HAZARDOUS MATERIAL/CHEMICAL INVENTORY AND CONTROL

A. Introduction:

1. This chapter provides University Faculty, Staff, and Students with guidelines on ordering chemicals, adding and removing chemicals from the inventory system, and proper storage and handling of hazardous materials and chemicals. It is essential for all hazardous materials and chemicals to be strictly controlled to ensure a safe working environment, prevent exposures, and reduce waste generation.

B. Responsibilities:

1. Environmental Health and Safety Department (EHS):

a. Keeps an accurate database of all chemicals on campus with a web based chemical inventory module called the Vertere Chemical Inventory Management System.

b. Works with the UNE Shipping and CHO's and Department Heads to ensure that all chemicals receive a barcode upon arrival and that current Safety Data Sheet(s)are onsite, available, and kept on file.

c. Controls hazardous substances on campus and applies for special licenses or government notifications as required.

d. Quarterly completes a chemical reconciliation on all labs' chemicals.

2. Chemical Hygiene Officers/Biosafety Officers/Department Heads:

a. Collaborates with EHS on the ordering of chemicals and quantities that their department requires.

b. Ensures all chemicals/biological agents are stored properly and are accounted for at all times.

c. Controls who has access to chemicals/biological agents and who is authorized to use them.

d. Provides a current copy of SDS' to the EHS department for every chemical ordered and keeps a current copy on file where the chemical is used.

e. Assists EHS with the chemical inventory process as needed.

3. Mailroom/Shipping and Receiving Department

a. Receives all packages including all chemical/hazardous material deliveries at UNE, inspects the packages to ensure there are no leaks or spills, and refuses damaged packages when necessary.

b. Notifies EHS if there are any chemicals that have leaked or spilled through their packaging.

c. Delivers the chemicals/hazardous materials to the appropriate departments on campus.

C. Policies, Practices, and Procedures:

1. Classification of Hazardous Materials/ Chemicals: In order to safely and properly handle and store hazardous materials/ chemicals, it is important to know the hazards of those materials. Hazardous materials/chemicals may generally be assigned to one or more of the following classifications:

   a. Flammable liquid: A liquid having a flash point of not more than 93 ºC.

Table 1: GHS Flammable (and Combustible) Liquid Criteria

Criteria	GHS Category	Transport Class/Packing Group
Flash point < 73°F(23°C) and initial boiling point < 95°F(35°C)	1	3, I
Flash point < 73°F(23°C) and initial boiling point > 95°F(35°C)	2	3, II
Flash point ≥ 73°F(23°C) and < 140°F(60.5°C)	3	3, III
Flash point > 140°F(60.5°C) and < 199.4°F(93°C)	4	Combustible Liquid, PG III [DOT uses <200°F(93°C)]

   b. Flammable solid: A solid which is readily combustible, or may cause or contribute to fire through friction.

   c. Oxidizer: A material which may cause the ignition of combustible materials without the aid of an external source of ignition or which, when mixed with combustible materials, increases the rate of burning of these materials when the mixtures are ignited.

d. Corrosive: A chemical that has a pH less than 2 or greater than 12.5 and causes visible destruction or, or irreversible alterations in, living tissue by chemical action at the site of contact.

e. Organic Peroxide: A liquid or solid organic substance which contains the bivalent -0-0 structure and may be considered a derivative of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. The term also includes organic peroxide formulation (mixtures).

f. Poison, Class A: A DOT term for extremely dangerous poison, poisonous gases or liquids that, in very small amounts, either as gas or as vapor of the liquid, mixed with air, are dangerous to life. Examples: phosgene, cyanogen, hydrocyanic acid, nitrogen peroxide.
Poison, Class B: A DOT term for liquid, solid, paste or semi-solid substance, other than Class A poisons or irritating materials, that are known (or presumed on the basis

of animal tests) to be so toxic to humans that they are a hazard to health during transportation.

g. Explosive: A chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.

h. Compressed Gas: A gas which when packaged under pressure is entirely gaseous at -50 ºC; including all gases with a critical temperature ≤-50 ºC. (See Chapter 10 of the Safety Manual for more information on compressed gas cylinders).

i. Cryogenics: Substances which are extremely cold such as liquid nitrogen, liquid helium and dry ice. These substances may also become asphyxiation hazards if spilled in non-ventilated areas.

