

University of Wisconsin - La Crosse

Environmental Health and Safety Standard

Subject: Chemical Hygiene Plan
Original: April 19, 2002
Last Update: October 2020

I. APPLICABLE DOCUMENTS

1. Occupational Safety and Health Administration, 29 CFR 1910.1450; Occupational Exposure to Hazardous Chemicals in Laboratories
2. Occupational Safety and Health Administration, 29 CFR 1910.1200; Hazard Communication
3. Wisconsin Department of Safety and Professional Services, Chapter 332; Public Employee Safety and Health.
4. Wisconsin Statutes, Section 101.11, Regarding Safe-Place of Employment
5. UW-La Crosse Laboratory Safety and Chemical Disposal Guide

II. PURPOSE

The purpose of this Chemical Hygiene Plan (CHP) is to define policies, procedures and guidelines to help ensure that University of Wisconsin-La Crosse (UWL) employees, faculty, and students are protected from the dangers associated with the hazardous chemicals with which they work. The CHP is part of UWL's compliance with the regulations implemented by the Occupational Safety and Health Administration (OSHA) that requires employers to develop and carry out the specifications of a written CHP.

III. SCOPE AND POLICY

This standard applies where laboratory use of hazardous chemicals occurs.

The written CHP applies to all UWL employees, faculty and students who use chemicals in UWL's teaching, research, and/or educational laboratories. The CHP identifies the policies, procedures, and guidelines for management of the laboratory safety and health. The policies set forward in this document are intended to ensure compliance with Federal and State regulatory requirements. Copies of this document are available upon request from the Environmental Health and Safety office.

This standard deals only with the use of hazardous chemicals, however employees, staff, and students may also encounter other potential physical, biological, or radioactive hazards in the laboratory. Therefore, laboratory staff should develop laboratory specific guidelines for each type of laboratory hazard.

IV. DEFINITIONS

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

Appendices A and B of the Hazard Communication Standard (29 CFR 1910.1200) provide further guidance in defining the scope of health hazards and determining whether or not a chemical is to be considered hazardous for purposes of this standard.

- B. 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.
- C. 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.
- D. 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.
 - (iv.) Protective laboratory practices and equipment are available and in common use to minimize the potential for exposure to hazardous chemicals.
- E. Protective laboratory practices and equipment means those laboratory procedures, practices and equipment accepted by laboratory health and safety experts as effective, or that the University can show to be effective, in minimizing the potential for exposure to hazardous chemicals.

Additional definitions are available in OSHA standard, 29 CFR 1910.1450.

V. RESPONSIBILITIES

Implementation of the CHP at UWL is a shared responsibility. It requires that responsibilities for its implementation be distributed among all university employees.

- A. Department Chairs:
 - (i.) Ensure that each laboratory covered by this plan develops and implements a laboratory specific chemical hygiene plan. The approved format for a laboratory specific plan is included as Appendix C of the UWL Laboratory Safety and Chemical Disposal Guide.
 - (ii.) Each department should collaborate with faculty and staff who are responsible for enhancing safety in all its laboratory activities to adopt guidelines and develop strategies to implement the CHP.
- B. Environmental Health and Safety:
 - (i.) Update and distribute the UWL CHP.
 - (ii.) Serve as the University Chemical Hygiene Officer.
 - (iii.) Monitor compliance with this CHP.
 - (iv.) Provide assistance to laboratory supervisors concerning appropriate storage, handling, and disposal of hazardous chemicals.
 - (v.) Assist in developing laboratory specific CHP's.
 - (vi.) Provide assistance in selection and use of personal protective equipment and laboratory safety equipment.
 - (vii.) Provide laboratory safety training upon request.
 - (viii.) Fulfill other responsibilities as identified in the Safety Responsibilities section of Part D of the UWL Laboratory Safety and Chemical Disposal Guide.
- C. Principal Investigator, Laboratory Manager, Laboratory Supervisor or Instructor:
 - (i.) Develop and implement a laboratory specific CHP. The approved format for a laboratory specific plan is included as Appendix C of the UWL Laboratory Safety and Chemical Disposal Guide.
 - (ii.) Inform students in their lab of their responsibility under the CHP.
 - (iii.) Train employees/students or schedule time for the individuals to attend designated training sessions concerning chemical safety as required by this CHP. Information and training requirements are identified in section VII of this CHP.
 - (iv.) Implement and enforce laboratory health, safety and chemical disposal practices.

