

Chemical Hygiene Plan For UNCW Laboratories

This program is required by OSHA and is based on the OSHA Occupational Exposure to Hazardous Chemicals in Laboratories (29 CFR 1910.1450). It covers all University of North Carolina at Wilmington employees who work in research laboratory settings. The requirements of this program do not apply to students (unless they work for the university). Please note that those who work in non-laboratory settings must comply with the UNCW Hazard Communication Program based on the OSHA Hazard Communication Standard (29 CFR 1910.1200).

The Chemical Hygiene Plan (CHP) ensures that the hazards of chemicals in use in laboratories at the University of North Carolina at Wilmington (UNCW) are communicated to all UNCW personnel and affiliates. Safety precautions necessary to prevent exposure shall be ensured by this plan.

A chemical hygiene plan has the following components:

- **It shall be site-specific**
- **It shall contain written Standard Operating Procedures (SOPs) that include each activity in which chemicals are used in the lab.**
- **It shall be immediately available to staff, Environmental Health & Safety (EH&S), and regulatory officials.**
- **It shall be reviewed annually and updated as necessary.**

RESPONSIBILITIES:

Environmental Health & Safety (EH&S):

Environmental Health & Safety is responsible for the implementation and monitoring of all safety and environmental programs, including the CHP. EH&S will assist with and monitor 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 EH&S Laboratory and Environmental Safety Manager acts as the CHO for the Center for Marine Science (CMS) and the UNCW campus. The CHO will provide the general laboratory training and the chemical specific user awareness training.

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 his/her laboratory. The Principal Investigator is responsible for providing lab-specific training for their employees to include safety procedures and hazard awareness training for the chemicals used within the lab. Each Principal Investigator or Lab Supervisor shall generate Standard Operating Procedures (SOPs) for the activities using chemicals in the lab. 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 complete 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.

HAZARD IDENTIFICATION:

Chemical hazards within the laboratory will be identified by the use of hazard communication signs, chemical labels, a chemical inventory, and Material Safety Data Sheets (MSDS).

Hazard Communication Signs:

Laboratory and other potentially hazardous work areas will have a hazard communication sign at all doors leading into the workspace. These hazard communication signs will identify the categories of potentially hazardous materials contained in the lab.

Emergency contact information will also be included on the sign. This emergency contact information will provide the names and phone numbers of individuals who would know the hazards that may result from an emergency in the laboratory.

EH&S will provide the hazard communication signs for the laboratories after receiving a completed Laboratory Safety Data Sheet for the laboratory (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 bottles and chemical containers must be labeled. The manufacturer's label will provide the initial information on the handling of any substance. Directions found on the label must be followed.

All substances transferred from an original container must be labeled with the full trade or chemical name of the contents, any dilution of the chemical and the date of the transfer. If abbreviations or codes of the chemical name are used, a key must be available in the lab identifying the code or symbol.

Chemical Inventory:

A complete chemical inventory of all chemicals found at the worksite is required to be maintained at all times. This must be updated annually, 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).

Material Safety Data Sheets (MSDS):

MSDSs 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 the laboratory maintain a “hardcopy” of the MSDS for the top 20 chemicals used in each laboratory. Supervisors are responsible for contacting the manufacture or distributor to obtain the MSDS. MSDSs may be supplied through electronic access if each employee is capable of retrieving this information at any time. When personnel travel between different workstations, MSDSs may be kept at the primary location.

MSDSs are available electronically. Check the EH&S web site (www.uncwil.edu/safety) for MSDSs on the internet. Please note that MSDSs or chemical inventories are considered exposure records and shall be kept for 30 years after an individual leaves the work setting.

STANDARD OPERATING PROCEDURES:

Each Principal Investigator or Lab Supervisor must complete a Standard Operating Procedure for each activity in which chemicals are used. See Attachment G for a template SOP.

The Standard Operating Procedures shall detail:

- a. The location of the laboratory.
- b. The individual responsible for the UNCW Chemical Hygiene Plan in that area.
- 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 each activity using chemicals (e.g. distillations, reactions, syntheses):
 - **The chemicals used in the process (e.g. hydrofluoric acid, formaldehyde, benzene).**
 - **The hazard class of each chemical (e.g. acid, base, flammable, reactive).**
 - **The human health hazard(s) of each chemical (e.g. nephrotoxin, teratogen, neurotoxin).**
 - **The personal protective equipment that shall be worn during the activity (e.g. gloves, lab coat, goggles).**
 - **The engineering controls that shall be used during the activity (e.g. fume hood, glove boxes, point source ventilation).**

Special consideration 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 of these hazardous substances.

- a. Select carcinogens are those compounds 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. Acute toxins (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 (962-3057).

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 the MSDS and how to use them.
- d. The location of the chemical inventory.

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

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

Training shall be delivered upon initial assignment and prior to work with any new 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 B). Training records must be documented.

USING CHEMICALS SAFELY:

Prior to Beginning Work with Chemicals:

Prior to purchasing chemicals for lab use, survey the work area 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.

