

**NORTHWESTERN CONNECTICUT COMMUNITY COLLEGE**

**CHEMICAL HYGIENE AND CHEMICAL  
MANAGEMENT PLAN  
2011-2013**

***DEPARTMENTS OF MAINTENANCE, ART, BIOLOGY, CHEMISTRY, NURSING,  
MEDICAL ASSISTING, AND VETERINARY TECHNOLOGY***

Edited by Tara Jo Holmberg  
Professor in Biology / Chemical Hygiene and Safety Officer  
Northwestern Connecticut Community College

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# NORTHWESTERN CONNECTICUT COMMUNITY COLLEGE CHEMICAL HYGIENE AND CHEMICAL MANAGEMENT PLAN

## INTRODUCTION

### PURPOSE:

This plan is intended to comply with OSHA Rules and Regulations 29 CFR 1910.1450, *Occupational Exposure to Hazardous Chemicals in Laboratories* (replace “laboratory” with “studio” or “workplace”), as published in the Federal Register, vol. 55, no. 21, January, 30, 1990, pgs. 3227-3335. This regulation is known as the “Laboratory Standard.” The objective of the Laboratory Standard is to protect employees from health hazards associated with hazardous chemicals in the laboratory. It is also intended to comply with NFPA 45 *Standard on Fire Protections for Laboratories Using Chemicals*, 1986. Additional standards are established to comply with both Connecticut Department of Environmental Protection (CT DEP) and Federal Environmental Protection Agency’s (EPA) requirements on the safe handling, storage, proper labeling, record keeping, transport, and disposal of hazardous materials.

The “Laboratory Standard” is a regulation developed for the protection of employees. Students are not officially covered by provisions of the “Laboratory Standard”. However, given the mission as an educational institution and as a matter of “best practice” Northwestern Connecticut Community College (hereafter, NCCC) will extend the provision of this Chemical Hygiene and Chemical Management Plan (hereafter, CHCMP) to cover art, science, nursing, medical assisting, veterinary technology and art students. In addition, all of the following departments will be covered by the CHCMP under the label “laboratories and studios”: Art, Science, Nursing, Medical Assisting, and Veterinary Technology. The Maintenance Department is also covered through the CHCMP.

Some policies and practices may not be a part of the “Laboratory Standard” but the policies and practices are crucial to the planning process for maintaining a safe environment for employees and students. For example, the amount of space per student is an example of a policy that affects the establishment of a safe environment but is not required by the OSHA “Laboratory Standard” to be included in the CHCMP.

### GENERAL PRINCIPLES:

This Plan and all its associated documents shall be maintained by the Chemical Hygiene and Safety Officer (hereafter, the CHSO) and be made available in the CHSO’s office, as well as online for all faculty/staff and interested parties. Additional copies will be housed online, in the maintenance department, and the Dean of Administration’s office. Associated documents include, but are not limited to: **a copy of relevant OSHA standards, allowable exposure limits of all chemicals on campus, equipment operating manuals and manufacturer’s literature, Material Safety Data Sheets (hereafter MSDS), and specific procedures for all processes conducted in the College laboratories, art studios, and maintenance departments.** The hazardous properties noted in these documents as determined by the EPA are to be the primary criteria in determining required control measures. Hazardous properties include, but are not limited to: exposure limits, vapor pressure, skin absorption, toxicological effects, corrosiveness, flammability, and reactivity.

- A. The CHCMP will apply to all persons using chemicals in the course of their College classes, including art materials. All such instructors and students will fall under the mandate of the CHCMP. In addition, other persons in these facilities on a regular basis, such as custodial and maintenance personnel, shall also comply with the protocols set forth by the CHCMP.
- B. The CHCMP provides specific laboratory/studio/maintenance practices designed to minimize the exposure of employees to hazardous substances. Employees should follow the practices specified in the CHCMP to minimize their health and safety risks.

- C. In order to minimize exposure to chemicals, because of their potential hazards, employees will follow general precautions for handling all chemicals in the workplace. Specific guidelines for some chemicals, such as those found in the appropriate MSDSs, will also be followed.
- D. **Employees are cautioned against underestimating the risk; exposure to hazardous substances should be minimized.** The decision, known as “best practices”, to use a particular substance should be based on the best available knowledge of each chemical’s particular hazard and the availability of proper handling facilities and equipment. Substitutions, either of chemicals, demonstrations, or experiments, should be made where appropriate to reduce risk without sacrificing instructional objectives. Microscale chemistry and “green chemistry” are best practices models that promote these concepts. When the risk outweighs the benefit, and no substitutions are available, then the experiment, demonstration, procedure, or chemical should be eliminated.
- E. The Permissible Exposure Limit (PEL) and Threshold Value (TLV) for a particular chemical used in the laboratory/studio/maintenance department are available on the MSDS for that chemical. Employee and student exposure to hazardous chemicals should not exceed these limits.
- F. The best way to prevent exposure to airborne substances is to prevent their escape into the laboratory/studio by using hoods or other ventilation devices. These devices will be kept in good working order and periodically maintained according to the manufacturer’s guidelines to provide a safe working area.
- G. The College should not accept a chemical from any authorized supplier without the accompanying MSDS. All MSDSs should be accessible to employees and students at all times, and employees should be trained to read and use the information provided on the MSDSs.

# I. STANDARD OPERATING PROCEDURES

## A. General

1. The design of the laboratory/studio/maintenance facility will provide sufficient space for safe work by a number of persons. Exit doors will be clearly marked and free of obstructions to permit quick, safe escape in an emergency.
2. Laboratory/studio/maintenance facility will be used only by persons with proper qualifications and training. The number of students assigned to a laboratory/studio space shall not exceed the number of stations available. The maximum number of students will not exceed the seat limits determined by the CHSO or Fire Marshall.
3. Only authorized persons are allowed in the laboratories/studios/maintenance department. Authorized persons include: full- and part-time faculty assigned to a particular laboratory/studio, students assigned to that laboratory/studio, trained student workers, trained Laboratory/Studio Technicians (hereafter, LSTs), trained Educational Assistants (hereafter, EAs), departmental chairperson, maintenance personnel, the Division Directors, the College Deans, and the College President.
4. Casual visitors are not permitted during the laboratory/studio session. Children under the age of sixteen should not be allowed to visit the laboratory/studio when class is in session *unless enrolled in the course*. Official visitors, supervisors, and colleagues shall be **required** to wear safety glasses if chemicals are being utilized during a classroom visit.
5. The laboratory or studio doors will be locked when the instructor and/or EA/LST is not in the room. All chemical cabinets are to be closed and locked when not in use. The maintenance department areas of campus will be closed and locked when not in use as well.
6. Faculty, staff, and students should follow the CHCMP to minimize their health and safety risks.
7. Generally, textbooks, laboratory/studio manuals, and other instructional materials designate the safety precautions needed for a particular laboratory/studio activity. Employees should consult additional references, including Material Safety Data Sheets.

