made of a woven material such as athletic shoes should be discouraged as they allow rapid penetration of spilled materials.

Skirts, Shorts

Skirts or shorts may be worn in low-hazard areas providing lab coats are worn. No shorts will be allowed in high hazards areas (where corrosives, highly toxic materials or flammables are in use).

SECTION E

APPENDIX A

PERSONAL PROTECTIVE EQUIPMENT SELECTION GUIDES

SECTION E

APPENDIX B

LABORATORY FUME HOOD MONITORS

SASH STOP INDICATORS

Some fume hoods on the UW Superior campus are not equipped with fume hood face velocity monitors or sash stops due to their age or condition.

All fume hoods undergo at least an annual face velocity check. If the fume hood meets the face velocity requirements with the sash fully raised, no sash stop indicator is attached to the hood. The user should lower the hood to an optimal working height of 18 inches to provide the best protection for the user for ventilation and splash protection.

Fume hoods that do not achieve the required face velocity with the sash fully raised are posted with a sash stop indicator that indicates the sash height (above the bench) that is required to achieved the 100 feet per minute face velocity.

The user is required to lower the sash to the indicated height for proper protection.

An example of the sash stop indicator is shown below:

SECTION F

LABORATORY PROCEDURES

GOOD LABORATORY PRACTICES

The following good laboratory practices shall apply to all laboratories on the UW-Superior campus. Additional laboratory practices may be included in Appendix A of Section F of the department Chemical Hygiene Plan.

1. Never eat, drink, smoke or apply cosmetics in the laboratory.
2. Always use a buddy system when working in the laboratory (see department policy on working alone).
3. Eye protection must be used at all times by employees. The only exception to this rule is when the instructor has determined that no eye hazards exist during a particular laboratory period. Contact lenses shall not be worn in the laboratory.
4. Note the location of all emergency equipment, including exits, fire extinguishers, fire alarms, safety showers and eyewash stations, fire blankets and emergency telephone numbers.
5. Always wash hands thoroughly after handling chemicals.
6. NEVER pipet by mouth. Use a pipet bulb or mechanical pipeting aid.
7. Keep all working surfaces clean. Clean up all spilled material and dispose of the material properly.
8. Return all chemicals to the appropriate storage area when not in use.
9. All chemicals shall be contained within spill-proof carriers when transported between laboratories or in public areas. The carrier and chemical should be compatible with each other.
10. Do not work with a chemical unless you have received the proper training regarding the hazards of the chemical.
11. Notify the supervisor immediately if injuries or symptoms of chemical exposures occur.
12. Plan work carefully before proceeding. Analyze the procedure for potential hazards before continuing.
13. Do not conduct the procedure in a hurry or compromise on safety.
14. Keep all egress areas (exit patterns) free from blockage by equipment or dangerous operations.
15. Avoid horseplay within the laboratory.

CONDITIONS REQUIRING PRIOR APPROVAL BEFORE PROCEEDING

Each department must indicate the conditions or processes that will require prior approval from the department CSO or CHO before proceeding with the procedure. This information will be found in Appendix B of Section F of the department Chemical Hygiene Plan.

In general, employees shall have approval from the department CSO or University CHO before proceeding with a laboratory procedure if:

1. The activities or tests involving toxic substances are non-routine and should be evaluated for health hazards, disposal routes and proper choice and use of necessary safety equipment prior to the start up of the test.
2. The activity involves the use of a known or suspected carcinogen. An evaluation for safe work practices, proper equipment and protective equipment will be conducted before the work begins.
3. The task may result in employee exposures exceeding the PEL.
4. The safety equipment necessary for the task has been reported to be inoperative, especially the ventilation system.
5. The task may result in a severe hazardous reaction due to improper handling, storage, disposal or misuse of the chemical.

PROCEDURE FOR WORKING ALONE IN LABORATORIES

Situations that require anyone to work alone in laboratories are often the result of the project size or conflicts of time, space or materials. The practice of working alone in laboratories poses certain risks to personal safety, and cannot be condoned if conducting a high-hazard experiment.