- (v.) Ensure the availability and enforce the use of personal protective equipment and Safety Data Sheets (SDS's).
- (v.) Correct or report hazardous conditions to the proper campus staff or the Environmental Health and Safety Office.
- (vi.) Fulfill other responsibilities as identified in the Safety Responsibilities section of Part D of the UWL Laboratory Safety and Chemical Disposal Guide.

D. Employee/Student(s):

- (i.) Attend required safety training sessions.
- (ii.) Follow all health, safety, and chemical disposal guidelines and appropriate work practices.
- (iii.) Wear and use prescribed personal protective equipment.
- (iv.) Follow all safety guidelines applicable to any special procedures being carried out after proper instruction and authorization is given.
- (v.) Assure that required safety precautions are in place before work is started.
- (vi.) Remain aware the hazards of the chemicals in the lab and how to handle them safely.
- (vii.) Report hazardous conditions to the supervisor as they are discovered and be familiar with emergency procedures.
- (viii.) Fulfill other responsibilities as identified in the Safety Responsibilities section of Part D of the UWL Laboratory Safety and Chemical Disposal Guide.
- (ix.) Complete an incident report for any accident. An incident report is available via Risk Management forms link on UWL's web page.

VI. STANDARD OPERATING PROCEDURES

The CHP provides a minimum set of guidelines for the handling of hazardous chemicals on campus. Individual laboratories are responsible for developing more detailed procedures as their situations warrant. All laboratories must follow the procedures in the Chemical Safety Procedures, Laboratory Hygiene, Personal Protective Equipment and Reducing Your Exposures to Chemicals sections of Part D of the UWL Laboratory Safety and Chemical Disposal Guide.

VII. INFORMATION & TRAINING

The hazards associated with chemicals used in the work area must be communicated to employees, students and any other laboratory workers. Such information shall be provided at the time of initial work in an area where hazardous chemicals are present and prior to assignments involving new exposure situations. The frequency of refresher information and training shall be determined by the Principal Investigator, Laboratory Manager, Laboratory Supervisor, or Instructor.

All affected individuals shall be informed of:

- A. The contents of the OSHA standard, Occupational Exposure to Hazardous Chemicals in Laboratories, 29 CFR 1910.1450, and its appendices which shall be made available.
- B. The location and availability of this CHP, the laboratory specific CHP and the UWL Laboratory Safety and Chemical Disposal Guide.
- C. The permissible exposure limits for OSHA regulated substances or recommended exposure limits for other hazardous chemicals where there is no applicable OSHA standard, as included in the SDS.
- D. Signs and symptoms associated with exposures to hazardous chemicals used in the laboratory, as included in the SDS.

- E. The location and availability of known reference material on the hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory including, but not limited to, SDS's received from the chemical supplier.

Training for all affected individuals shall include:

- A. Methods and observations that may be used to detect the presence or release of a hazardous chemical (such as monitoring conducted by UWL, continuous monitoring devices, visual appearance, or odor of hazardous chemicals when being released, etc.).
- B. The physical and health hazards of chemicals in the work area.
- C. The measures to protect themselves from these hazards, including specific procedures UWL has implemented to protect individuals from exposure to hazardous chemicals. Examples include appropriate work practices, emergency procedures, and use of personal protective equipment (PPE).
- D. Correct labeling of hazardous chemicals.