## B. Chemical Safety and Health Standards and Procedures for the Laboratories/Studios at NCCC

1. Individual in Laboratories/Studios:
  - a. Food, beverages, and smoking in the academic laboratories/studios are **STRICTLY PROHIBITED**:
    - i. The laboratories/studios shall have posted at the entrance of all applicable rooms, and within the laboratories/studios, signs prohibiting food, beverages and smoking in the laboratories/studios. *Smoking in state facilities is prohibited by state law.*
    - ii. The laboratory/studio instructor will not permit any student to enter the laboratories/studios with any food or beverage for human consumption in either open or closed containers, and will remind students that eating, drinking, and chewing gum in these spaces is strictly prohibited.
    - iii. Food and beverages for human consumption shall not be placed in the refrigerators with chemical or biological preparations. Refrigerators containing chemical or biological preparations shall be clearly labeled. Food and beverages for laboratory/studio use can be stored in a laboratory or studio refrigerator but must be clearly labeled.

- iv. Coffee, tea, and hot water pots are prohibited in the laboratories/studios.
- v. The application of cosmetics will not be permitted in any laboratory/studios.
- vi. Chewing gum will not be permitted in any laboratory/studios.
- vii. The manipulation of contact lenses will not be permitted in any laboratory/studios.
- viii. Pipetting by mouth is **STRICTLY PROHIBITED** under all circumstances. A bulb or other such device should be used for suction.

- b. Students and staff should conduct themselves in a responsible manner at all times in the laboratory/studio. This means that horseplay, throwing items, and pranks are prohibited.
- c. Employees should not work alone in the laboratory/studio or chemical storage area unless other employees are in the vicinity or are aware that someone is working alone in the laboratory/studio or storage area. A telephone with an outside emergency line should be accessible within each laboratory/studio.
- d. “Wafting” to test chemical odors should only be done with extreme caution and when specifically directed to do so in the written experimental procedure. **Chemicals should never be tasted.**
- e. Proper Bunsen burner procedures shall be followed as directed by the instructor and a flame should never be left unattended.
- f. Do not force glass tubing into rubber stoppers. Lubricate the glass and hold the tubing with a cloth towel as the tubing is inserted into the stopper to prevent breakage.
- g. Careful storage and handling procedures should be used to avoid glassware breakage. In the event of breakage, instructors or LSTs should wear protection for their hands and use a brush and pan to pick up broken glass. Broken glass should be placed in a clearly marked broken glass container that is to be used for no other purpose. Broken glass contaminated with chemicals must be treated as hazardous waste – *please see standard for disposing hazardous waste.*
- h. Remove hot glassware with the appropriate size tongs, safety mitts, or wait until it cools. Do not attempt to pick up hot glassware with vinyl/latex gloves, paper towels, or bare hands.
- i. Dress appropriately for laboratory/studio/maintenance work. Wear approved coats or aprons. Avoid loose or baggy clothing and dangling jewelry. Tie back long hair. Sandals and open-toed shoes or shoes that have a heel greater than 1” are not allowed in laboratories/studios.
- j. Only the chemicals needed for a particular experiment should be available for use in the laboratory/studio. All other cabinets should remain locked in the chemical storage room or in chemical storage cabinets. Chemicals for a particular experiment or project should be dispensed in small quantities during the laboratory/studio period. Liquids should be dispensed in dropper bottles whenever possible. Flammable liquids used in a laboratory/studio should not exceed the amount that can be generated as waste in one day.
- k. Should a fire drill or any other evacuation occur during a laboratory/studio activity, turn off all Bunsen burners and electrical equipment and leave the laboratory/studio as directed.

## 2. Student Safety Instructions:

- a. During the FIRST LAB of the session, the laboratory/studio instructor will provide each student with the departmental safety rules and regulations and discuss the safety procedures with the students that includes:
    - i. The type, location, and function of safety equipment – i.e. showers, eye wash stations and/or fountains, fire extinguishers, fire blankets, and spill centers.
    - ii. The required protective equipment – laboratory/studio coats or aprons, goggles, face shields, and appropriate clothing and footwear.
    - iii. The proper handling of chemicals and generated waste.
    - iv. Food and drink policies.
    - v. The correct course of action that should be taken in an emergency, including the Emergency Action Plan.
  - b. Students will sign an appropriate Student Safety Contract outlining the above procedures that will be kept on file in the CHSO's office for a period of three years.
  - c. A video may be made available to show students to outline the policies in "a" above.
3. Students in the laboratory/studio:
- a. Must read laboratory/studio procedure directions ahead of time and follow all verbal and written instructions.
  - b. Must follow all safety precautions and wear appropriate safety equipment while performing experiments and projects.
  - c. Shall report all accidents or injuries to the instructor at once, regardless of the severity.
  - d. Shall only perform authorized experiments/projects.
  - e. Shall only work in a laboratory/studio under direct supervision of the instructor. Students are never to work alone.
  - f. Shall clean the laboratory counters, table tops, or studio space where appropriate.
  - g. Shall place all chemical waste into an appropriate waste container.
  - h. If a student is in violation of any of the policies in I.2. above, or in violation of any specific policies/procedures to that particular laboratory/studio or course, they will be promptly removed from the laboratory/studio for that day and will need to meet with the instructor or CHSO before being allowed back into class.

### C. Housekeeping practices

1. Individuals in the laboratory/studio:
  - a. ***Sinks are to be used only for the disposal of pure water. Individual instructors are not allowed to determine the hazardous nature of chemicals for disposal.*** ALL waste solutions should be placed in an appropriately labeled waste container, no matter the type.
  - b. Place all waste in appropriate, segregated receptacles that are properly labeled.
  - c. All laboratory/studio areas must be kept clean and contain only items needed for the task at hand.
  - d. Clean up all chemical spills as soon as they occur. Chemical and cleanup materials should be disposed of correctly – see standards for chemical spills and waste disposal.
  - e. Tabletops are to be swept clean and washed at the end of each use.
  - f. Keep all cabinets and drawers closed when not in use to avoid catching and bumping hazards.
  - g. Never block access to emergency equipment, showers, eyewashes, or exits.
  - h. Store chemicals and equipment properly. Chemicals are never to be stored in aisles, on the floor, in stairwells, on desktops, or on bench tops.
  - i. Before leaving the laboratory/studio, double-check that gas valves and water faucets are shut off and that equipment/appliances not needing continuous electricity are unplugged.

- j. At the conclusion of each laboratory experiment or studio session, the Instructor or EA/LST must ensure that:
  - i. All chemicals and reagents are returned to their proper storage area
  - ii. All chemical waste is placed in appropriate containers that are properly labeled.
  - iii. A waste generation form must be filled out and filed if not already complete for a particular waste.
  - iv. All glassware and equipment is cleaned and returned to their proper storage area.
  - v. All workstations are cleaned with a mild cleaning solution.
  - vi. All trash is placed in the appropriate containers.

## 2. Custodial Staff

- a. Custodial staff, at the end of the day, shall:
  - i. Sweep laboratory and studio floors.
  - ii. Wipe down workstations with a mild cleaning solution
  - iii. Clean whiteboards and chalkboards

## D. Chemical Procurement

1. The purchasing of chemicals should be guided by the maxim that less is better. The smaller the chemical inventory, the fewer the problems associated with storage, and the less likely that the college will face excessive cost to dispose of if chemical are outdated, expired, or surplus.
2. Chemicals should be ordered in quantities that are likely to be consumed in one or two years and should be purchased only in the quantity for the declared use.
3. The EA/LST, along with the CHSO, will oversee the purchase of chemicals for the academic division. All chemicals requisitioned must have a declared use by the instructor requesting the chemical and must be approved by the CHSO.
4. Requests for new chemicals or changes in laboratory/studio procedures must be submitted to the CHSO AND the EA/LST at least **4 WEEKS** before the proposed laboratory or studio session. It must be reviewed and approved by the CHSO BEFORE the chemical may be purchased or the change to procedure made.
5. A chemical will not be accepted from a vendor without the material safety data sheet and an adequate identifying label.
6. Chemicals will only be received by the CHSO or the EA/LST. When a chemical is received, proper handling, storage, and disposal will be known.
7. No chemicals shall be transported by a state or private vehicle, including across campus, or brought in from an outside location, including from an instructor's home.
8. All chemicals should be in tightly closed, sturdy, and appropriate containers before being accepted.
9. The container should be marked with the full level and date(s) it is received and opened.
10. The chemical inventory list will be updated each time a chemical is received. In addition, the laboratory (laboratories)/studio for which the chemical is to be used must be documented.