Minimize the risk to personal safety by using a "buddy system":

- Try to schedule work so at least two people are working in laboratories on the same floor of the building at the same time, or within earshot of an audible warning.
- If someone is isolated on a floor of a building, contact the person with a frequency appropriate to the degree of hazard.
- Request the person working alone notify the "buddy" when leaving the floor.

ACADEMIC LABORATORIES

Students should never be allowed to work unattended in an academic laboratory. A stockroom assistant or laboratory supervisor should always be in the immediate vicinity.

NORMAL WORKING HOURS

During normal working hours (between 7 am and 6 pm, Monday through Friday) supervisory personnel should be aware of where the staff are working and what procedures are being conducted.

- Non-routine operations shall be cleared through the laboratory supervisor of the area.
- Staff not normally assigned to work within the laboratory unit shall clear his/her actions through the laboratory supervisor.

AFTER HOURS WORK

Laboratory work should be reserved to normal working hours when ever possible. When it is absolutely necessary to conduct laboratory work during non-routine hours (6 pm-7 am weekdays, and anytime Saturday or Sunday) special procedures should be followed:

- The only laboratory work to be conducted during non-routine hours shall be limited to low-hazard necessities. No high-hazard work shall be conducted.
- The necessity to work during non-routine hours should be cleared through the supervisor.
- Whenever possible, at least two people should work together in a "buddy system".
- Notify Campus Safety, ext. 8114, of the following information:
 - Where you will be working (buildings and lab numbers)
 - How long you expect to be working.
 - Notify Campus Safety when you leave work.
 - Request an escort to your parked vehicle. (optional)
- Campus Safety will attempt to check on your safety during the period you are working. However, due to unpredictable campus emergencies, the Officers may not always be available to conduct this check.

SPECIAL HAZARD CHEMICALS OR PROCESSES

Each department will designate areas as needed that may be used for chemicals or processes that present special hazards.

Special Hazards include but are not limited to:

1. The use of carcinogens
2. The use of highly toxic chemicals
3. The use of reproductive toxins that may result in airborne concentrations or skin absorption potential.
4. The use of lasers.
5. The use of radioactive materials.
6. Practices that may result in physical hazards such as explosion or fire.
7. The use of highly reactive chemicals.
8. The use of infectious material or other bio-hazards.

Designated areas may include:

- Laboratory Hoods
- Glove Boxes
- A designated portion within the laboratory
- An entire laboratory within the building.

Designated areas:

1. Designated areas shall be posted and the boundaries clearly marked.
2. Each department will describe the designated areas and the special procedures required within their laboratories in Appendix C Section F of the department Chemical Hygiene Plan.
3. Access to the designated area should be restricted to authorized personnel only.
4. Authorized personnel should have completed the appropriate training required for working with the hazard(s).
5. The designated area should be equipped with all of the necessary safety, first aid and spill clean-up material required for the particular hazard.

PROCEDURES FOR WORKING WITH CARCINOGENS, REPRODUCTIVE TOXINS, HIGHLY TOXIC CHEMICALS AND UNKNOWNNS

Scope:

Any use of chemicals which are known to be highly toxic, carcinogenic, or reproductive toxins must be restricted to designated areas within the laboratory when present in concentrations exceeding 0.1%.

This designation is not intended as a high hazard containment area. As of this writing, the University of Wisconsin-Superior does not have a containment laboratory for working with high risk chemical hazards.

Excluded from these requirements will be any chemical deemed to be a reproductive toxin or carcinogen only through the (intentional) oral route of entry (example: ethanol when consumed in high concentrations is a embryotoxin).

Definitions:

Carcinogens: Any substance listed in the IARC Monographs, NTP Annual Report or by OSHA as a known or suspected of being an animal or human carcinogen.

Reproductive toxin: Any spermicidal, mutagenic or teratogenic substance described as such in a published resource.