2. Ordering Hazardous Materials/Chemicals: There are specific guidelines that must be followed when ordering hazardous materials and chemicals. It is essential to determine how materials will be stored and used in order to avoid ordering materials that we do not have the capability of maintaining or disposing. In addition, there are some chemicals that require special training.
Before ordering any materials (biological/radioactive/chemical):

   a. Search for least hazardous option or consider substituting a hazardous chemical for something less hazardous or non-hazardous. Always look for the safest alternative.

   b. Consider checking with other departments that use similar chemicals before placing an order to see if they have excess of the same chemical that you may be able to use.

   c. Only order the quantity of the substance that you are going to use. Do not order excess or bulk if it is not needed.

   d. When ordering biological materials, prior approval to order biological materials must be obtained from the department's Biological Safety Officer, EHS, and the Institutional Biosafety Committee (IBC).

   e. Radioactive materials require prior approval from the Radiation Safety Officer.

   f. Highly toxic materials or those requiring special treatment (storage conditions, containment, and disposal) must be approved by EHS or the Chemical Hygiene Officer. EHS must be contacted prior to ordering any Class A carcinogens such as:

      i. Arsenic and arsenic compounds

      ii. Asbestos

      iii. Benzene

      iv. Benzidine

      v. Chloromethyl methyl ether

      vi. Chromium and chromium compounds

vii. Diethylstibesterol

viii. 2-Napthylamine

ix. Vinyl chloride

g. The following chemicals have specific OSHA regulations which include required personal protective equipment, monitoring and training. EHS must be notified of their use.

i. 2-Acetylaminoflourene

ii. Acrylonitrile

iii. alpha-Naphthylamine

iv. 4-Aminodiphenyl

v. Asbestos

vi. Benzene

vii. Benzidine

viii. Benzine

ix. beta-Naphthylamine

x. beta-Propiolactone

xi. bis-Chloromethyl ether

xii. 1, 3-Butadiene

xiii. Cadmium

xiv. 1,2 Dibromo-3-chloropropane (DBCP)

xv. 3,3'-Dichlorobenzidine (and its salts)

xvi. 4-Dimethylaminoazobenzene

xvii. thyleneimine

xviii. Ethylene oxide

xix. Formaldehyde

xx. Inorganic Arsenic

xxi. Lead

xxii. Methyl chloromethyl ether

xxiii. Methylene chloride

xxiv. Methylenedianiline

xxv. N-Nitrosodimethylamine

xxvi. Vinyl chloride

3. Shipping/Transporting Hazardous Materials/Chemicals:

   a. Absolutely no hazardous materials or chemicals may be brought from home to UNE.

   b. Absolutely no hazardous materials or chemicals may be brought from UNE to home.

   c. Transportation of hazardous materials is strictly prohibited. If a hazardous substance or chemical must be transported between the Biddeford and Portland campuses, you must contact EHS.

   d. Shipping of chemicals/biohazardous materials and dangerous goods from UNE is strictly regulated and MUST be done through the EHS Department or by an individual with specialized training (such as DOT/IATA) accepted by EHS. **This includes dry ice**.

4. Receiving Hazardous Materials/Chemicals on Biddeford Campus:

   a. All hazardous materials/chemicals are received by the UNE Mailroom (either Portland or Biddeford Campus depending on where they were shipped).

   b. Damaged packages/containers will be refused by employees in the UNE Mailroom if they arrive in an unsafe condition.

   c. The packages are sorted and then delivered to the appropriate departments. It is then the responsibility of the department to store the material properly according to regulations.

   d. The department the material was delivered to will then be responsible for contacting EHS to bar code the substance and add it to the Vertere Chemical Inventory System or bar code the chemical themselves if they have the equipment. The department will then forward one copy of the SDS to EHS and keep a copy for the lab/storage location's SDS book/file.