11. No person shall accept any chemical as a gift from outside agencies or bring chemicals into the college without written authorization from the Dean of Administration.
12. If approved by the Dean of Administration, it must be established that the donated chemical is in excellent condition and that there is a specific use for the donated chemical.

#### E. Storage and Distribution of Chemicals

1. All storage rooms and chemicals will be securely locked when not in use. Storage and preparation areas will only be accessible to persons authorized to use the chemicals (Applicable faculty, the CHSO, the EA/LST, and the Building Superintendent).
2. All chemicals will be stored in tightly closed, sturdy, and appropriate containers. The original labels on the chemical must not be altered.
3. If a chemical has been transferred to a secondary container, the new container will be appropriately labeled, including the name of the chemical and all hazard information, including the date it was transferred or prepared.
4. Chemicals will be stored based on the reactive nature and compatibility group of the chemical.
5. Flammables (both solids and liquids) will be stored in approved storage containers and approved flammable cabinets. Glass bottles containing highly flammable liquids (class 1A) will not exceed 500 mL. Approved plastic bottles will not exceed 1 gallon, and safety cans will not exceed 2 gallons.
6. Combustible packaging material should not be stored near flammable chemical storage areas.
7. OSHA standards and NFPA standards Guidelines or Local Fire regulations will be consulted on the proper use of flammable chemicals in the laboratory/studio.
8. Acids will be stored in acids cabinets with compatible acids on the same shelf. Nitric acid will be stored in a separate acid cabinet from other acids. Large acid containers will be stored on the bottom shelf.
9. Bases will be stored in an area separate from acids, preferably in an acids/bases corrosives cabinet marked for "Bases or Alkalines Only", with compatible bases on the same shelf. Large containers will be stored on the bottom shelf.
10. Only minimal quantities of "highly reactive chemicals" will be stored and only in the manufacturer's original containers with proper labeling.
11. **Refrigerators used to store flammables chemicals must be explosive proof. (NFPA 45) Household refrigerators *must not* be used to store flammable chemicals.**
12. Chemicals should not be distributed to other persons or to other areas of the college without prior approval of the CHSO, or knowledge of the departments involved and the Dean of Administration. Chemicals will not be transferred to another location without the simultaneous transfer of a copy of the MSDS for those chemicals. It will also not be transferred to a person that has not been trained in the proper use, storage, and disposal of those chemicals.
13. Receiving, transporting, unpacking, and dispensing of chemicals shall be done only by trained personnel.

14. Compressed Gases: A compressed gas is defined as any material or mixture having either an absolute pressure greater than 276 kPa (40 ft-lbs/in<sup>2</sup> at 21 °C), or an absolute pressure greater than 717 kPa (104 ft-lbs/in<sup>2</sup> at 54 °C) or both or any liquid flammable material having a Reid vapor greater than 276 kPa (40 ft-lbs/in<sup>2</sup> at 38 °C) in its container.
- Gas cylinders should only be moved from one place to another with the protective cap securely in place, and the cylinders securely chained or belted to the dolly or other approved carrier.
  - Both full and empty cylinders will only be stored where they can securely be restrained by straps, chains, or a suitable stand.
  - A cylinder should be considered empty when there is a slight positive pressure. An empty cylinder will be returned to the supplier as soon as possible. Any cylinder of gas will be returned to the supplier when it is no longer needed.
  - Cylinders should not be exposed to temperatures greater than 50 °C.
  - Cylinders containing flammable gases should be stored separately from cylinders containing oxidizing gases.

## F. Waste Disposal

- The College, CHSO, and the EA/LST shall ensure that the disposal of laboratory/studio chemicals complies with the EPA regulations, both federal and state. (See Appendix for regulations).
- No student or faculty member shall dispose of any chemical, except for pure water, before, during, or after a laboratory/studio session. Disposal of approved chemicals shall be determined by, and completed by, the CHSO.
- The College and CHSO shall ensure that drain disposal of laboratory/studio chemicals complies with all EPA, CT DEP, and City of Winsted rules and regulations.
- NCCC is considered a “Conditionally Exempt Small Quantity Generator” (or CESQG) by the Department of Environmental Services, and must not generate, in each and every calendar month throughout the whole College, more than:
  - 100 kg of hazardous waste
  - 1 kg of acute hazardous waste
  - 100 kg of contaminated soil, waste, or debris resulting from the cleanup on an acute hazardous waste spill
- The College will adhere to the rules and regulations governing the accumulation time limits and amounts set forth for a “Conditionally Exempt Small Quantity Generator” for storage. The satellite accumulation area will be clearly marked with appropriate signs and securely locked. Hazardous waste will be removed from campus at least once every 6 months.
- Waste containers in the satellite accumulation area will be clearly and appropriately labeled, with the name of the chemical and the start date of accumulation. They will then be placed inside the secondary containment unit. When the satellite containers are full, they must be dated and moved to the central waste accumulation area within three days or shipped off site.
- Any central waste accumulation area will have secondary containment and will be securely locked with access only by authorized personnel.

8. All waste containers will have an up-to-date log of the materials that are in the container. When any material is added to the container, the name of the chemical, the date added, the lab in which it was generated, and initials of the individual adding the hazardous substance(s), will be recorded in the log for that container. A master list for the central waste accumulation area will be maintained and will suffice as a log for an individual waste.
9. Upon the completion of each laboratory/studio activity that generates waste, the waste container will be returned to the central waste accumulation area. Waste should not be stored in the laboratory/studio proper. If the laboratory or studio session is conducted in the evening or on a weekend, the container for that waste should be covered, put into a fume hood reserved for that waste, and moved to the satellite accumulation area as soon as possible.
10. Hazardous wastes should never be placed in the common solid trash containers.
11. Flammable, combustible, water immiscible materials, or water-soluble solutions of toxic substances should not be poured down the drain.
12. Separate waste containers will be provided for different types of hazardous wastes, or incompatible waste – i.e. heavy metals, chlorinated hydrocarbons, non-chlorinated and any other categories recommended by the approved EPA transport company contracted by the College.
13. All chemical waste, hazardous and non-hazardous, excess quantities of chemicals and unstable chemicals will be removed from site according to “best practice” for a CESQG, by an EPA and State licensed company.
14. To minimize the accumulation of hazardous waste instructors should:
  - a. Use microscale laboratory procedures, or
  - b. Select less hazardous materials (“green chemistry”), or
  - c. Order chemicals in quantities that are likely to be consumed in a year, and/or
  - d. Avoid the inadvertent accumulation of hazardous waste through negligence or error. Potential waste materials are surplus, old, and/or unnecessary chemicals.
15. Prior to ordering new chemicals, using existing chemicals, or creating new products from reactions, the CHSO should determine if the material will need to be treated as hazardous waste by referring to EPA and CT DEP’s standards for Hazardous Waste Regulations.