Highly Toxic: Any substance that has been tested and found to have one of the following:

1. A median oral LD₅₀ of ≤ 50 mg/kg (rat).
2. A median LD₅₀ of ≤ 200 mg/kg by continuous contact for 24 hours (rabbit).
3. A median LC₅₀ of ≤ 200 ppm by volume of gas or vapor, or ≤ 2 mg/l of gas, vapor, mist, fume or dust by continuous inhalation (rat).

Unknowns: Any chemical substance for which there is no known statistically significant study that establishes its toxicity, or is listed as an unknown on the MSDS.

Designated areas may include:

Laboratory Hoods
Glove Boxes
A designated portion within the laboratory
An entire laboratory or building.

The designated areas must have (minimum requirements):

1. Adequate ventilation (100 feet/minute face velocity)
2. Safety shower and eyewash
3. Hand washing facilities
4. Appropriate personal protective equipment.
5. Appropriate warning signs and displays
6. Spill clean up materials
7. Appropriate material safety data sheets

Designated areas shall be posted and the boundaries clearly marked.

Access

1. Access to the designated area (while the chemicals are in use) shall be restricted to authorized personnel only.
2. Authorized personnel should have completed the appropriate training required for working with the hazardous material.
3. Ancillary personnel who must routinely enter the area will be notified of the type of hazards present (warning signs, written notification) and provided with sufficient training prior to entering the designated area.
4. All hazards shall be secured before ancillary personnel will be allowed to conduct maintenance in the designated area.

SECTION F

APPENDIX A

DEPARTMENT SPECIFIC SAFE WORK PRACTICES

SECTION F

APPENDIX B

**DEPARTMENTAL PROCEDURES REQUIRING PRIOR
APPROVAL**

SECTION F

APPENDIX C

**DEPARTMENTAL DESIGNATED FACILITIES FOR HIGH
HAZARD WORK AREAS**

Lake Superior Research Institute DESIGNATED FACILITIES

Designated Facilities:

The following laboratory areas used by the Lake Superior Research Institute are designated for use with highly toxic chemicals, reproductive toxins and carcinogens:

Barstow 2, 2A, 5, 5B, 15 General Chemistry Preparation Laboratories and 307 Taxonomy lab.

1. Materials will be restricted to use within the hood only.
2. Concentrated materials will be stored in a vented cabinet compatible with the hazard.
 - a. Chemicals classified as having a Toxic (Blue) storage code will be stored in the vented base cabinet beneath the Gray hood.
 - b. Chemicals classified as having a Flammable (Red) storage code will be stored in the vented flammable storage cabinet.
 - c. Chemicals classified as have a Reactive (Yellow) storage code will be stored in desiccators until a more appropriate storage area can be purchased.
3. Refrigerator/freezers may be approved for the storage of low-volatility chemicals upon approval of the Chemical Safety Officer.
4. Materials may be required to be handled in the open laboratory atmosphere when weighing small quantities for use. When this is required the personnel shall:
 - a. Use appropriate respiratory protection.
 - b. Minimize contact and skin absorption by selecting glove materials that provide adequate protection against the hazards.
 - c. Conduct the manipulation at a time in which a minimum number of staff are present in the laboratory.
 - d. Clean the area thoroughly after use and dispose of all contaminated materials properly and promptly.

Barstow 12 Aquatic toxicology laboratory.

1. Materials will be restricted to use within:
 - a. The laboratory hood.
 - b. Vented exposure chambers kept at negative pressures.
 - c. Glove boxes kept at negative pressures.

2. Concentrated materials will be stored in the vented cabinet compatible with the hazard located in Barstow 12, 15 or 15A.
3. Due to the multiple chemicals that may be in use simultaneously in the aquatic toxicology program, the entire testing laboratory (exclusive of animal rearing areas) will be designated as a facility for the use of reproductive toxins, carcinogenic or highly toxic chemicals.