5. Storage of Hazardous Materials/ Chemicals: The University requires the use of an approved chemical segregation system (such as the Flinn Storage System [Appendix W] or UNE Segregation Table [Appendix S] of the UNE Safety Manual). The following guidelines will be observed for storage of hazardous materials/ chemicals:

   a. Hazardous materials/ chemicals must be stored based on their compatibility, not simply in alphabetical order. Store materials of the same hazard together (such as: flammable with flammable and oxidizers with oxidizers).

b. Hazardous substances should be stored in an orderly manner with older products most accessible and the newer products least accessible.

c. Good housekeeping must be practiced in areas where hazardous products are stored.

d. All hazardous materials/chemicals from the manufacturer must be properly labeled, including:
   i. Product Identifier
   ii. Pictogram (GHS system)
   iii. Signal Word
   iv. Hazard Statement(s)
   v. Precautionary Statement(s)
   vi. Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party.

e. All in-house (secondary labels) must include the following:
   i. Product Identifier
   ii. Words, pictures, symbols, or combinations thereof, which provide information regarding the hazards of the chemical.

f. Hazardous materials/chemicals will be stored in original containers in which they were packaged at the manufacturing plant. If this is not practical, these products should be transferred according to manufacturers' recommendations into containers that are constructed to withstand the effects of the product over the maximum storage time and are labeled properly per the above standards.

6. Handling of Hazardous materials/chemicals: Consult Chapter 16 on Laboratory Safety or the Chemical Hygiene Plan (CHP) in the specific guidelines and required personal protective equipment.

7. Chemical Management Inventory System:

   a. UNE uses a web-based Chemical Management Inventory system with Vertere software. All chemicals are added to the software so we have an accurate, up-to-date list of what chemicals are on each campus, where they are located, who ordered them, and the quantity of what is being stored. Once they are added to the system, a unique bar code is created for each container and then affixed to the container for tracking purposes.

   b. Exclusions: The following list of substances are not required to be inventoried:

      i. Culture Media

      ii. Buffer Solutions

      iii. Test Kits

      iv. Bio-Molecules (enzymes and proteins)

      v. Consumer products (such as bleach, aspirin, corn oil, etc.)

c. Inventory Procedure:

i. Chemicals are received at the UNE Mailroom/Shipping-Receiving area.

NOTE: If the package appears to be damaged or leaking upon delivery, the UNE Mailroom staff will refuse the shipment and send it back to the supplier. If there is any spilled material, **the employee will evacuate the area and promptly notify EHS.**

ii. UNE Mailroom employee will deliver all chemical packages to the designated department on campus.

iii. The department that receives the chemical will then perform the following steps:

Step 1: Inspect the incoming package for any damage or leaks.

Step 2: Ensure the chemical container is appropriately labeled.

Step 2: Add the item to the electronic chemical management inventory system (including chemical name, manufacturer, quantity, storage location, and addressee's name) or have EHS add it to the inventory.

Step 4: Barcode the item with a UNE chemical inventory barcode or contact EHS to barcode if they do not have the equipment.

Step 5: Retain a copy of the SDS and forward a copy to EHS.

d. Deleting/Changing/Sharing Chemicals:

i. To remove a chemical from the electronic chemical management system if it has been completely used and the chemical container is then empty, remove the UNE barcode and stick it to the "Chemical Inventory Removal Form" and provide the form with all bar codes to EHS every month or email EHS with each the barcode number to report that the substance has been used and no longer needs to be in the inventory.

ii. To remove a chemical because it is old or no longer needed but there is still some left in the container, contact EHS so the item can be added to the "UNE Shared Chemical List" or so it can be collected and treated as hazardous waste. EHS will update the inventory at that time.

iii. To update the chemical inventory system to reflect that the item has been given to another department/lab/staff member, please email EHS with the bar code number on the container and who/where it is being transferred to so the online system can be updated accordingly.

e. UNE Chemical Sharing Program: As an alternative to sending out unwanted chemicals as hazardous waste, if you have a reasonable amount of a chemical that you are not going to use, you may offer it to other labs in the UNE lab community

by notifying EHS to post it in the UNE Lab Newsletter. Once the chemical is posted, other labs can email EHS to obtain the chemical on a first come, first serve basis. If no one would like the chemical, it will be deleted from the chemical inventory and sent out as hazardous waste.
**Please note it is important to notify EHS before donating your substance to another department or individual so that the chemical inventory is accurate. **

f. Chemical Reconciliations: Quarterly chemical reconciliations will be performed by EHS for each lab to ensure an accurate and up-to-date record of all chemicals on campus.