## G. Spills

### 1. Spill Kits

- a. A spill kit will be accessible for each laboratory/studio/maintenance area. This kit might include, depending on the specific laboratory/studio procedure and its use:
  - i. Spill control pillows
  - ii. Inert absorbent such as vermiculite, clay, sand, or kitty litter.
  - iii. Neutralizing agents for acid spills such as sodium carbonate or sodium hydrogen carbonate
  - iv. Neutralizing agents for alkali spills such as boric acid solution.
  - v. Mercury spill kits.
  - vi. Large plastic scoops, brooms, pails, dust pans, and bags.
  - vii. Appropriate personal protection equipment (PPE) reserved for spills including, but not limited to:
    - (a) Gloves
    - (b) Splash goggles

- (c) Aprons
- (d) Boots

- (e) Masks/Respirator
- (f) Face shield

## 2. Minor Spills

- a. If there is no immediate danger (flammability, toxicity, reactivity, corrosivity) to personnel, containment should be accomplished by using spill pillows, towels, or other devices that will keep the spill from spreading. Cleanup procedures listed in the MSDS should be followed. Appropriate PPE should be used.
- b. If the spilled material was a hazardous chemical, all of the materials involved in the cleanup will be considered to be hazardous waste and will be disposed of as such.

## 3. Major Spills

- a. If a major spill occurs and cannot be cleaned-up by the lab instructor, then the cleanup should only be undertaken by individuals who are trained in HAZMAT procedures.
- b. If the chemical involved in the spill is judged to present an immediate hazard, evacuation of the laboratory/studio and building(s) is to be absolute, and the area should be isolated until a HAZMAT team arrives. *Check MSDS for a description of such hazardous chemicals.*
- c. If hazardous vapors are present, the area should be isolated. Only persons trained in the use of respirators may enter the area. This probably will mean waiting for the arrival of a HAZMAT team.
- d. If a volatile, flammable material is spilled, immediately extinguish the flames, turn off all electrical apparatus, and evacuate the area. Consult the MSDS for appropriate clean-up procedures. If the quantity exceeds all of the College's personnel ability or training to handle spills, seal the area until appropriately trained personnel arrive.

# II. CONTROL MEASURES

## A. Personal Protection Equipment (PPE)

- 1. It is the responsibility of the College to provide appropriate safety and emergency equipment for employees authorized to be in the science and technology laboratories. Protective apparel should be compatible with the degree of protection for the substance being handled.
- 2. Laboratory/studio aprons or coats, eye protection, and non-permeable gloves are standard equipment for school classrooms. PPE will be made to all laboratory/studio instructors, and required of all students in the laboratory/studio.
- 3. All eye protection devices should conform to ANSI Standard Z87.1 1989. Chemical splash safety goggles will be used as standard protective eyewear. These goggles should fit snugly around the face to provide the eyes from a variety of hazards. **Everyday eyeglasses, even with shields, are not acceptable protection against chemical splashes.**
- 4. Any experiment that involves heating, the use of any chemical, glassware, or bodily fluids will require the use of chemical splash safety goggles. The goggles also protect against chemical dust and fumes.
- 5. If contact lenses are worn in the laboratory/studio, then chemical splash goggles must be worn at all times.
- 6. Safety goggles should be used for all studio projects and maintenance/custodial activities involving glazes, chemicals, sprays, or those that will produce dust. Respirators should be used according to

manufacturers' recommendations for art studio or maintenance/custodial activities producing dusts or using sprays.

7. Full-face shields protect the face and throat against injury from flying particles and chemical splashes. Full-face shields must be worn when operating pressurized systems that might explode or an evacuated system that may explode. Face shields must be worn in addition to the splash goggles.
8. Standing shields should be used for group protection when there is a potential for explosions, implosions, or splashes. They should also be used when using corrosive liquids to protect against impact and splashes. Safety goggles and/or a full-face shield must also be worn.
9. Laboratory/studio coats or aprons that are worn in the laboratory/studio should offer protection from spills and splashes, and should be fire resistant and easy to remove in case of an accident.
10. When gloves are required, MSDS should be consulted for information regarding the proper type of glove to use. No one kind of glove is suitable for all situations.

## **B. Administrative Control**

### **1. Inventory Control**

- a. An inventory of all chemical will be kept up to date on permanent file and will include:
  - i. The name of the chemical and the chemical formula.
  - ii. The amount of the chemical in storage.
  - iii. The date of purchase and/or the last date inventoried in the chemical inventory log.
  - iv. The location of the chemical in the storage area.
- b. Whenever new chemicals are purchased or when chemicals are completely consumed, the inventory list will be updated. The inventory should be updated monthly. The chemical list and waste generation forms will be audited for accuracy annually.
- c. Every area or laboratory/studio in which chemicals are used or stored must have an up-to-date inventory. A printed copy of the most recent chemical inventory will be kept by the CHSO and the EA/LST .

### **2. Hazard Identification and Labels**

- a. All chemicals in storage must be clearly labeled and stored according to a Chemical Compatibility Chart. Each chemical label should list the health hazard, reactivity, flammability, corrosiveness, and toxicity for that chemical. Required PPE and first aid can be found on the MSDS, if not on the label.
- b. Labels on incoming containers must not be removed or defaced.
- c. If a chemical is stored in its original bottle or container, it should have the manufacturer's original label identifying the potential hazards, and the date purchase, the date first opened, and the initials of the person who opened the container.
- d. If a chemical has been transferred to a secondary container, the new container, the new container will be appropriately labeled with
  - i. The chemical name.
  - ii. The chemical formula.
  - iii. The concentration if it is in solution.
  - iv. The solvent if it is a solution.
  - v. Any hazard warning.
  - vi. The initials of the person responsible for the transfer.

- e. Unlabeled bottles should not be opened and such materials need to be disposed of promptly, as outlined in the section on disposal procedures.

### 3. Signs and Posters

- a. Emergency telephone numbers will be posted in laboratory/studio and maintenance areas.
- b. Signs shall be used to indicate the location of exits, evacuation routes, safety showers, eyewash stations, fire extinguishers, fire blankets, first aid kits, fume hoods, and other safety equipment.
- c. Warning signs will be placed in areas/on equipment where special/unusual hazards exist.
- d. Posters to reinforce laboratory/studio procedures will be displayed in the laboratories.

### 4. Material Safety Data Sheets (MSDS)

- a. Each MSDS received with incoming shipments of a chemical will be placed in a notebook in the laboratory/studio/maintenance area and be made available to instructors and to students.
- b. The MSDS for each chemical in the laboratory/studio/maintenance area usually give recommended limits or OSHA mandated limits, or both, as guidelines to employee's exposure limits to hazardous chemicals. Typical limits are expressed as threshold limit values (TLVs), permissible exposure limits (PELs), or action levels. When such limits are stated, that limit, along with other information about the hazardous characteristics of the chemical, will be used to set guidelines. These guidelines will determine the safety precautions, control measures, and PPE needed to work with that particular chemical.
- c. A MSDS for each element or compound on the chemical inventory are available in the laboratory/studio/maintenance area for which that chemical is used or stored. Chemical manufacturers and suppliers are required to supply one copy of a MSDS the first time the chemical is purchased by an institution.