The CHP provides a minimum set of guidelines for information and training related to use of hazardous chemicals. Individual laboratories are responsible for providing information and training. For additional assistance individuals should refer to the Training For Laboratory Personnel chapter in Appendix G of the UWL Laboratory Safety and Chemical Disposal Guide.

VIII. METHODS OF CONTROL AND PERSONAL PROTECTIVE EQUIPMENT

Engineering controls, personal protective equipment, work practice controls, and administrative controls each play a role in a comprehensive laboratory safety program. Implementation of specific measures must be carried out on a case-by-case basis.

All laboratories must follow the procedures in the Personal Protective Equipment, Reducing Your Exposures to Chemicals, and Chemicals Requiring Special Precautions sections of Part D in the UWL Laboratory Safety and Chemical Disposal Guide.

IX. MEDICAL CONSULTATION AND EXAMINATIONS

Employees and students affected by this CHP have an opportunity to receive medical attention under the following circumstances.

- A. Whenever an individual develops signs or symptoms associated with a hazardous chemical to which the individual may have been exposed in the laboratory, the individual will be provided an opportunity to receive an appropriate medical examination.
- B. Whenever exposure monitoring reveals an exposure level routinely above the action level (or in the absence of an action level, the Permissible Exposure Limit (PEL)) for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements, medical surveillance will be established for the individual as prescribed by the particular OSHA standard.
- C. 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 individuals are provided an opportunity for a medical consultation. Such consultation will determine the need for a medical examination.

Employees may receive medical care through their employer provided health care plan or may choose to initiate a Workers Compensation claim through the UWL Human Resources Office. Students may receive medical care for

some health issues from the UWL Student Health Center or at cost through their private healthcare practitioner/health insurance plan.

X. PRIOR APPROVAL

The responsibility for approval of the purchasing and use of toxic chemical agents rests with the principal investigator, laboratory manager, laboratory supervisor or instructor.

XI. SAFEGUARDS FOR PARTICULARLY HAZARDOUS SUBSTANCES

In addition to the standard operating procedures and general safety guidelines mentioned in the earlier section, special precautions are needed when handling select carcinogens, reproductive toxins, and substances having a high degree of acute toxicity. A minimum set of guidelines that should be followed in each laboratory are described in the Chemicals Requiring Special Precautions section of Part D in the UWL Laboratory Safety and Chemical Disposal Guide. This section describes provisions for establishing a designated area, use of containment devices and decontamination procedures. Waste removal procedures are provided in Part G of the UWL Laboratory Safety and Chemical Disposal Guide. Attachment A UWL provides a Prior Approval Form for use of Particularly Hazardous Substances.

The principal investigator, laboratory manager, laboratory supervisor or instructor should include additional safeguards as identified in Attachment A. The approved format for a laboratory specific plan is included as Appendix C of the UWL Laboratory Safety and Chemical Disposal Guide.

XII. RECORDKEEPING

Each individual affected by this CHP will be requested to sign a training record indicating that they have received and understood all of the health and safety requirements. Online learning management system records can also be used to verify completion of training. The principal investigator, laboratory manager, laboratory supervisor, or instructor should maintain the training records.

XIII. APPROVAL

The CHP is effective immediately. All UWL faculty, staff, and students shall fulfill their responsibilities as designated within this written standard.

Signature on File

Robert J. Hetzel
Vice Chancellor, Administration and Finance
University of Wisconsin-La Crosse

Date

Attachment A

UWL Particularly Hazardous Substance (PHS) Prior Approval Form

The Principal Investigator (PI) or other person in authority for a lab shall complete this Prior Approval form for use of Particularly Hazardous Substances (PHS's). At UWL PHS's include select carcinogens, reproductive toxins, hazardous chemicals with a high degree of acute toxicity, explosives, self/water reactive, and pyrophoric chemicals. Responsibility for determining if a hazardous chemical is a PHS rests solely with the PI or other person in authority in a lab.

