

Chemical Hygiene Plan

For

UNCW Laboratories

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Chemical Hygiene Plan for UNCW Laboratories

This program is required by OSHA and is based on the standard, Occupational Exposure to Hazardous Chemicals in Laboratories (29 CFR 1910.1450). It applies to all University of North Carolina Wilmington employees who work in laboratory settings. Employees who work with hazardous materials in non-laboratory settings must comply with the UNCW Hazard Communication Program based on the OSHA Hazard Communication Standard (29 CFR 1910.1200). It is good practice that the same levels of safety and precautions that are afforded to employees be implemented for students; however, the mechanisms for supplying personal protective equipment, medical evaluations, and for reporting accidents may differ.

The Chemical Hygiene Plan (CHP) serves to communicate the hazards of chemicals used in laboratories at the University of North Carolina Wilmington (UNCW) to personnel and affiliates and to convey safety precautions necessary to minimize exposure to hazardous chemicals and to protect employees from health hazards associated with the use of hazardous chemicals.

The requirements of a chemical hygiene plan are:

- It shall be site specific.
- It shall contain written Standard Operating Procedures (SOPs) that address the safe usage of hazardous chemicals in the laboratory.
- It shall be immediately available to staff, Environmental Health & Safety (EH&S) and to regulatory officials.
- It shall be reviewed annually and updated as necessary.

RESPONSIBILITIES:

Environmental Health & Safety Department (EH&S):

Environmental Health & Safety is responsible for the implementation and monitoring of safety and environmental programs and operates under authority of the Chancellor as described in UNCW Policy 05.600. The Chemical Hygiene Plan is administered by EH&S who will assist departments in their implementation and compliance with the CHP. EH&S will review the CHP annually, update if necessary, and notify departments of any changes. In addition, EH&S will inspect fume hoods, drench showers and eyewashes, perform exposure and hazard assessments, provide general laboratory training and chemical-specific user awareness training.

Chemical Hygiene Officer (CHO):

A Chemical Hygiene Officer is required under this program. The CHO is an individual who can provide technical guidance in the implementation of the CHP. The CHO for the UNCW Campus and Center for Marine Science (CMS) is appointed within EH&S by the EH&S Director and will provide general laboratory training and chemical-specific user awareness training as needed.

Department Chairs:

Department Chairs are responsible for supporting the Principal Investigators and laboratory staff with the resources necessary to ensure compliance with this program. This includes providing training, time away from work to attend training sessions, safety equipment, and the appropriate personal protective equipment (PPE).

Principal Investigators/Lab Supervisors:

Each Principal Investigator or Lab Supervisor is responsible for implementing the CHP in their laboratory. The Principal Investigator is responsible for providing lab-specific training for their employees and students to include safety procedures and hazard awareness training for the chemicals used within the lab. Each Principal Investigator or Lab Supervisor shall provide Standard Operating Procedures (SOPs) for the activities where hazardous chemicals are used. The SOP must incorporate general safety practices to protect lab workers. See attachments for basic chemical handling procedures (Attachment F) and a template for creating SOPs for the lab (Attachment G).

Each Principal Investigator or Laboratory Supervisor is responsible for providing training, ensuring that personal protective equipment is obtained and worn, maintaining a chemical inventory, and ensuring that all aspects of the CHP are complete for their area. In addition, each Principal Investigator is responsible for conducting an annual review of the laboratory's CHP and revising it as necessary.

Individuals:

Individual laboratory workers are responsible for wearing the appropriate personal protective equipment, ensuring that hazards are minimized and controlled, adhering to prescribed safety rules and regulations, and following the Standard Operating Procedures.

Visiting Scientists:

Visiting Scientists are expected to adhere to the rules and expectations of the Chemical Hygiene Plan in the same manner as UNCW employees.

DEFINITIONS

(29 CFR 1910.1450 (b))

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

For purposes of this plan, hazardous chemicals also include those that present a physical hazard.

Physical hazard means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

HAZARD IDENTIFICATION

Chemical Hazards within the laboratory will be identified by the use of hazard communication signs, chemical labels, a chemical inventory, and safety data sheets (SDSs).

Hazard Communication Signs:

Laboratory and other potentially hazardous work areas will have a hazard communication sign at the door leading into the workspace. These hazard communication signs will identify the categories of potentially hazardous materials within the lab and the names of individuals who would know the hazards that may result from an emergency in the laboratory. EH&S will maintain emergency contact information for each laboratory.