### 5. Records

- a. Chemical Inventory
  - i. An inventory of all chemicals will be conducted annually and chemical usage determined.
  - ii. The EA/LST, in concert with the CHSO, will conduct this inventory and retain a copy. The CHSO will retain a hard copy of the chemical inventory.
- b. Inspection Records
  - i. The EA/LST will inspect all laboratories on a monthly basis, complete, sign inspection list(s), and retain a copy. The CHSO must retain a copy of the report on file.
  - ii. Fire extinguishers should be tagged to indicate the date and results of the last inspection by the Fire Department. A log of all other safety equipment will be kept with the date of inspection and the results of the inspection.
  - iii. Records indicating the dates of repair on all safety equipment.
- c. Records and Reports
  - i. Training Records: The College shall maintain records of employee training for at least 30 years, and these records should be made available to employees.
  - ii. Incident Reports Involving Students: Reports within laboratories/studios must be completed for any incident and are to remain on file for 3 years. Copies are to be retained by the student, reporting instructor, CHSO, Division Director, and Dean of Administration.
  - iii. Incident Reports Involving Employees: Reports for any must be completed for any incident involving an employee in service of their duties with the College. Copies are to be retained

by the employee, HR, CHSO, Division Director, and Dean of Administration. HIPPA will be followed where necessary.

- iv. Medical and Exposure Records: Records of air concentration monitoring, exposure assessments, medical consultation, and medical examinations must be kept for at least 30 years after the employee ceases employment with the State.
- v. Waste Disposal Records: The College will retain records of disposal of all wastes as per RCRA and CERCLA. These records shall conform to the requirements of EPA and the CT DEP's Hazardous Waste rules.
- vi. MSDSs: The College will maintain a file of current MSDSs and will make them accessible to both employees and students. If an MSDS is not available when a new chemical is obtained, that chemical must not be used until a MSDS is obtained.

## 6. Exposure Monitoring

- a. If there is a reason to believe that exposure levels for a regulated substance have exceeded the action level or permissible exposure limits, the Academic Assistant should ensure that the employee or student exposure to that substance is measured.
- b. Factors which may raise the possibility of overexposure and therefore warrant an initial measurement of the employee or student exposure include:
  - i. The manner in which the chemical procedure or operations involving the particular substances are conducted.
  - ii. The existence of historical monitoring data that shows elevated exposure to the particular substance for similar operations.
  - iii. The use of a procedure that involves significant quantities or is performed over an extended period.
  - iv. Signs or symptoms of exposure (e.g. skin or eye irritation, shortness of breath, nausea, or headache), which are experienced by employees or students in conjunction with any of the above. *(Some of these symptoms are very general and can be due to many other causes.)*
  - v. There is reason to believe that an exposure limit may be exceeded.
- c. If the substance in question does not have exposure monitoring or a medical surveillance requirement, exposure monitoring and medical surveillance shall be continued until exposure levels are determined to be below the action level or 50% of the PEL. In the absence of PELs, the TLVs should be referenced.
- d. If a substance has an exposure monitoring requirement and if there is reason to believe that exposure levels for that substance routinely exceed the action level, or, in the absence of the action level, the PEL, the College shall measure the employee or student exposure to the substance.
- e. If the initial monitoring as described in (d) above discloses employee or student exposure over the action level, or, in the absence of the action level, the PEL, the College shall immediately comply with the exposure monitoring provisions of the relevant standard for that substance.
- f. The College shall, within 15 working days after the receipt of any monitoring results, notify the employee or student of these results in writing.
- g. The following substances are examples of those regulated by OSHA standards and require monitoring:
  - i. Lead
  - ii. Benzene
  - iii. 1,2-dibromo-3-chloropropane
  - iv. Asbestos
  - v. Acrylonitrile
  - vi. Ethylene oxide
  - vii. Formaldehyde
  - viii. Vinyl chloride
  - ix. Inorganic arsenic

## III. PARTICULARLY HAZARDOUS SUBSTANCES

## A. General

1. This section of the CHCMP describes specific and general control measures which are designed to reduce the exposure of instructors, the EA/LST, student workers, students, and other employees to especially hazardous substances. Employees should read and understand these practices before beginning a procedure using particularly hazardous substances.
2. Particularly hazardous substances include highly toxic chemicals, reproductive toxins (teratogenic compounds), select carcinogens, highly flammable, highly corrosive, and highly reactive chemicals.
3. The use of these substances requires prior approval of the CHSO.
4. Particular hazardous substances should be used in designated areas and in fume hoods.
5. The use of particularly hazardous substances shall require special waste procedures and decontamination of contaminated areas.

## B. Highly Toxic Chemicals

1. When a PEL or TLV value is less than 50 ppm or 100 mg/m<sup>3</sup>, the user should work with the chemical in an operating fume hood, glove box, vacuum line, or other device equipped with appropriate traps. If none are available, the chemical should not be used.
2. If a PEL or TLV value is not available, the human or animal median lethal inhalation concentration information, LC 50, should be used as a guideline. If that value is less than 200 ppm or 2000 mg/m<sup>3</sup> when administered for one hour or less, then the chemical should be used in an operation fume hood, glove box, vacuum line, or some other device equipped with appropriate traps. If none are available, the chemical should not be used.
3. Examples of highly toxic chemicals are
  - a. Benzene
  - b. Chloroform
  - c. Formaldehyde
  - d. Bromine
  - e. Carbon disulfide
  - f. Carbon tetrachloride
  - g. Cyanide salts
  - h. Hydrofluoric acid

## C. Reproductive Toxins (Teratogenic Agents)

1. A reproductive toxin refers to chemical which affect reproductive capabilities including chromosomal damage (mutations) and which affect fetuses (teratogenesis).
2. A reproductive toxin is a compound that
  - a. Is described as such in the MSDS or label.

- b. Is identified as such by the Oak Ridge Toxicology Information Resources Center (615) 576-1746 (<http://www.ornl.gov/sci/techresources/tirc/hmepg.shtml>)
- 3. No reproductive toxins shall be allowed in the College's laboratories without written authorization from the CHSO.
- 4. When such chemicals are authorized for use, they should only be handled in a satisfactorily operating fume hood. Skin contact must be avoided by wearing appropriate PPE. People using these substances must always wash their hands and arms immediately after working with the chemical(s).
- 5. These chemicals should be stored in a well-ventilated area in unbreakable containers.
- 6. Pregnant individuals will not use teratogenic chemicals.
- 7. Examples of reproductive toxins include:
  - a. Organomercurial compounds
  - b. Ethidium bromide
  - c. Carbon disulfide
  - d. Xylene
  - e. Toluene
  - f. Benzene
  - g. Mercury
  - h. Lead compounds
  - i. Ethyl ethers
  - j. Vinyl chloride

#### D. Select Carcinogens

- 1. Select carcinogens means any substance that:
  - a. Is regulated by OSHA as a carcinogen
  - b. Is listed as a carcinogen in the National Toxicology Program Annual Report on Carcinogens (<http://ehp.niehs.nih.gov/roc/toc10.html>)
  - c. Is listed under Group 1 Carcinogens to humans by the International Agency for Research on Cancer (IARC) (<http://www.iarc.fr/>)
  - d. Is listed as either group 2A or 2B by IARC, and causes significant tumor incident in experimental animals under set criteria of exposure.
- 2. All work with these substances should be conducted in a designated area, such as a fume hood, glove box, or portion of a laboratory/studio/maintenance area designated for use of chronically toxic substances. Such a designated area should be clearly marked with warning and restricted access signs.
- 3. Any procedure that may result in a generation or aerosols or vapors should be performed in a hood whose performance is known to be satisfactory.
- 4. Skin contact should be avoided by using PPE as appropriate. Any protective clothing should be removed before leaving the designated area and placed in a labeled container. Hands, arms, and neck should be washed after working with these materials.