Barstow 15A General Metals/Instrumentation Laboratory

1. Materials shall be restricted to use within the hood.
2. Refrigerator/freezers may be approved for the storage of low-volatility chemicals upon approval of the Chemical Safety Officer.

Barstow 310 General Prep. Lab/ Chemistry Academic Lab.

1. Materials shall be restricted to use within the hood.
2. Refrigerator/freezers may be approved for the storage of low-volatility chemicals upon approval of the Chemical Safety Officer.

SECTION G

CHEMICAL EXPOSURES, INJURIES AND RECORDKEEPING

EXPOSURES TO HAZARDOUS CHEMICALS

Engineering controls, industrial ventilation, material substitution and good laboratory practices will be used to control exposures to hazardous materials. Employee, student and frequenter exposures to SPS 332 / OSHA regulated chemicals shall not exceed the Wisconsin permissible exposure limits (PEL). (see Section A, Appendix C.) Every attempt will be made to maintain routine exposure at or below one half of the PEL or TLV (whichever is more protective) for an additional measure of safety. Where SKIN notations are associated with chemical substances, employees and students will be instructed to use the appropriate personal protective equipment necessary to prevent skin contact with liquids, solids and high vapor concentrations.

The Occupational Health and Safety Administration (OSHA) and the American Conference of Governmental Health Industrial Hygienists (ACGIH) are two organizations that have developed exposure limits to airborne contaminants. SPS 332/OSHA Permissible Exposure Limits (PELs), are exposure limits that are established by law. Threshold Limit Values (TLV's) are advisory exposure limits. Both exposure limits represent the average exposure to air contaminants that a worker in an industrial setting may be exposed to for a 40 hour week for a 40 year working lifetime without experiencing serious adverse health effects.

Exposure limits are expressed as the number of parts of substance per million parts of air (parts per million, PPM) parts of air or as milligrams (mg) or micrograms (μg) of substance per cubic meter of air (mg/M^3 or μ/M^3). The exposure limits are Time Weighted Average (TWA) concentrations generally for an 8 hour work day; but they can also be expressed as a Short-Term Exposure Limit (STEL), which is a 15 minute TWA, or as a Ceiling limit (C) which is a concentration that should never be exceeded, even for a short period of time.

A "SKIN" notation next to a PEL or TLV of a chemical substance indicates that a significant exposure can occur by absorption through the skin. This can occur through direct skin contact with the chemical substance or if the skin is exposed to a high vapor atmosphere.

Never rely on the odor threshold of a chemical for the determination of chemical exposures. While the odors may indicate the presence of a chemical, the ability to discern odors varies among people. Many chemicals have odor thresholds that are above the safe levels of exposures. Other chemicals cause olfactory fatigue, which could result in exposures to excessive levels.

EXPOSURE MONITORING

Determinations must be made to assess whether the employee exposure exceeds the PEL by computation or by measurement by a qualified industrial hygienist or experienced Chemical Hygiene Officer. The department CHO will arrange for air sampling through the University Chemical Hygiene Officer. (Monitoring may be conducted by passive monitors, absorption

tubes, direct reading instruments or air sampling by a qualified individual.) All computations will be fully documented and will be approved by the University CHO. The University CHO will seek the assistance of the campus Environmental Health & Safety Director when determining whether exposure monitoring is required.

There are situations in the laboratory in which the employee will handle small quantities of hazardous chemicals that, under normal use, would probably not result in exposures above the PEL. The number of employees, the variety of compounds, and the frequency of use makes the practicality of employee exposure monitoring for each employee and each compound cumbersome and impractical. The appropriate course of action is to use engineering controls, material substitution and personal protective equipment to reduce the potential for exposure.

EMPLOYEE EXPOSURE MONITORING RECORDS

Records of any air monitoring results or computations involving employee exposures shall be maintained in the employee's file for 20 years. The employee will be notified in writing of the results of any monitoring within 15 days of receiving the results of any monitoring.