Obtaining Chemicals for Laboratory Use:

Most chemicals may be ordered directly by the department. Some chemicals require EH&S approval prior to purchase. EH&S must approve work with select carcinogens, acute toxins, and radioactive materials. (See Attachment E).

Ensure that a MSDS is delivered along with the chemical that is ordered. If you need a MSDS for a chemical already on hand, call the supplier or use the list of MSDS web sites accessible through the EH&S web site (www.uncwil.edu/safety).

Engineering Controls:

Fume hoods shall be used when individuals are using any hazardous chemical. All work must be performed a minimum of four inches from the front edge of the hood. The sash should be lowered to the stops or prescribed height as designated by EH&S. If the hood is not working correctly, all work in the hood must cease until the hood has been repaired. To have a hood repaired or serviced, contact Physical Plant (962-3101).

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

Personal Protective Equipment (PPE):

Laboratory members shall use personal protective equipment (PPE) as necessary. The PPE must be fit to the individual wearer and be specific for the hazard. Individuals shall be trained regarding the use and wearing of the PPE. PPE may include gloves, safety glasses, lab coats, aprons, or gowns, and under special conditions, respirators.

- **Gloves:**
One type of glove is not appropriate for all uses. Determine which glove is appropriate for your use using MSDSs and glove compatibility guidelines. The following web site provides useful information for glove selection: <http://www.ehs.cornell.edu/lrs/chemInfo/protection.htm> .
- **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.

Chemical Waste and Disposal:

EH&S will dispose of all chemical waste. It must be properly packaged and labeled. A Hazardous Material Transfer Form is available from EH&S and must be submitted prior to pick-up. Consult your CHO to determine the procedures for storage of waste prior to the pick up.

Waste Containers:

EH&S supplies 5-gallon waste containers for disposing of glassware and liquid hazardous waste. Please call EH&S (962-3057) to request a waste container. The glass container, once full, can be disposed of directly into the dumpster by lab personnel. The liquid hazardous waste is disposed of and managed by EH&S. A Hazardous Material Transfer Form is available from EH&S and must be submitted prior to pick-up.

Chemical Spills:

Laboratory staff shall clean chemical spills and contaminated areas that are bench scale and in which they have adequate materials to respond. If the spill is large or there are concerns about the safety of laboratory individuals, call University Police (962-4911) or EH&S (962-3057) for assistance.

Spill Kits:

EH&S recommends that each laboratory have a spill kit. Since each laboratory uses different chemicals, the spill kit should be specific to the hazards present in that laboratory. For assistance creating an appropriate spill kit, please contact EH&S (962-3057) or the Chemistry Stockroom Coordinator (962-3460). Mercury spill kits can be acquired directly through the Chemistry Stock Room.

EXPOSURE MONITORING:

Personnel monitoring shall be performed if there is reason to believe that the exposure level of any chemical exceeds the action level or Permissible Exposure Limit (PEL). Monitoring will be performed by EH&S staff. Results of the monitoring will be discussed with laboratory employee(s). If you have concerns about exposures to specific chemicals, contact EH&S (962-3057) 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 above the action level for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements.**
- **When an event takes place in which employees are exposed to hazardous substances (i.e.- chemical spill, release, explosion, etc.).**

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 (962-3057) to arrange a medical consultation and examination. For an incident or exposure requiring immediate medical attention, please contact University Police (962-4911). 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 accidents and injuries, regardless of severity, involving employees must be reported to the Workers' Compensation Administrator (962-3712) and EH&S (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.

RECORD KEEPING:

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 and monitored by EH&S.

LABORATORY MOVES AND CLOSURES:

Prior to planning the movement or closure of a laboratory, please contact EH&S (962-3057). EH&S will ensure that all hazardous materials are safely disposed and gives guidance on how to safely accomplish this.

OSHA RULE:

The OSHA rule regarding this program is available electronically at http://www.osha-slc.gov/OshStd_data/1910_1450.html

ATTACHMENTS:

- A. [UNCW EH&S Telephone Numbers](#)
- B. [Flammable Storage Sheet](#)
- C. [Laboratory Self-Inspection Checklist](#)

Chemical Hygiene Laboratory Self-Inspection Checklist

For UNCW

Environmental Health & Safety

The purpose of this form is to assist university laboratories in complying with the OSHA Laboratory Safety Standard. Self-inspections should be conducted by the Principal Investigator or Lab Supervisor and periodic formal inspections will be conducted by Environmental Health & Safety (EH&S). If you have any questions or concerns regarding chemical safety in the laboratory, please contact EH&S at 962-3057.