8. Contractor Owned Chemicals: According to OSHA's Hazard Communication Standard Guidelines, "employers are responsible for protecting their employees from all hazardous chemicals known to be present, including those brought on-site by contractors." Contractors who bring materials on-site are required to notify and provide a list of materials and quantities to EHS. A decision will be made as to whether the material(s) will be allowed on-site.

a. Any spills or accidental discharges of hazardous materials are to be immediately reported to the University's Director of Environmental Health and Safety or alternate EHS staff member, if the director is not available.

b. If it becomes necessary for the contractor to dispose of any chemicals, paint, or other waste materials, the University, through its Director of Environmental Health and Safety, will assist in arranging for such disposal, but the contractor is responsible for all expenses associated with disposal of Contractor generated wastes.

c. The Contractor is responsible for coordinating the flushing or disinfection of any utility lines with the Facilities Management Department and the University of New England's Waste Water Treatment Plant Operator prior to initiating these activities. The Contractor must also place into secondary containment all petroleum products and submit an inventory of those products to the EHS Department.

d. If the Contractor encounters or suspects hazardous or toxic materials, the Contractor shall immediately stop work in the associated area and advise the University. The work in the area shall not resume until the hazardous materials has been removed or mitigated in compliance with all federal and state regulations.

e. The University maintains a complete set of Safety Data Sheets (SDS), for any potential chemical hazards. The Contractor shall have on hand SDS for all hazardous materials used on the "Project". The Contractor shall comply with all applicable Federal, State and local laws, rules and regulations, including those of the US Environmental Protection Agency, Occupational Safety and Health Administration, and the State of Maine, Department of Environmental Protection.

9. Spill Procedures: All spill response and spill cleanup procedures can be found in the UNE Safety Manual in Chapter 16-Lab Safety.

10. Waste Reduction: By state law, the University is required to strive to reduce the amount of hazardous waste it generates. Therefore, University departments should take the following measures:

    a. Buy only those amounts of hazardous materials/chemicals which can be used before the expiration date of the material.

    b. Determine if someone else in the department has a legitimate need for, and can use, the product by utilizing the UNE Chemical Sharing Program.

11. Employee Access to Safety Data Sheets (SDS's):

    a. Employees have the right to obtain copies of any SDS(s) and/or list(s) of hazardous chemicals used in their workplace.

    b. There are three ways to obtain a Safety Data Sheet:

        i. Contact your supervisor or the Chemical Hygiene Officer,

        ii. Access SDS through web links, or

        iii. Contact EHS.

    c. Every work area must have copies of SDS's relevant to their work. Copies of SDS's for the entire University are kept in the Facilities office on each campus.

    d. Safety Data Sheets may be kept in any form, including operating procedures, and may be designed to cover groups of hazardous chemicals in a work area where it may be more appropriate to address the hazards of a process rather than individual hazardous chemicals. However, in all cases the required information is provided for each hazardous chemical,

    e. SDS' must be readily accessible during each work shift to employees when they are in their work area(s).

    f. Electronic access and other alternatives to maintaining paper copies of the safety data sheets are permitted as long as no barriers to immediate employee access in each workplace are created by such options.

D. Record Keeping:

1. Safety Data Sheets (SDS): SDS' must be readily accessible during each work shift to employees when they are in their work area(s)

    a. Electronic access and other alternatives to maintaining paper copies of the material safety data sheets are permitted as long as no barriers to immediate employee access in each workplace are created by such options.

b. SDS' will be maintained by the chemical user of the chemical.

c. SDS' for substances no longer utilized at UNE will be maintained for a period of 30 years by EHS.

2. The University Chemical Inventory is maintained by EHS

   a. All applicable departments must provide an inventory of the hazardous chemicals that are in use.