MEDICAL CONSULTATION AND EVALUATION

EMPLOYEES

If employees are exposed above the action level of chemical regulated under a specific standard under OSHA, or if the employee exhibits symptoms of exposure to any hazardous chemical, the employee is entitled to seek medical attention at no cost to the employee. When symptoms develop, the supervisor should be notified immediately to initiate the medical consultation and or evaluation and to implement preventative actions.

Medical evaluations and consultations will be performed under the direct supervision of a licensed physician. The employer will provide the identity of the hazardous chemical, a description of the conditions under which the exposure occurred, and the signs or symptoms of exposure that the employee is experiencing.

Following consultation or examination by the health care professional, the physicians written opinion will be sent to the employer for inclusion in the employee's on-site medical record. The employer will provide a copy of the physicians written opinion to the employee.

The physician's written opinion will be limited to:

- (a) Recommendations for further followup
- (b) The results of the medical examination and any associated tests

- (c) Any medical condition which may place the employee at an increased risk as a result of a hazardous chemical exposure
- (d) A statement that the employee has been informed by the physician of the results of the consultation or examination and any medical condition that may require further examination or treatment

The written opinion may not reveal findings or diagnosis un-related to the occupational exposure.

STUDENTS

Students who experience signs or symptoms of exposure will be referred to the UW Superior Student Health and Counseling Services for a referral for outside consultation or treatment at the student's expense. The laboratory supervisor will provide the health care professionals with the material safety data sheets and all other pertinent information related to the exposure.

INJURIES

Campus Safety Officers are the designated first responders for non-life threatening injuries or illnesses that occur at UW-Superior. Campus Safety may provide first aid, transport the injured for medical treatment or call paramedic units as needed.

ACADEMIC STUDENTS (NON-EMPLOYEE) INJURY OR ILLNESS

A student who is not an employee is responsible for his or her own expenses when injuries occur, provided the student was adequately informed of the hazards of the activity and trained in the use of personal protective equipment.

When any injury occurs:

1. If the injury is minor, ask the student to seek medical attention at the health care provider through Student Health and Counseling Services or their own health care professional.
2. If the injury requires more than minor first aid, contact Campus Safety, extension 8114, for first aid and or transportation to an emergency room.
3. Complete an accident/injury report in cooperation with the Campus Safety Officer when any injury occurs, no matter how minor.

EMPLOYEE/STUDENT EMPLOYEE INJURIES OR ILLNESS

Minor Injuries

Injuries are minor when they require one-time first aid treatment such as a bandage. Examples include paper cuts, scrapes, minor burns, minor cuts or scratches or slivers. An injury that requires medical attention from a physician or nurse at any time is not considered a minor injury.

An injury to any employee that requires minor first aid but no further medical attention should be recorded on the Minor Injury Log sheet for each lab and a supervisor should be informed. The supervisor in the area should initial the log sheet acknowledging the injury.

The supervisor reserves the right to request/suggest the employee to receive further medical attention.

When a minor injury requires medical attention at a later time:

- a. Seek medical attention.
- b. Notify both the physician and the office at the medical facility that the injury is work related.
- c. After treatment, the worker and his/her supervisor should complete an accident/injury report available from the Worker Compensation Technician in Personnel.

Processing the claims proceeds at a much more smoothly if there is documentation to show when and how the injury occurred.

Injuries Requiring Medical Attention

When injuries require medical attention, advanced first aid or life saving techniques:

1. Call 911 if injuries are life threatening. For non life threatening injuries call Campus Safety at ext 8114.
2. Indicate to the medical facility and the physician at the time of treatment that the injury is work related.
3. Immediately after treatment, the injured worker and his/her supervisor must complete an injury/accident report.

The charges incurred by employees (staff or student) in a work-related incident will be submitted for payment to Workers Compensation, however payment of claims is not guaranteed.