See the end of this form for the definition of PHS and other guidance. The guidance includes a method, using a Hazard "H" code on a Safety Data Sheet (SDS), to determine that a chemical meets the PHS definition.

The applicant can complete a separate form for each chemical. As an alternate, chemicals can be grouped into similar hazard categories as long as the hazards and hazard controls are identical. To complete this alternate option, attach a list of chemicals that apply to this Prior Approval Form. If using this hazard group option, insert "See attached chemical list" in section 1.A. Chemical name.

Contact Environmental Health and Safety (EH&S) for assistance or questions with completing this form.

1. Substance Information

A. Chemical name: _____

B. CAS#: _____

C. Physical State: _____

D. SDS Hazard "H" Code(s): _____

E. Estimated Use Duration: _____ (hours/day) Frequency: _____ (days/year)

2. Procedure: Briefly describe how the material will be used.

3. Exposure Controls

A. Ventilation/Isolation *(circle all that apply)*

- | | | |
|-----------------------|-----------------|------------------------------------|
| 1. Exhausted Lab Hood | 2. Glove Box | 3. HEPA Filtered Massing Enclosure |
| 4. Vented Gas Cabinet | 5. Blast Shield | 6. Snorkel: Point Exhaust |
| 7. Others: _____ | | |

B. Personal Protective Equipment (PPE) *(circle all that apply)*

- | | | | |
|--|-----------------------------|------------------|-------------|
| 1. Safety Glasses | 2. Chemical Goggles | 3. Face Shield | 4. Gloves |
| 5. Standard Lab Coat | 6. Flame Resistant Lab Coat | 7. Apron | 8. Footwear |
| 9. Respirator <i>(Require EH&S approval)</i> | | 10. Other: _____ | |

4. **Location of Proposed Use/Designated Area** (circle all that apply)

A. Building: 1. PSSC 2. Cowley 3. HSC

B. Provide Room Numbers by Building and Identify Location(s) where Substance(s) will be used.

(A Designated Area can be an entire lab or location within a lab. Designated Area signage is required and is available from EH&S).

5. **Spills, Decontamination, and Waste Disposal**

A. Spill control materials readily available Yes No

B. Reviewed and can implement Part E: Emergency Procedures as described in *UWL Laboratory Safety and Chemical Disposal Guide*. The *Guide* is available from EH&S. Yes No

C. Decontamination Methods: (circle all that apply)

1. Physical Cleaning 2. Lab Bench Mat/Liner Pad 3. Spill Tray
4. Evaporation 5. Dispose Contaminated Items 6. Chemical Inactivation
7. Other: _____

D. Disposal (circle all that apply)

1. Benchtop Neutralization Waste 2. Deactivation 3. Fully Consumed/No Waste
4. Dispose through EH&S 5. Other: _____

6. **Approval**

The Principal Investigator (PI) or the person in authority for an instructional lab at the time of use of PHS's identified by this form has demonstrated an understanding of the hazards of the PHS's and plans to handle the PHS's in a manner that minimizes risk to health and safety. The individual(s) signing this form are authorized to use and supervise/manage the use by other personnel in the lab who they authorize to use the substance(s) in the manner described.

Printed Name:
PI or Other Person in Authority
Hygiene Officer

Printed Name:
PI or Other Person in Authority

Printed Name:
UWL or Dept. Chemical

Signature:

Signature:

Signature:

Date:

Date:

Date:

Using This Form

Identifying Particularly Hazardous Substances

There is no comprehensive list of PHS, but there are different ways to determine if a chemical is a PHS.