5. Select carcinogens should be stored in unbreakable containers in a ventilated area with controlled access. All containers should be labeled with the identity and hazard of the substance. Immediately upon completion of the project, all select carcinogens should be disposed of following standard hazardous waste disposal procedures.
6. No select carcinogens shall be allowed in the College's laboratories without written authorization from the CHSO.
7. Examples of select carcinogens are:
  - a. Benzene
  - b. Nickel metal dust
  - c. Vinyl chloride
  - d. Formaldehyde

#### E. Highly Flammable Chemicals

1. The College will define Class 1A liquids as highly flammable chemicals. Class 1A liquids have a flash point of less than 73° C and a boiling point of less than 100° C.
2. All flammable products must be kept in an approved flammable storage cabinet and compatible chemicals kept on the same shelf. Store dry flammables above liquid flammables.
3. Do not store any oxidizers (i.e. bleach) near any flammable items. Three sources are required to start a fire: an oxygen source, a heat source, and a flammable. If an oxidizer is near a flammable, only a small heat source is required to start a spark leading to a fire.
4. Multiple containers of the same product should be stored next to one another and older stock used first.
5. Examples of highly flammable chemicals are:
  - a. Diethyl ether
  - b. Acetone
  - c. Pentane
  - d. Petroleum ether
  - e. Acetaldehyde
  - f. Ligroines

#### F. Highly Reactive Chemicals

1. Reactivity information may be given in a manufacturer's MSDSs and on labels. The most complete and reliable reference on chemical reactivity is the current edition of *Bretherick's Handbook of Reactive Chemical Hazards*.
2. A reactive chemical is one that is
  - a. Described as such on the labels, in the MSDS, or by Bretherick
  - b. Is ranked by the NFPA as a 3 or 4 for reactivity
  - c. Is identified by the Department of Transportation (DOT) as an oxidizer, and organic peroxide, or an explosive (Class A, B, or C)
  - d. Fits the EPA definition of Reactive in 40 CFR 261.23

- e. Is known or found to be reactive with other substances.
3. Reactive chemicals should be handled with all proper safety precautions, including segregation in storage, and prohibition of mixing even small quantities with other chemicals without prior approval and appropriate PPE and precautions.
  4. Examples of commonly encountered highly reactive chemicals are:
 

a. Ammonium dichromate	e. Potassium chlorate
b. Nitric acid	f. Azides
c. Perchloric acid	g. Organic nitrates
d. Hydrogen peroxide	h. Acetylides

#### **G. Highly Corrosive Chemicals and Contact Hazard Chemicals**

1. Corrosivity, allergen, and sensitizer information is provided in manufacturer's labels and MSDSs.
2. A corrosive chemical is one that
  - a. Fits the OSHA definition of Corrosive in 29 CFR 1910.1200
  - b. Fits the EPA definition of Corrosive in 40 CFR 262.22 (has a pH greater than 12 or less than 2.5)
  - c. Is known to be reactive to living tissue, causing visible destruction, or irreversible alterations of the tissue at the site of contact.
3. A contact hazard chemical is
  - a. An allergen or sensitizer that is so identified or described in the MSDS or on the label
  - b. Is so identified or described in medical or industrial hygiene literature
  - c. Is known to be an allergen or sensitizer.
4. Corrosive and contact hazard chemicals will be handled with all proper safety precautions and PPE.
5. Examples of highly corrosive chemicals are:
  - a. Hydrochloric acid (>1 M conc.)
  - b. Sulfuric acid (>1 M conc.)
  - c. Nitric acid (>1 M conc.)
  - d. Phosphoric acid (>1 M conc.)
  - e. Perchloric acid (>1 M conc.)
  - f. Potassium hydroxide (solid or aqueous solution > 1M conc.)

#### **IV. MEDICAL CONSULTATION AND MEDICAL EXAMINATIONS**

- A. The College's laboratory/studio instructors and students do not regularly handle significant quantities of materials that are acutely or chronically toxic. Therefore, regular medical surveillance is not justified.
- B. In the event that an instructor or student is exposed to levels of a hazardous chemical exceeding the established PEL or TLV, or should the instructor or student exhibit signs and symptoms of such exposure, the affected party shall be provided an opportunity to receive an appropriate medical examination.
- C. All medical examinations and consultations shall be performed by or under the direct supervision of a licensed physician and shall be performed without cost to the instructor or student, without loss of pay, and at a reasonable time and place.
- D. The College shall provide the following information to the physician conducting the examination.
  - 1. The identity of the hazardous chemical(s) to which the affected party has been exposed.
  - 2. A description of the conditions under which the exposure occurred, including quantitative exposure data, if possible.
  - 3. A description of the signs and symptoms of exposure that the affected party is experiencing.
  - 4. A copy of the MSDSs for the chemical(s) involved.
- E. A written opinion from the examining physician for any consultations or examinations performed under this standard should include:
  - 1. Any recommendations for further medical attention.
  - 2. The results of the medical examination and any associated tests.
  - 3. Any medical condition revealed during the examination which might compromise the instructor's/student's safety during, or as a result of, exposure to hazardous chemicals found in the College's laboratory/studio/maintenance area.
  - 4. A statement that the instructor/student 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.
  - 5. A copy of the physician's report to be retained by the college.
  - 6. The written opinion from the physician should not reveal specific diagnoses unrelated to the occupational exposure.

## V. TRAINING AND INFORMATION

### A. Training for Employees

1. General
  - a. The College shall provide employees with information and training to ensure that they are apprised of the hazards of chemicals present in their work area.
  - b. Such information shall be provided at the time of the employee's initial assignment to a work area where hazardous chemicals are present, and prior to assignments involving exposure situations. The frequency of refresher information and training shall be determined by the employer.
  - c. Employees shall be informed of the content of the "Laboratory Standard", 29 CFR Part 1910.
  - d. Employees shall be informed of the location and availability of the CHCMP.
  - e. All employees should be trained in the methods and observations that may be used to detect the presence or release of hazardous chemicals.
  - f. Employees shall be informed of the location of MSDSs.
  - g. Employees shall be informed of the location of PPE and of emergency equipment as outlined in the CHCMP.
  - h. Employees shall be informed of the signs and symptoms associated with exposures to hazardous chemicals used in the laboratory/studio/maintenance area.
2. The objective of the employee training and information program is to assure that all individuals at risk are adequately informed about
  - a. The physical and health hazards associated with hazardous chemicals present in the laboratory/studio/maintenance area.
  - b. The proper procedures to minimize the risk of exposure to students, faculty, staff, and visitors.
  - c. The proper response to accidents.
3. The College shall provide training opportunities for all individuals at risk. These training opportunities should include information about the hazards of chemicals present in the laboratory/studio/maintenance area and sources of information concerning hazards in the laboratory/studio/maintenance area. In particular, the training program should cover the laboratory/studio/maintenance department standard, MSDSs, the CHCMP, and the responsibilities of the College and employee.
4. Trained employees will sign a training form indicating the date that they underwent orientation. This training will be conducted yearly in the fall, before the start of the semester, for permanent employees. Training will be conducted for adjunct faculty in January if they were not on contract in the fall semester.
5. Employees should be trained on the potential chemical hazards in the employee's work areas and on appropriate sections of the CHCMP. This training should be provided to all

employees who actually work in the science, art, nursing, veterinary technology, medical assisting, or maintenance department, as well as to other employees whose assignments may require that they enter a laboratory/studio/maintenance area where exposure to hazardous chemicals might occur. Employees who are responsible for receiving and handling shipments of new chemicals or chemical wastes should also be informed of the potential hazards and appropriate protective measures for chemicals they may receive.