SECTION G

APPENDIX A

WISCONSIN PERMISSIBLE EXPOSURE LIMITS

[Wisconsin Permissible Exposure Limits \(PELs\)](#)

SECTION H

HAZARDOUS WASTE IDENTIFICATION AND COLLECTION PROCEDURES

HAZARDOUS WASTE IDENTIFICATION AND COLLECTION

This is a summary of the key elements of the UW-Superior Hazardous Waste Program. Please refer to the [UW Superior Hazardous Waste Management Program](#) available on line or contact the Environmental Health & Safety office (ext 8073) for assistance.

INTRODUCTION

All hazardous waste activities, including generation, storage, labeling and disposal, must be conducted according to the state statute NR600. Severe penalties may be levied against the generator of the waste, the Hazardous Materials Management Coordinator and/or the Chancellor for intentional or accidental violation of the statute. Waste disposal is conducted only through the State of Wisconsin Hazardous Waste Disposal Contract.

Wastes may not be intentionally diluted or treated in an attempt to avoid disposal charges. Evaporation or sewerage of combustible or flammable liquids or solids is forbidden. Dilution or treatment may result only from a recognized step in the process. (Acid-Base Neutralization and silver recovery are exceptions to this rule.)

IDENTIFICATION

Wastes are defined as materials that are no longer suitable for their intended purpose. This includes materials that are waste products of a procedure, old outdated products that have not been used or new products purchased in excess. Hazardous wastes are solid, liquid or gaseous wastes with one or more of the characteristics listed below. Unless otherwise noted, the waste should be containerized and shipped for disposal.

1. **Corrosive: Any substance with a pH less than 2 or greater than or equal to 12.5.** A corrosive waste with no other waste characteristic may be neutralized to a pH between 6 and 9 and sewerage (Log date and Volume).
2. **Ignitable: Any substance having a flash point less than 140°F (60° C), or any ignitable gas, or an oxidizer.** Aqueous wastes containing 24% or less of an alcohol are not considered to be hazardous wastes. See the precautions on treatment in the introduction.
3. **Reactive: Any unstable substance that can undergo rapid violent change, reacts violently with water, or is a sulfide or cyanide bearing material.**
4. **TCLP listed waste. A liquid mixture containing any of listed substances at or above the TCLP concentrations (TCLP table is found in Section H, Appendix B).** If a solution contains a TCLP substance that is less than the Hazardous Waste regulatory limits but higher than the limits of the Municipal Sewer Code, it must be disposed of as a

hazardous waste.

5. **Acutely Hazardous:** Any material that has been found to be fatal to humans in low doses, or has an oral LD50 (rat) of less than 50 mg/kg, an inhalation LD50 (rat) or less than 2 mg/l, or a dermal LD50 (rabbit) of less than 200 mg/kg. Acutely hazardous wastes are found in NR605 Table IV (found in Appendix B of Section H).
6. **It is a toxic waste.** Any material listed in NR605 Table V (found in Appendix B of Section H).
7. **It is a listed waste from non-specific sources.** Any material listed in NR605 Table II (found in Appendix B of Section H).

In general, all of the following substances used in our laboratories or studios should be disposed of hazardous waste: (this list is not complete)

Aqueous solutions, >24% alcohol.	Cyanide-bearing wastes
Formaldehyde solutions, > 0.1%	Heavy metal salts and solutions
Oxidizing solutions	Sulfide-bearing wastes
Solvents	Chemicals labeled as toxic or poisons
Kerosene-saturated sawdust	Acid or base solutions

Sediment, soil, or other solid or aqueous materials that may have waste characteristics must be evaluated on a case-by-case basis.

Special Disposal Procedures

Through special written agreements made with the UWS Hazardous Materials Management Coordinator (HMMC), the Superior Municipal Sewage Treatment Plant and the Wisconsin Department of Natural Resources, the following materials may be disposed of via sewerage rather than as a hazardous waste:

1. 0.1% aqueous formaldehyde solutions from the transfer of preserved specimens into a holding solution (volumes and dates of the discharge must be reported to the HMMC).
2. Acid and base solutions, with no other hazardous waste characteristics, may be sewerage after neutralization to between pH 6 - 9. (volumes and dates must be reported to the HMMC).
3. Empty containers should be triple-rinsed before disposal in the trash.