EH&S will provide the hazard communication signs for each laboratory after receiving a completed Laboratory Safety Data Sheet for the facility (Attachment B). The Laboratory Safety Data Sheet and the hazard communication signs will be reviewed annually and revised, if necessary, by the CHO and Principal Investigator.

Chemical Labels:

All chemical containers must be labeled. The manufacturer's labels will provide the initial information on the handling of any substance. Directions found on the label must be followed.

Where substances are transferred from an original container, the new container must be labeled with the full trade or chemical name of the product and concentration of the chemical. If abbreviations or codes of the chemical name are used, a key for identifying the code or symbol must be available in the lab.

Chemical Inventory:

An inventory of hazardous chemicals found in the laboratory is required to be maintained at all times. This must be updated annually and available for staff, EH&S or CHO review. This inventory should include the top 20 chemicals used in the lab (based on quantity) and chemicals that are carcinogenic, reproductive toxins, or acutely toxic. This inventory must be included on the Laboratory Safety Data Sheet (Attachment B).

Safety Data Sheets (SDS):

SDSs for all chemicals used in the laboratory shall be readily available (by paper or electronic means) to all personnel during their work shift. EH&S highly recommends that each laboratory maintain a paper copy of the SDS for their top 20 chemicals and supervisors are responsible for obtaining the sheets. SDSs may be supplied through electronic means if each employee is capable of retrieving the information at any time. When personnel travel between different workstations, SDSs may be kept at the primary location.

SDSs are often available electronically. Check the manufacturer's website for the most recent version. EH&S also maintains a subscription service to MSDSONline which is accessible to employees and students through mySeaport. Please note that SDSs and chemical inventories are considered to be part of an exposure record and, where required, shall be kept for 30 years after an individual leaves the work setting.

STANDARD OPERATING PROCEDURES:

Each Principal Investigator or Lab Supervisor must complete Standard Operating Procedures for laboratory work involving the use of hazardous chemicals. (See Attachment G for a template.) SOPs may be prepared to address a process, such as distillation; a specific hazardous material, such as arsenic; or a class or family of chemicals, such as inorganic acids.

Details of the Standard Operating Procedures include:

- a. The location of the laboratory.
- b. The individual responsible for laboratory safety programs, e.g., PI, lab manager.
- c. The storage of chemicals, e.g., chemical storage cabinet, under the fume hood.
- d. The requirements for chemical transport.
- e. The emergency procedures and equipment.
- f. The spill control and decontamination procedures.
- g. The waste disposal procedures.

- h. For procedures using hazardous chemicals, e.g., distillations, reactions, syntheses:
- The chemicals used in the process, e.g, formaldehyde, acetone
 - The hazard class of each chemical, e.g, poison, corrosive, flammable
 - The human health hazard of each chemical, e.g., nephrotoxin, teratogen
 - The personal protective equipment that must be worn during the activity, e.g., gloves, lab coat, goggles
 - The engineering controls that must be used during the activity, e.g., fume hood, glove box

Special considerations shall be provided for particularly hazardous substances. OSHA defines these as select carcinogens, reproductive toxins, and substances with a high degree of acute toxicity. See Attachment E for a list that includes many particularly hazardous substances by these criteria:

- a. Select carcinogens that are regulated by OSHA as a carcinogen, are listed by the National Toxicology Program (NTP) as a carcinogen, or are listed under Group 1, Group 2A, or Group 2B by the International Agency for Research on Cancer (IARC) monographs.
- b. Reproductive toxins.
- c. Acutely toxic materials (LD50 is less than or equal to 100 mg/kg).

For these particularly hazardous compounds, the following are also required:

- a. Establishment of a dedicated work area.
- b. Use of a containment device such as a fume hood or glove box.
- c. Specific waste removal procedures.
- d. Specific decontamination procedures.

If the use of select carcinogens, reproductive hazards, and/or acute toxins takes place in the laboratory, please ensure that all of the information listed above (dedicated work area, the use of the fume hood or glove box, a specific waste removal procedure, and a specific decontamination procedure) is included in the SOP. If you are not sure whether a chemical meets the criteria, please check with EH&S at 962-7017.