1. Use the Hazard "H" code on a Safety Data Sheet (SDS), to determine that a chemical meets the PHS definition. See the appended list of Hazard "H" codes.
2. The OSHA Laboratory Standard defines particularly hazardous substances as:

Carcinogens – A carcinogen is a substance capable of causing cancer. Carcinogens are chronically toxic substances; that is, they cause damage after repeated or long-duration exposure, and their effects may become evident only after a long latency period. A chemical is considered a carcinogen if it is included in any of the following carcinogen lists:

- OSHA-regulated carcinogens as listed in Subpart Z of the [OSHA standards](https://www.osha.gov/SLTC/carcinogens/standards.html).
<https://www.osha.gov/SLTC/carcinogens/standards.html>
- Under the category "known to be carcinogens" in the *Annual Report of Carcinogens* published by the [National Toxicology Program \(NTP\)](https://ntp.niehs.nih.gov/whatwestudy/assessments/cancer/index.html) latest edition.
<https://ntp.niehs.nih.gov/whatwestudy/assessments/cancer/index.html>
- Group 1 ("carcinogenic to humans") of the [International Agency for Research on Cancer \(IARC\)](https://monographs.iarc.fr/agents-classified-by-the-iarc/), latest edition. Chemicals listed in Group 2A or 2B ("reasonably anticipated to be carcinogens") that cause significant tumor incidence in experimental animals under specified conditions are also considered carcinogens under the OSHA Laboratory Standard. <https://monographs.iarc.fr/agents-classified-by-the-iarc/>

Reproductive Toxins – Reproductive toxins are substances that have adverse effects on various aspects of reproduction, including fertility, gestation, lactation, and general reproductive performance. When a pregnant woman is exposed to a chemical, the fetus may be exposed as well because the placenta is an extremely poor barrier to chemicals. Reproductive toxins can affect both men and women. Male reproductive toxins can in some cases lead to sterility.

Substances with a High Acute Toxicity – High acute toxicity includes any chemical that falls within any of the following OSHA-defined categories:

- A chemical with a median lethal dose (LD₅₀) of 50 mg or less per kg of body weight when administered orally to certain test populations.
- A chemical with an LD₅₀ of 200 mg less per kg of body weight when administered by continuous contact for 24 hours to certain test populations.

- A chemical with a median lethal concentration (LC₅₀) in air of 200 parts per million (ppm) by volume or less of gas or vapor, or 2 mg per liter or less of mist, fume, or dust, when administered to certain test populations by continuous inhalation for one hour, provided such concentration and/or condition are likely to be encountered by humans when the chemical is used in any reasonably foreseeable manner.

Explosives – Any chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion, i.e., with substantially instantaneous release of gas and heat, unless such compound, mixture, or device is otherwise specifically classified by the U.S. Department of Transportation; see 49 CFR chapter I. The term "explosives" shall include all material which is classified as Class A, Class B, and Class C explosives by the U.S. Department of Transportation, and includes, but is not limited to dynamite, black powder, pellet powders, initiating explosives, blasting caps, electric blasting caps, safety fuse, fuse lighters, fuse igniters, squibs, corded detonator fuse, instantaneous fuse, igniter cord, igniters, small arms ammunition, small arms ammunition primers, smokeless propellant, cartridges for propellant-actuated power devices, and cartridges for industrial guns..

Self-reactive – Self-reactive chemicals are thermally unstable liquid or solid substances liable to undergo a strongly exothermic decomposition even without participation of oxygen (air). This definition excludes substances classified as explosives, organic peroxides, oxidizing liquids or oxidizing solids.

Water-reactive chemicals are those that spontaneously undergo a chemical reaction with water, as they are highly reducing in nature. Examples include alkali metals, sodium through cesium, and alkaline earth metals, magnesium through barium.

Pyrophoric chemical – are liquids, solids, and gases that will ignite spontaneously in air at or below 130 °F. Oxidation of the compound by oxygen or moisture in air proceeds so rapidly that ignition occurs.

Globally Harmonized System (GHS)

Hazard “H” Codes for Particularly Hazardous Substances (PHS)

Safety data sheets (SDS) now include hazard “H” codes” (in SDS Section 2: Hazards Identification) which correspond to hazard classifications under the Globally Harmonized System (GHS). The codes can serve as a quick reference for determining how to safely use and handle chemicals. The same applies to determining if a chemical is a particularly hazardous substance (PHS). The following details the hazard categories, and their corresponding H Codes, which indicate that a chemical is a PHS.