COLLECTION PROCEDURES

1. **Determine the disposal routes of the wastes before the procedure is to be conducted.** Prepare the containers, container inventories and labels to accept the waste.
2. Keep the amount of waste generated to a minimum quantity. Hazardous wastes charges are billed as the number of pounds shipped. Academic departments will not be directly billed for the wastes generated, but lack of cooperation or participation in the program could change this status. Excess waste charges deplete university funding that could be used elsewhere. Helpful Hints for minimizing wastes include:
 - a. Substitute products or methods that generate less waste
 - b. Adjust purchasing practices to purchase only the materials that will be used within a 1-2 year period.
 - c. Downsize experiments or procedures to produce less waste.
 - d. Control the materials that students bring into class for their own use.
 - e. Do not accept materials from off-campus without prior approval from the Campus HMMC.
3. Collect wastes as they are generated and transfer them to the proper labeled container.
4. Update the container inventory after each addition of waste, if the waste does not have a single make-up.
5. All containers must be kept closed except when adding wastes.
6. Store all wastes in the satellite collection area in the laboratory.
7. When the container is full, notify the hazardous waste coordinator for the department or the campus to remove the wastes. A completed waste inventory form must accompany the waste.

WASTE CONTAINERS AND LABELING

Collect the waste in glass, metal or plastic containers that are chemically compatible with the waste. Containers should be 5 gallons or less in size. The container must be labeled with:

1. The words "HAZARDOUS WASTE"
2. The primary hazard classes of the material.
3. The contents: all solutes and solvents and known percentages. (This may be kept on an accompanying inventory sheet or card).
4. The date of the first waste addition, and with each additional entry.
5. The name of the responsible party for the waste and if necessary, the account number.

IMPORTANT NOTE: ALL containers of wastes must be closed except when adding wastes.

SPILLS

When a spill of a hazardous material occurs, the lab supervisor or employee must make an immediate assessment of the spill and its effect upon human occupants and building safety to determine the proper course of action. This determination must be based upon the nature of the hazardous material that was spilled, its toxicity and physical hazards, the size or amount of the spill and the spill location.

SMALL SPILLS

Small spills can be defined as the amount of material an individual can safely handle during a laboratory exercise.

1. Determine the relative hazard of the spilled material based on label information and material safety data sheet.
2. If the material is extremely reactive or highly toxic, evacuate the laboratory and call for assistance in spill clean up. Notify Campus Safety at ext. 8114 that assistance is required.
3. If the material poses no unusual hazards when compared to the typical laboratory use, don the appropriate personal protective equipment and use the available spill clean up supplies to clean up the spill.
4. Log the spill details on a Spill Report. Contact the Hazardous Materials Coordinator to remove the wastes from the area.

LARGE SPILLS or SPILLS OF EXTREMELY DANGEROUS CHEMICALS

1. Evacuate the area. In case of fire or when hazardous vapors may spread to other areas, pull the fire alarm to evacuate the building.
2. Call Campus Safety at ext 8114 to notify them of spill and report to them the chemical name of the spilled material and the approximate quantity.
3. Campus Safety will immediately notify the Superior Hazardous Material Spills Team, who will respond and contain the spill.
4. Remain available to Campus Safety to provide additional information as needed.

SECTION H

APPENDIX A

WASTE CONTAINER INVENTORY FORMS

HAZARDOUS WASTE CONTAINER INVENTORY
University of Wisconsin-Superior Academic Departments

Note: An inventory card may be substituted for this form.

Please complete the following information each time an addition of waste is made to this container. This inventory should remain with the container until it is picked up for disposal.

When the container is full, please notify the department hazardous waste manager or Carol Lindberg, HMMC, for removal and disposal.