TRAINING:

The Principal Investigator shall train all employees who work in laboratories in the following areas:

- a. The physical and health hazards of the chemicals used in the laboratory.
- b. The SOPs to be used in the laboratory.
- c. The location of SDSs and how to use them.
- d. The location of the chemical inventory.
- e. The appropriate handling of laboratory wastes.

EH&S will train employees who work in laboratories in the following areas:

- a. The contents of the CHP.
- b. The methods for detecting chemicals in laboratories.
- c. The measures employees can take to protect themselves from exposure to chemicals, e.g., engineering controls, personal protective equipment.
- d. The general procedures for managing laboratory wastes.

Training shall be made available upon initial assignment and prior to work with any new hazardous chemical or new activity using chemicals. EH&S offers General Lab Safety Training and Chemical Specific User Training to employees and provides a checklist for employees to use

to ensure they are sufficiently trained (see Employee Review in Attachment D). Training must be documented and records retained for 5 years.

Students who are enrolled in laboratory courses or are participating in laboratory research where hazardous chemicals are used must receive instruction on safe handling of the materials, prevention of exposure, and recognition of and response to incidents.

Online training is available for all employees through mySeaport at UNCW EH&S Vivid Learning Access. Students may also be enrolled by request to the EH&S Department. Recommended courses are the University Laboratory Safety Series: Working Safely, Analyzing Hazards, and Developing and Using Controls.

USING CHEMICALS SAFELY:

Prior to Beginning Work with Chemicals:

Prior to purchasing chemicals for lab use, survey the work areas and ensure that there is adequate storage and equipment necessary to work safely. Complete the SOP (Attachment G) or create your own and conduct any training necessary. **Note that processes where perchloric acid is heated require availability of a perchloric acid fume hood unless otherwise approved by EH&S. Cold storage of flammable liquids requires an approved flammable storage refrigerator or freezer. Household units and cold rooms are not suitable.**

Obtaining Chemicals for Laboratory Use:

Most chemicals may be ordered directly by the department. EH&S must approve work with radioactive materials and be notified of work with select carcinogens, acute toxins, and controlled substances. (Attachment E)

Ensure that an SDS is delivered along with the chemical that is ordered. Of you need an SDS for a chemical already on hand, contact the supplier or use available electronic sites.

Engineering Controls:

Fume hoods shall be used when handling hazardous chemicals in a way that might result in an over exposure or a hazardous condition. Ensure containment by performing work at a minimum of four inches back from the front edge of the hood and by minimizing the sash opening. During hood use, the sash should be positioned at or below the stops (or prescribed height as designated by EH&S) and laboratory workers should note airflow conditions as shown by hood monitors. If the hood is equipped with a combination sash, sliding panel openings should be minimized to a single panel width. Larger sash openings are only appropriate during equipment/apparatus loading and set-up. When work concludes, *Shut the Sash* to provide a barrier between the hood and the room and to conserve energy by minimizing loss of conditioned air.

If the hood is not working correctly, all hazardous work in the hood must cease until the hood has been repaired. To have a hood repaired or serviced, log on to AiM via mySeaport and complete an electronic work request. Emergency work requests can be phoned in to Physical Plant's work order desk at 962-3101. Contact EH&S at 962-3057 with any questions about fume hoods.

Other protective devices such as glove boxes, shields, increased ventilation, point source vapor collection, and others may be necessary, depending on the activity.

Personal Protective Equipment (PPE):

Laboratory workers shall use personal protective equipment (PPE) as necessary. The PPE must fit the individual, be specific for the hazard, and training in the proper use is necessary. PPE may include gloves, safety glasses, safety goggles, face shields, lab coats, aprons, gowns, and other protective devices. In special conditions, respirators may be appropriate.

- Gloves:
One type of glove is not appropriate for all uses. Determine which glove is appropriate for your use by reviewing MSDSs and glove compatibility guidelines.
- Respirators:
Respirators may not be worn without EH&S approval. Respirator use should be the last line of defense against chemical hazards and only considered if engineering controls are not adequate. EH&S manages a Respiratory Protection Program that includes initial training, fit-testing, and medical monitoring. Employees are not allowed to use a respirator at UNCW without being on this program. Voluntary use of filtering face pieces and other respirators requires compliance with 29 CFR 1910.134 Appendix D.

