

# BENNINGTON COLLEGE

## Chemical Hygiene Plan Dickinson Science Building 2016-2017

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# Bennington College Chemical Hygiene Plan

## Dickinson Science Building

1	Introduction	3
1.1	History of the OSHA Laboratory Standard	3
1.2	Role of the Chemical Hygiene Plan	4
2	Facilities & Personnel to Be Covered Under This Plan	4
3	Responsibilities	5
3.1	Provost and Dean of the College	5
3.2	Chemical Hygiene Officer	5
3.3	Lab Safety Officers	5
3.4	Students, Student Employees and Researchers	6
4	Standard Laboratory Procedures and Regulations	6
4.1	Basic Rules and Procedures	6
4.2	Control Measures and Equipment	11
4.3	Chemical Procurement, Distribution, and Storage	12
4.4	Housekeeping, Maintenance, and Inspections	13
4.5	Access to Laboratories	14
4.6	Medical Program	14
4.7	Protective Apparel and Equipment	15
4.8	Records	16
4.9	Spills and Accidents	17
4.10	Waste Disposal Program	17
5	Training	18
 <u>Appendices</u>		
A.	Current Safety Personnel and Contact Information	19
B.	Incident Report Form	20
C.	Hazardous Waste Management Policy & Procedures	22

## 1. INTRODUCTION

The purpose of the written Chemical Hygiene Plan at Bennington College is to specify procedures, equipment, personal protective equipment, and work practices that are capable of protecting employees from the health hazards associated with hazardous chemical use in the laboratory. The intent of the program is to minimize risks associated with hazardous chemical use by reduction, elimination (where feasible), and adherence to the standard personal exposure level (PEL) and threshold limit values (TLV) established for safe use. The document is adapted from the Chemical Hygiene Plan from Wittenberg University, from which much of the text and organizational structure was obtained. It is the responsibility of all faculty, staff, and students who work in the laboratories of Dickinson Hall to know and follow the provisions of this Plan.

Because knowledge concerning the hazards involved and the best means of reducing those hazards increases constantly, the College reserves the right to modify this document at any time as new information becomes available which would affect something contained within this plan. It shall be the policy of the College to review this document at least once per year.

### *1.1 History of the OSHA Laboratory Standard*

On November 25, 1983, the Occupational Safety and Health Administration (OSHA) published the Hazard Communication Standard (HazComm) which applied to certain manufacturers and in part to certain laboratories. HazComm requires that employers inform employees about the presence and use of hazardous substances in the workplace. HazComm applies to all employees in all workplaces. OSHA received many comments regarding whether the procedures of the Hazard Communication Standard should apply to laboratories where the staff is highly educated. OSHA decided that although "...31.9% of all laboratory workers have bachelors degrees, 20.6% have masters degrees, and 20.9% have doctorates...there is some question as to whether laboratory workers actually make themselves as knowledgeable as they should be and some laboratory employees are not professionally trained." (51 CFR 2664). Thus, while HazComm may seem inappropriate for employees with scientific training, OSHA was not convinced that these workers should not fall under some (other) set of guidelines.

Other unique differences for laboratories (compared to production facilities) were noted: the small amounts of chemicals used, the vast number of different chemicals involved, and nearly half of the laboratories in one survey could not accurately predict their chemical needs even one month in advance.

OSHA decided "...Despite the existence of the unique characteristics of laboratory work places, in actual practice incidents of acute adverse health effects resulting from exposure to toxic substances in laboratories do occur. Furthermore, some studies...have shown increased risks of certain types of diseases for laboratory workers. In addition, although laboratory workers are, in general, a well-educated work force, there is evidence that many laboratories do not have health and safety programs...". Therefore, OSHA proposed the Occupational Exposures to Hazardous Chemicals in Laboratories rule from which this Chemical Hygiene plan originates.

On January 31, 1990, The Department of Labor has published in the Federal Register an amendment to 29 CFR 1910, Subpart Z, identified as Section 1910.1450 (URL: [http://gabby.oshaslc.gov/OshStd\\_data/1910.1450.html](http://gabby.oshaslc.gov/OshStd_data/1910.1450.html).) The title of that amendment is "Occupational exposures to hazardous chemicals in the laboratory", better known as the "Laboratory Standard".

A part of the Laboratory Standard is the requirement for the development of a Chemical Hygiene Plan. The fact that Bennington is primarily a teaching institution is irrelevant to the Laboratory Standard; the Laboratory Standard applies to (relatively small) companies that have labs that do not produce chemicals.

### ***1.2 Role of the Chemical Hygiene Plan***

This Chemical Hygiene Plan describes the Bennington College laboratory safety program, including, but not limited to, standard operating procedures for safe use of hazardous chemicals, criteria for selecting control measures including personal protective equipment, engineering controls, control-equipment inventory and operations (such as vented hoods), employee training programs, medical programs, and safety inspections. This document is intended to comply with 29 CFR 1910.1450 as well as other applicable Federal and State regulations. Where references exist within this document to other documents, those documents will be considered fully applicable here as if those documents had been reproduced here. The Chemical Hygiene Plan is designed as a tool to coordinate safety procedures.