6. Laboratory/studio/maintenance department employees should be trained on the applicable details of CHCMP, including a review of the general rules of laboratory/studio/maintenance department safety. The training program should describe appropriate sections of the standard operating procedures, particularly those procedures that require prior approval of the CHSO.
7. The training an employee receives should be determined by the nature of the work assignment in the laboratory/studio/maintenance department.
8. Employees should be trained in measures they may take to protect themselves from exposure to hazardous chemicals, including location and proper use of protective equipment and emergency equipment. In addition, the training must also include a discussion of inventory procedures to be followed, proper storage and ordering rules, and the College's hazardous waste disposal procedures.
9. All science, art, nursing, veterinary technology, medical assisting, and maintenance department employees will be trained to read and understand MSDSs.
10. All laboratory/studio employees will be trained in labeling and storage procedures as outlined in the CHCMP.
11. All laboratory/studio employees shall be informed of the permissible exposure limits for OSHA regulated substances on the site or recommended exposure limits for other hazardous chemicals on site where there is no applicable OSHA standard.
12. All laboratory/studio employees shall be informed of the location and availability of known reference material on the hazards, safe handling, storage, and disposal of hazardous chemicals where there is no applicable OSHA standard.
13. Employees that routinely do not follow the CHCMP or other safety best practices will be subject to disciplinary action by the College Administration for non-compliance.

## **B. Training for Students**

1. Instruction in laboratory/studio safety shall be provided to all students involved in laboratory/studio activities.

2. Initial training and orientation to the lab should happen at the beginning of the semester, during the first scheduled laboratory/studio section. Students will also review the Student Safety Contract, sign, and return it on this day.
3. Prior to each laboratory/studio activity involving chemical protocols, class time shall be devoted to safe laboratory/studio practices and to the student safety agreement.
4. The extent of student training should be based on the course level, course of study, the laboratory/studio facility, college policies, the CHCMP, and the level of chemical handling and potential exposure to hazardous chemicals.
5. Safety training should include the importance and the content of the label and of MSDSs. As appropriate, the student should also be introduced to other sources of chemical safety information.

## VI. PRIOR APPROVAL

- A. Prior approval should be obtained from the CHSO whenever a new laboratory/studio protocol is to be carried out. This prior approval should also be sought for experiments that have not been performed recently or for which the potential for harm is present. The potential for harm may be affected by a change in the amounts of materials being used, the conditions under which the experiment is to be conducted, or the substitution, deletion, or addition of a chemical.
- B. **Prior approval by the CHSO is critical** before doing any procedure should be obtained where one or more of the following conditions exist:
  1. Potential for a rapid rise in temperature.
  2. Potential for a rapid rise in pressure.
  3. Use of a flammable solvent.
  4. Potential for a chemical explosion.
  5. Potential for a spontaneous combustion.
  6. Potential for the emission of toxic gases that could produce concentrations in the air that exceeds toxic limits.
  7. Change in a procedure, even if the change is quite small.
  8. Involves the use of highly toxic substances.
- C. A list of acceptable reagents should be developed for use in the laboratory/studio/maintenance department. An employee who desires to use a substance that is not on the acceptable list must seek the permission of the CHSO. The decision to use the chemical will be based on the best available knowledge of the hazards of the substance and the availability of proper handling facilities and equipment. The written request should include the following information:
  1. How the use of the chemical is pedagogically sound.

2. How the use of the substance is an effective method to illustrate an important process, property, or concept.
3. What adequate safeguards are in place to assure proper use of the substance.
4. An estimate of the exposure time of the employees and students to the substance.
5. Information on PEL and TLV of the substance.

D. Students, INCLUDING STUDENT WORKERS, shall only work in a laboratory/studio or chemical storage area under the **direct supervision** of an instructor or trained EA/LST.

## VII. SAFETY/EMERGENCY FACILITIES AND EQUIPMENT

### A. Equipment

1. The College should ensure that adequate emergency equipment is available in the laboratory/studio/maintenance department and inspected periodically to ensure that it is functioning properly. All instructors should be properly trained in the use of each item.
2. Emergency equipment items that should be available include: eyewash station, fire extinguisher of the appropriate type, safety shower, telephone for emergencies, fire blanket, and identification signs.
3. Each laboratory/studio/maintenance area should have a standard first aid kit stocked according to school policy.
4. Multipurpose fire extinguishers should be available in the laboratory/studio and throughout the facilities. A multipurpose, ABC, fire extinguisher can be used on all fires EXCEPT for class D fires. Extinguishers should be visually checked monthly, and inspected and tested annually.
5. Every eyewash station will be capable of supplying a continuous flow of aerated, tepid, potable water to both eyes for 15 minutes. The valve should remain in the open position without the need to hold the valve.
6. Safety showers should be capable of supplying a continuous flow of tepid, potable water for at least 15 minutes. The shower should have a quick-opening valve requiring manual closing.
7. Eyewash stations and safety shower stations shall be located so they will be accessible within 10 seconds.
8. Safety equipment will be tagged following an inspection, showing the date, inspector, and results.
9. Laboratories in which hazardous substances are being used should have spill control kits tailored to deal with the potential risk associated with the materials being used. If there is

no immediate danger to instructors or students, containment should be accomplished by spill pillows, towels, rolls, inert absorbents, neutralizing agents, or other devices.

10. Each storeroom shall be equipped with a heat sensor and smoke alarm.

## **B. Facilities**

### 1. Fume hoods

- a. Laboratory/studio fume hoods are the most important components used to protect laboratory/studio instructors and students from exposure to hazardous chemicals and agents used in the laboratory/studio. Functionally, a standard fume hood is a fire and chemical resistant enclosure with one opening (face) in the front with a movable window (sash) to allow the user access into the interior. Large volumes of air are drawn through the face and out the top of the hood to contain and remove contaminants from the laboratory/studio.
- b. Laboratory/studio fume hoods are not meant for either storage or disposal of chemicals. If a hood must be used for storage, in order to provide adequate ventilation for flammable chemicals, for example, it must not be used for laboratory/studio experiments or transfer of chemicals. In that event, it must be used only for storage.
- c. Laboratory/studio activities that may release airborne contaminants above the PEL or TLV concentrations must be carried out in the fume hood. In addition, if laboratory/studio activities produce potentially hazardous vapors of gaseous substances, the laboratory/studio activities should be conducted in the fume hood.
- d. In most cases, the recommended face velocity is between 80 and 100 feet per minute (fpm)
- e. Fume hoods should be positioned in the laboratory/studio so that air currents do not draw fumes from the hood into the room.
- f. The exhaust stack from a fume hood shall be in a vertical position – up adjacent buildings to avoid reentry of the exhaust into the building.
- g. Fume hoods or other local ventilation devices should be used when working with a volatile substance at a TLV of less than 50 ppm.
- h. All biohazard and fume hoods shall be inspected annually and certified by the appropriate State of Connecticut agency. Any hood not passing inspection must be taken out of service immediately and not be used until the hood has passed inspection. It is the responsibility of the College to purchase the parts and replace the unit in a timely fashion so as not to endanger the health and well being of the instructor or place the College at risk.
- i. Fume hood air velocity should be tested twice a year. The maintenance department is responsible for maintaining the fume hoods.