Chemical Waste and Disposal:

EH&S will dispose of all regulated chemical waste; hazardous materials may not be discharged to the sewer or thrown away as regular trash. Laboratory personnel are responsible for proper packaging and labeling, safely storing the waste during accumulation in the lab, and for ensuring that containers are closed except when waste is being added to them. To request waste disposal, complete and submit a [Laboratory Waste Form](#) or phone: 962-7258.

Waste Containers:

EH&S supplies containers for disposal of broken glassware and organic solvent waste. Please call 962-7258 to request a waste container. Full broken glassware containers can be sealed and disposed of directly into the dumpster by lab personnel. No liquids are permitted in broken glass boxes. Hazardous chemical waste is managed by and disposed of by EH&S.

Chemical Spills:

Laboratory staff are responsible for cleaning up chemical spills and contaminated areas that are bench scale and for which they have adequate materials and training to respond. If the spill is large or there are concerns about the safety of laboratory individuals, call University Police at 962-2222 or EH&S at 962-3057 for assistance.

Spill Kits:

EH&S recommends that each laboratory have a spill kit. Suggested contents are listed in Attachment H. Since each laboratory uses different chemicals, the kit should be specific to the hazards present in that laboratory. For assistance in creating an appropriate spill kit, please contact EH&S at 962-7017.

Sharps:

Laboratories are responsible for purchase of sharps boxes. EH&S will dispose of full boxes; contact 962-7892 for collection. No hazardous chemicals are permitted.

EXPOSURE MONITORING:

Monitoring is appropriate when there is reason to believe that the exposure level of any chemical approaches or exceeds the action level or Permissible Exposure Limit (PEL) for that substance. Monitoring will be performed by EH&S staff and results will be provided to laboratory

employee(s). If you have concerns about exposures to specific chemicals, contact EH&S at 962-7017 for an assessment.

MEDICAL CONSULTATION AND EXAMINATIONS:

The opportunity to receive medical attention is available to all employees who work with hazardous chemicals in the laboratory, under the following circumstances:

- When an employee develops signs or symptoms associated with exposure to a hazardous substance.
- When exposure monitoring reveals an exposure level routinely above the action level for an OSHA-regulated substance for which there are exposure monitoring and medical surveillance requirements.
- When an event, such as a chemical spill, leak, explosion or other occurrence, takes place resulting in the likelihood of a hazardous exposure.

The medical consultations and examinations will be provided at no charge to the employee, without loss of pay, and at a reasonable time and place. Please contact EH&S at 962-7017 to arrange a medical consultation and examination. For an incident or exposure requiring immediate medical attention, please call 911. Any UNCW staff member working at an off-campus facility who needs immediate medical attention should contact the nearest emergency health care provider.

ACCIDENT REPORTING:

All work-related accidents and injuries, regardless of severity, and work-related illnesses involving employees must be reported to Human Resources' Workers' Compensation Administrator and to EH&S at 962-3057. If these forms are not completed within the required time schedule, the employee's medical benefits may be affected and the department may be held responsible for treatment costs and penalties.

RECORDKEEPING:

The accident report form will be retained by the Workers' Compensation Administrator. The medical records will be retained by the health care provider. Training records will be kept by the department or facility for a period of five years and monitored by EH&S.

SURPLUS EQUIPMENT:

Laboratory equipment for surplus or disposal must be decontaminated by the user, then evaluated and tagged by EH&S before it can be released.

LABORATORY MOVES AND CLOSURES:

Prior to planning the movement or closure of a laboratory, please contact EH&S at 962-7017. EH&S will ensure safe handling of hazardous materials and give guidance on how to safely accomplish the move. When closing laboratories, EH&S will work with laboratory personnel to ensure that materials and equipment are handled and disposed of properly.

OSHA RULE:

The NC-OSHA rule regarding this program is available electronically at
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10106

ATTACHMENTS:

- A. UNCW EH&S Contact Information
- B. Laboratory Safety Data Sheet
- C. Flammable Material Storage Information
- D. Laboratory Self-Inspection Checklist
- E. Particularly Hazardous Substances
- F. Basic Laboratory Safety Guidelines
- G. Standard Operating Procedures (SOP) Template
- H. Suggested Spill Kit Contents
- I. Suggested References
- J. Hazard Communication Standard Pictograms