Building: _____ Department: _____
Lab Number: _____ Contact: _____ Date: _____

LAB INSPECTION:

- Exits are lighted and clear of obstruction.
- Work area is free of debris and in good condition.
- Inventory of all chemicals is maintained and updated annually for review.
- Food is stored and consumed away from the work area.
- Hand washing facilities are provided inside the lab.
- Material Safety Data Sheets are readily available.
- Labels on chemical containers are legible and firmly secured.
- Labels identify the degree of hazard.
- Chemicals are stored according to compatibility.
- Corrosive chemicals are stored below eye level.
- A flammable storage cabinet is provided for flammable liquids when required.
- Explosion proof refrigerators are provided for cold storage of flammable liquids.
- Gas cylinders are properly secured.
- Extension cords are not used in place of permanent wiring.
- UL listed/FM approved electrical equipment is provided.
- Electrical cords and equipment are protected against chemicals and temperature.

___ Fume hoods are not used for storage.

___ Personal Protective Equipment is provided and in use.

___ A written Chemical Hygiene Plan is in the lab and available for inspection.

___ Emergency numbers and evacuation procedures are posted in conspicuous locations in the lab.

EMPLOYEE REVIEW (All lab personnel must be able to answer the following questions.)

- Do you know what the Chemical Hygiene Plan is and where it is located?
- Do you know what Material Safety Data Sheets are and where they are located?
- Do you know where the Standard Operating Procedures are for the lab?
- Do you know what to do if there is a chemical spill?
- Do you know the location of and how to use the emergency eyewash/shower?
- Do you know what Permissible Exposure Limits are and where to locate them for the chemicals you work with?
- Do you know how to recognize the presence or release of the chemicals used in your area?
- Do you know the health hazards associated with the chemicals you use?
- Do you know the signs and symptoms associated with exposure to the chemicals in your lab?
- Do you know the measures (work practices, emergency procedures, Personal Protective Equipment, etc.) you can take to protect yourself from the hazards associated with the chemicals used in your lab?
- Do you know the location of the chemical inventory in your lab?

Flammable Storage Sheet

Building codes limit the amount of flammable materials that may be stored in laboratories and the size of containers. Flammable liquids should be stored in approved safety cans or in fire-rated flammable storage cabinets wherever possible.

Flammable Liquids – Maximum Size of Containers

<u>Container Type</u>	<u>Class 1A</u>	<u>Class 1B</u>	<u>Class 1C</u>
Glass	1 pint	1 quart	1 gallon
Metal or approved plastic	1 gallon	5 gallon	5 gallon
Safety cans	2 gallon	2 gallon	2 gallon
Metal drums	Contact EH&S for storage requirements (962-3057)		

Class 1A – Flash point < 73 °F (22.78 °C), boiling point < 100 °F (37.78 °C)

Class 1B – Flash point < 73 °F (22.78 °C), boiling point ≥ 100 °F (37.78 °C)

Class 1C – Flash point ≥ 73 °F (22.78 °C), boiling point < 100 °F (37.78 °C)

Safety cans are the safest way to store flammable liquids. They have spring loaded lids and an internal screen which prevents combustion of the contents. Large polypropylene (Nalgene) containers with stopcocks or valves at the bottom should never be used to store flammable liquids. These valves frequently leak and are unsafe in a fire.

Flammable Liquids – Maximum Quantities

<u>Location</u>	<u>Max. Amount</u>
Open laboratory (including safety cans)	10 gallons
Fire rated storage Cabinet	60 gallons

Flammable Storage Refrigerators and Environmental Rooms:

Never store flammable liquids in a standard or domestic refrigerator. If flammable liquids must be refrigerated or cooled they must be kept in an approved “flammable storage” refrigerator or freezer. These units are available from many vendors. Domestic refrigerators have a variety of ignition sources inside the cabinet, such as lights, switches, defrost coils, etc. that could ignite vapors. Flammable storage refrigerators have no ignition sources inside the cabinet. In extremely rare occasions it may be necessary to use an “explosion proof” refrigerator or freezer (i.e., one with no interior or exterior ignition sources).

Refrigerators used for food storage should be labeled with a “Store No Chemicals” label. Refrigerators used for storage of other chemicals should be labeled with “Store No Food” label.

Environmental Rooms (cold/warm rooms) have many ignition sources and little or no air circulation from outside. They should never be used for storage of flammable or other hazardous materials. Small quantities of hazardous materials (e.g. 500 ml) may be used in these spaces but they should not be stored there.

UNCW EH&S TELEPHONE NUMBERS

EH&S Main Office		962-3057
Radiation Safety Air Monitoring Programs Emergency Response	Stan Harts	962-3108
Chemical/Laboratory Safety Chemical Hygiene Officer Hazardous Waste Universal Waste	Diana Morgan	962-7017
Biological Safety Fire Safety Respiratory Protection	Danny Edens	962-4287
OSHA Record keeping Training Coordinator Bloodborne Pathogens Hazard Communications	Joan Greene	962-3057

OTHER IMPORTANT TELEPHONE NUMBERS

Facility Number for General Emergencies: **962-4911**

Carolinas Poison Center: **1-800-848-6946**

University (UNCW) Police Department: **962-4911**

New Hanover Regional Medical Center: **343-7000**

Vitaline: **815-5188**

Workers Compensation Administrator - Human Resources: **962-3712**