This Chemical Hygiene Plan is a public document and shall be readily available to affected employees, their representatives, and other parties upon request.

## **2. FACILITIES AND PERSONNEL TO BE COVERED UNDER THIS PLAN**

The laboratories of the College and all of the work in these laboratories currently meets, and is expected to continue to meet, the definition of "Laboratory" and "Laboratory Scale" given in 29 CFR 1910 subpart Z. This plan covers all work in all laboratories in Dickinson Hall, including but not limited to, the chemistry, cell biology, animal physiology, ecology, geology and physics labs.

This Chemical Hygiene Plan strictly applies only to trained laboratory employees, including student employees. Students working in labs as part of regular courses and tutorials must be familiar with the contents of this Plan and follow the safety practices described herein but are not subject to the formal training requirements specified for employees. Custodial, maintenance, and other College personnel who enter the laboratories as part of their job functions are covered by Bennington College's Hazard Communication Program, available from Buildings & Grounds.

### **3. RESPONSIBILITIES**

#### ***3.1 Provost and Dean of the College***

The Provost and Dean of the College has the responsibility for approval of the Chemical Hygiene Plan and for the appointment of a qualified individual as the Chemical Hygiene Officer.

#### ***3.2 Chemical Hygiene Officer***

The Chemical Hygiene Officer is the person responsible for overseeing the implementation of the Chemical Hygiene Plan at Bennington College. The Chemical Hygiene Officer has the following responsibilities:

- a. Review the Chemical Hygiene Plan as circumstances warrant, but at least once every 12 months;
- b. Recommend changes in the Chemical Hygiene Plan to the Provost and Dean of the College;
- c. Consult regularly with faculty and staff regarding the use of hazardous substances in labs and for informing and training all personnel who fall under the purview of this Plan;
- d. Arranging for periodic inspection of all safety equipment as specified in this Plan;
- e. Arranging for regular chemical waste disposal with appropriate outside contractors as described in Appendix B of this Plan;
- f. Overseeing annual laboratory safety inspections as specified in this Plan.

#### ***3.3 Lab Safety Officers***

Every laboratory shall have an assigned Lab Safety Officer. They (in concert with the Chemical Hygiene Officer) are responsible for making certain that all College employees, including student employees, who work within the laboratories are aware of the hazards of the materials with which they are working and have received the training required by the Chemical Hygiene Plan, the Hazard Communications Plan and any other applicable Federal or State regulations prior to beginning work in the laboratory. Further, they are required to plan the work to be done in the laboratories under their supervision so that is done in a manner consistent with this Chemical Hygiene Plan. Where such work departs from the usual practices, either because a new procedure is to be used or especially hazardous materials are required to carry out the work, the Lab Safety Officer should consult with the Chemical Hygiene Officer to be certain that the procedures to be followed will ensure the safety of the persons involved.

The Lab Safety Officer will in most cases be the faculty or staff member who is most directly responsible for work performed in a lab or stockroom; current Lab Safety Officers for the various laboratory spaces in Dickinson Hall are listed in Appendix A. The specific roles of the Lab Safety Officers are listed below (with references to specific sections of this document):

1. MSDS procurement (4.3.1).
2. Arranging for routine housekeeping of working spaces (4.4.1).
3. Disposal of hazardous waste (4.4.1, 4.10.1, and Appendix C).
4. Informal lab inspections (4.4.2).
5. Overseeing maintenance of safety equipment (4.4.3).
6. Maintaining an inventory of all chemicals (4.8.2).

### ***3.4 Students, Student Employees and Researchers***

All students working in Dickinson Hall laboratories are responsible for knowing and abiding by the contents of this Chemical Hygiene Plan; particular attention should be given to the procedures for safe handling of chemicals and for working in areas where chemicals are used (Section 4.1), proper use of personal protective equipment (section 4.7), requirements for operations that require prior approval (sections 4.1 and 4.2) and procedures to be followed in cases of spills, fires, or other emergencies (section 4.9).

## **4. STANDARD LABORATORY OPERATING PROCEDURES AND REGULATIONS**

All employees and students working in laboratories shall abide by the practices and policies set forth in the following sections.

### ***4.1 Basic Rules and Procedures***

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

The non-mandatory recommendations for a Chemical Hygiene Plan also include references to "moderately chronic," "highly chronic," and "highly acute" toxicity without defining these terms precisely. This Chemical Hygiene Plan places the burden on the lab supervisor, in consultation with the Chemical Hygiene Officer, to make informed decisions about the relative danger of various substances encountered in labs. Information supplied on MSDSs can assist in this process.