Explosives: (include GHS # H200, H201, H202, H203, H204, H205, H230, H231, H240, H241, H271) Examples: Dinitrophenol • Heavy Metal Azides • Trinitroaniline • 2,4,6-Trinitrophenol (picric acid)

Self-Reactive Substances: (include GHS # H251)

Examples: Acrylonitrile • Cyclopentadiene • Ethyl Acrylate • Perchloric Acid Solutions (over 72.5% by weight) • Picric Acid

Pyrophoric Liquids and Solids: (include GHS # H250)

Examples: n-Butyllithium • t-Butyllithium • Dichloromethylsilane • Diethylzinc • Organoaluminum Compounds • Raney Nickel Catalyst • Sodium Hydride

Water-Reactive Chemicals: (include GHS # H260, H261)

Examples: Calcium Hydride • Cesium • Lithium • Lithium Aluminum Hydride • Magnesium • Potassium • Potassium Hydride • Sodium

Acute Toxicity: (include GHS # H300, H304, H310, H330, H370 and/or H371)

Examples: Bromine • Hydrofluoric Acid • Potassium Cyanide • Sodium Azide • Sodium Cyanide • Methanol

Select Carcinogens: (include GHS # H350, H351)

Examples: Acetaldehyde • Acrylamide • Acrylonitrile • Aniline • Benzene • 1,3-Butadiene • Chloroform • Dichloromethane (methylene chloride) • Formaldehyde • Inorganic Compounds (Arsenic, Cadmium, Chromium) • Napthalene • Pentachlorophenol • Trichloroethylene

Reproductive Toxicants: (include GHS # H340, H341, H360, H361, H361d, H361f)

Examples: Acetaldehyde • Acid Dichromate Solution • Acridine Orange • Aniline • Benzene • Carbon Disulfide • Chloroform • Dimethyl Formamide • Ethidium Bromide • 2-Ethoxy Ethanol • Hexanes • Inorganic Compounds (Arsenic, Cadmium, Lead) • 2-Methoxy Ethanol • Toluene • Trichloroethylene

*NOTE: This list merely provides a few examples for each PHS Category and the H codes used by GHS in identifying them. There are hundreds of known chemicals which are considered PHS and will have one or more of these H codes assigned to them and indicated on their SDS. Many chemicals fall under more than one category. Always check the SDS of the chemicals you wish to procure to see if they are a PHS and to ensure necessary safety considerations are addressed before you order/acquire them.

List of GHS Hazard “H” Codes for Particularly Hazardous Substances (PHS)

Physical Hazards

H200: Unstable explosive
H201: Explosive; mass explosion hazard
H202: Explosive; severe projection hazard
H203: Explosive; fire, blast or projection hazard
H204: Fire or projection hazard
H205: May mass explode in fire
H230: May react explosively even in the absence of air
H231: May react explosively even in the absence of air at elevated pressure and/or temperature
H240: Heating may cause an explosion
H241: Heating may cause a fire or explosion
H250: Catches fire spontaneously if exposed to air
H251: Self-heating; may catch fire
H260: In contact with water releases flammable gases which may ignite spontaneously
H261: In contact with water releases flammable gas
H271: May cause fire or explosion; strong oxidizer

Health Hazards

H300: Fatal if swallowed
H304: May be fatal if swallowed and enters airways
H310: Fatal in contact with skin
H330: Fatal if inhaled
H340: May cause genetic defects
H341: Suspected of causing genetic defects
H350: May cause cancer
H351: Suspected of causing cancer
H360: May damage fertility or the unborn child
H361: Suspected of damaging fertility or the unborn child
H361d: Suspected of damaging the unborn child
H361f: Suspected of damaging fertility
H370: Causes damage to organs, single exposure
H371: May cause damage to organs, single exposure