Department: _____

Staff responsible for the waste: _____

Date Started: _____ **Date full:** _____

Date	Description of the Waste	Conc.	Solvent	Init.

THE CONTAINER MUST BE KEPT CLOSED EXCEPT WHEN ADDING WASTES!

SECTION H

APPENDIX B

HAZARDOUS WASTE IDENTIFICATION TABLES FROM NR 600 AND OTHER SOURCES

<http://www.uwsuper.edu/ehs/envmanag/hazwaste/upload/NR-661-HW-Lists.pdf>

SECTION I

SOURCES OF INFORMATION

REFERENCES

NIOSH, [Pocket Guide to Chemical Hazards](#). U. S. Department of Health and Human Services. U. S. Government Printing Office, Washington D. C., June, 1990.

[Annotated Permissible Exposure Limits](#) with TLVs for Chemical Substances with Permissible Exposure Limits. Occupational Safety and Health Administration

[NIOSH Occupational Health Guidelines for Chemical Hazards](#)

National Research Council. [Prudent Practices for Handling Hazardous Chemicals in Laboratories](#). National Academy Press, Washington, D. C.

[Laboratory Safety](#) Resources, Occupational Safety and Health Administration.

[IARC Monographs](#) by the International Agency for Research on Cancer

SECTION J

GLOSSARY

GLOSSARY

- ACGIH** American Conference of Governmental Industrial Hygienists
- ANSI** American National Standards Institute.
- CEILING** The maximum concentration an employee may be exposed to at any time during a work period.
- CFR** Code of Federal Regulations. Rules established by the Federal Government are incorporated into a written code.
- CHO** Chemical Hygiene Officer. The appointed individual(s) responsible for administering the chemical hygiene plan.
- CHP** Chemical Hygiene Plan. A detailed written plan designed to protect employees from chemical and physical hazards in the laboratories.
- DSPS** Department of Safety and Professional Services - Safety and Building Division. The regulatory body in the State of Wisconsin for state agencies.
- CORROSIVE** A substance that can cause destruction of animal tissue at the site of contact.
- DERMATITIS** An inflammation of the skin.
- ECZEMA** A skin disease.
- FLAMMABLE LIQUID** A liquid having a flash point below 100° F.
- FUME** Finely divided particles created when volatilized solids condense in cool air. (Fumes are not vapors or gases.)
- IARC** International Agency for Research on Cancer.
- INFLAMMATION** Tissue reaction to infection or trauma.
- LEL** Lower explosive limit. The lowest concentration (percentage) of a gas or vapor in air that will cause an explosion or support combustion with an ignition source.

- MSHA** Mine Safety and Health Act.
- NIOSH** National Institute of Occupational Safety and Health.
- OSHA** Occupational Safety and Health Act.
- PEL** Personal Exposure Limit. A legal limit of employee exposure. The 8 hour time weighted average concentration most employee's may be exposed to without causing serious adverse effects.
- PPE** Personal protective equipment.
- ROE** Route of entry. The pathways a chemical or biological hazard may enter the body. Generally speaking, the most common ROEs are inhalation, ingestion, absorption, and injection.
- SCBA** Self-contained breathing apparatus. A respirator.
- STEL** Short Term Exposure Limit. The concentration an employee may be exposed to for a 15 minute TWA without suffering from serious adverse effects. STELs should occur no more than 4 times per day with 60 minutes between STELs.
- TLV or TLV-TWA** Threshold limit value. The ACGIH recommended time weighted average concentration most workers may be exposed to for an 8 hour day, 40 hour work week without suffering adverse effect. TLV's may be expressed as: TLV-TWA, TLV-Ceiling, TLV-STEL. This is not a legal limit.
- TWA** Time weighted average. A weighted airborne concentration averaged over a time period, usually 8 hours.
- UEL** Upper explosive limit. The highest concentration (percentage in air) that will support combustion or cause an explosion with an ignition source.
- VAPORS** The gaseous form of substances that are normally solids or liquids at standard conditions. (Vapors and gases are not fumes.)