### 2. Ventilation

- a. General laboratory/studio ventilation should not be relied on for protection from exposure to hazardous chemicals. A rate of 4-12 room air exchanges per hour should

be an acceptable standard when local exhaust systems, such as hoods, are used as the primary method of control. Laboratory/studio airflow should not be turbulent and should flow continuously throughout the laboratory/studio.

- b. Laboratories/studios should be kept at a negative pressure relative to the outside hallways and building to prevent the escape of fumes and dust into the surrounding facility.
- c. Any alteration of the ventilation system should be made only if thorough testing indicates that employee and student protection from airborne toxic substances will continue to be adequate.
- d. Exhaust from the fume hoods should be vented directly to the outside.

### 3. Flammable Storage

- a. Chemicals with a flash point below 93.3 °C (200 °F) should be considered “fire hazard” chemicals. Any chemical whose MSDS or label states “Flammable” is in this category.
- b. Fire hazard chemicals in excess of 500 mL should be stored in a flammable solvent storage area, safety cans, or in storage cabinets designed for flammable materials.
- c. Flammable materials should be stored in a flammable liquid storage cabinet or other appropriate location. When transferring significant quantities of flammable liquids from one container to another, it is important that they be properly grounded to prevent accidental ignition of flammable vapors and liquids from static electricity or other sources of ignition. Large quantities of flammable chemicals stored outside cabinets should be in flame-proof storage cans which conform to NFPA guidelines. NFPA 30, Flammable and Combustible Liquids code, and NFPA 45, Fire Protection for Laboratories Using Chemicals, and/or the applicable local fire codes should be followed.

### 4. Electrical

- a. All electrical outlets should have grounding connection accommodating a three prong plug.
- b. All laboratories/studios should have circuit breakers readily accessible. Employees should know how to cut off electricity to the laboratory/studio in case of emergency.
- c. Laboratory/studio lighting should be on a separate circuit from electrical outlets.
- d. All electrical outlets should be checked for continuity after initial occupancy or whenever electrical maintenance or changes occur.
- e. If electrical equipment shows evidence of excess heating, it should be immediately unplugged.
- f. Install ground-fault circuit interrupters (GFCIs) as required by code to protect users from electrical shock, particularly if an electrical device is hand-held during a laboratory/studio operation.

## VIII. RESPONSIBILITIES

### A. President

NCCC's President, along with the Dean of Administration, shall have the ultimate responsibility for the CHCMP within the institution and shall provide continuing support for institutional chemical hygiene and management. The President shall provide continuing support for the ongoing development and implementation of the chemical safety program at NCCC. This includes encouraging College employees to be sensitive of the need for chemical safety on campus.

## **B. Dean of Administration**

The Dean of Administration, as an executive officer, along with the President, has the ultimate responsibility for CHCMP for the college. The Dean of Administration will, with other administrators, provide continuing support for the college's chemical hygiene programs, including development and enforcement of the CHCMP. The Dean will contact EPA-approved companies for disposal and transport of chemical and hazardous waste from NCCC's laboratories/studios/maintenance facilities.

## **C. Chemical Hygiene and Safety Officer**

The CHSO, provided by the system or someone in the College, is responsible for implementing all elements of this plan for the College, which includes the monthly review of hazardous waste storage and accumulation as well as the annual review of new laboratory/studio protocols and addition of processes and/or new chemicals. In addition, the CHSO shall review and modify the CHCMP as necessary for **all** departments.

1. The CHSO will be appointed by the NCCC's Deans and/or President.
2. The CHSO should be qualified by training and experience to provide technical guidance in the development and implementation of the CHCMP.
3. The CHSO has the responsibility to:
  - a. Develop and implement the CHCMP and the safety plan for the college, including training, reporting, and other functions.
  - b. Manage waste determinations as necessary.
  - c. Maintain a current chemical inventory.
  - d. Work with administrators and instructors to develop and implement the safety program.
  - e. Assure that inspections in the laboratory/studio/maintenance department are performed when appropriate and that the records of inspections are maintained.
  - f. Monitor the procurement, use, and disposal of chemicals used in the College's operations.
  - g. Provide technical assistance to the college and instructors in all departments on the CHCMP.
  - h. Assure that the CHCMP is reviewed annually and revised as needed, so that it is always in compliance with current legal requirements.

- i. Make decisions regarding requests to use chemicals identified as explosive, carcinogenic, mutagenic, highly toxic, or otherwise unsuitable for college laboratories.
- j. Determine the need for PPE beyond that specified for general laboratory/studio/maintenance department use.
- k. Implement appropriate training with regard to chemical hygiene for all college employees whose normal work locations include laboratory/studio/maintenance department areas.
- l. Ensure that employees have received appropriate training.
- m. Ensure that employees and students have access to the CHCMP, MSDSs, and other suitable reference materials.

#### **D. Division Director**

The Division Director is responsible for chemical hygiene programs within their department. The Division Director will monitor compliance with the CHCMP. The Division Director is also responsible for enforcement of all federal, state, and local health, safety, and environmental regulations and policies as applicable to their Division.

#### **E. Laboratory/Studio Technician (LST), Educational Assistant (EA), or Academic Assistant (AA)**

1. This employee is responsible for assisting the CHSO in the implementation of the CHCMP and the safety plan for NCCC. This includes training, reporting, and other related functions.
2. Provide continuing support for the implementation and enforcement of the College's CHCMP.
3. This employee will be responsible for:
  - a. Be a role model to students and coworkers by using and modeling good chemical hygiene habits.
  - b. Monitoring the procurement of chemicals and ensure that MSDS are provided for each chemical ordered.
  - c. Developing and retaining a chemical inventory list annually.
  - d. Inspecting all laboratories or studios according to best practice and maintain a log of all inspections.
  - e. Purchasing all laboratory/studio safety equipment and PPE for the department.
  - f. Setting up chemical and biological laboratories weekly and placing chemical waste in the satellite accumulation areas OR setting up studio chemicals and placing chemical waste in the satellite accumulation areas
  - g. Direct supervision of student workers in the laboratory/studio areas.

#### **F. Laboratory/Studio Instructors**

1. Laboratory/studio instructors are responsible for:
  - a. Using and modeling good chemical hygiene habits for students and coworkers.
  - b. Participating in training programs provided by the College.
  - c. Maintaining an awareness of health and safety hazards.
  - d. Planning and conducting each operation in accordance with the College's CHCMP procedures.
  - e. Consulting reference materials, including MSDSs, related to chemical safety where appropriate.
  - f. Reporting accidents, injuries, unsafe practices, and unsafe conditions.

## G. Students

1. Students are responsible for:
  - a. Practicing good chemical hygiene habits.
  - b. Reporting accidents and maintain an awareness of health and safety hazards.
  - c. Conduct all activities according to the CHCMP procedures.

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