#### **4.1.2. Personal Work Practices**

- a. Inspect personal protective equipment (PPE) prior to use, and wear appropriate protective equipment as procedures dictate and when necessary to avoid chemical exposure.
- b. Do not eat, drink, or apply cosmetics in the laboratory (smoking is prohibited anywhere Dickinson Hall).
- c. Wash promptly and thoroughly anytime a chemical has contacted the skin.
- d. Wash hands well with soap and water before leaving the laboratory.
- e. Be aware of long hair or loose-fitting clothing, and confine these close to the body when there is the possibility of their coming into contact with hot surfaces or flames, getting caught in equipment, or coming into contact with hazardous chemicals.
- f. Do not sit on lab benches, hood airfoils, or other work surfaces where hazardous materials may have been used; sit only on proper chairs or stools.
- g. All employees and students are to be vigilant about unsafe practices and conditions in the laboratory, and shall immediately report such problems to their supervisor or faculty member, or the Chemical Hygiene Officer.
- h. Seek information and advice from knowledgeable persons, as well as applicable standards and codes, about the hazards present in the laboratory. Plan operations, equipment choices, and protective measures accordingly.
- i. Never operate equipment without functioning safety guards and operational safety controls.

#### **4.1.3 General Precautions for Chemical Handling.**

- 4.1.3.1 For each chemical in use, all faculty, staff, and students shall make themselves aware of:
  - a. Chemical hazards and appropriate safety procedures as described in the Safety Data Sheet (SDS), as may be specified by the supervisor, and through other appropriate references, as may be necessary;
  - b. The appropriate safety eyewear and other personal protective equipment to be used;
  - c. Symptoms of exposure for the chemicals with which they work and with the precautions necessary to prevent exposure;
  - d. Location and proper use of emergency equipment, including fire extinguishers, safety showers, and eyewash stations;
  - e. Proper storage for the chemical when it is no longer in use;
  - f. Appropriate personal work practices (see above);

- g. Proper waste disposal procedures; and
  - h. Emergency procedures, including spill clean-up methods and evacuation routes.
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- 4.1.3.2. Do not block access to emergency showers, eyewashes, or exits.
  - 4.1.3.3. Skin contact with chemicals is to be avoided, and all personnel are to wash hands before leaving the laboratory.
  - 4.1.3.4. Mouth suction for the purposes of pipetting or starting a siphon is prohibited; use pipette bulbs or other pipetting aids.
  - 4.1.3.5. Do not use refrigerators, glassware or utensils which are also used for laboratory operations for the storage or handling of food or beverages.
  - 4.1.3.6. When working with flammable liquids, be certain that there are no sources of ignition nearby that might cause a fire or explosion.
  - 4.1.3.7. Any chemical mixture should be assumed to be as toxic as its most toxic component, and substances of unknown toxicity should be assumed to be toxic.

**4.1.4 Chemical Labeling.** To avoid the generation of unidentified waste materials and to prevent unsafe laboratory conditions, it is the policy of Bennington College that all containers of chemicals be labeled as described below.

- 4.1.4.1. All chemical and waste containers in the laboratory shall be labeled.
- 4.1.4.2. Chemical containers are to be provided with a durable label that clearly identifies the contents and any relevant hazard. Except for containers holding transferred bulk solvents, the label should also include the date of acquisition and the source (manufacturer or experimental procedure) of the chemical.
- 4.1.4.3. Chemicals that are known reproductive toxins, select carcinogens, or are otherwise highly toxic should have an additional warning label that describes the nature of the hazard.
- 4.1.4.4. Waste containers also must be labeled with the words “Hazardous Waste” in addition to a description of the contents, the generating process, and the user. Waste containers should remain closed except when adding waste.
- 4.1.4.5. An exemption from labeling requirements is made for transferring a chemical from a labeled container into another container, such as a beaker or Erlenmeyer flask, where the chemical is solely for the *immediate* use of the worker who performed the transfer. It is the responsibility of all laboratory workers, including faculty, staff, and students, to insure that no unlabeled containers of chemicals are on benchtops before leaving the laboratory.

4.1.4.6. Labels should be periodically inspected by the Lab Safety Officer or staff member in charge of the lab to ensure that labels have not been damaged, defaced, or removed.

**4.1.5. Avoidance of Routine Exposure.** Never taste chemicals. Avoid contact with skin. As a general rule, one should avoid smelling chemicals, particularly as a means of identification. However, since it is prudent to know the odors of some common chemicals as a matter of safety, when smelling any chemical, waft the vapors very cautiously to avoid inhaling high concentrations and minimize the amount smelled.

**4.1.6. Equipment and Glassware.** Handle and store laboratory glassware with care to avoid damage. Do not use damaged glassware; be especially careful to check for “star cracks” on glassware that is to be either pumped to vacuum, pressurized, or used with a heating mantle or other heat source. Use extra care with Dewar flasks and other evacuated glass apparatus; shield or wrap them to contain chemicals and fragments should implosion occur. Use equipment only for designed purpose.

**4.1.7. Procedures for Use of Gas Cylinders.**

4.1.7.1. Gas cylinders must be chained or secured at all times while in use, storage, or transport.

4.1.7.2. Gas cylinders must be transported only while chained to a cylinder cart, and with all protective caps or rings securely in place.

4.1.7.3. When tapping a gas cylinder, use only a pressure regulator which has a CGA fitting designation identical to that of the cylinder in use.

4.1.7.4. Gas containers will be labeled in accordance with Section 4, above (Chemical Labeling). Empty containers should also be clearly indicated with tags marked “EMPTY” or “MT.”

4.1.7.5. If the regulator or associated valving shows any evidence of improper performance or operation, including the failure to read zero when disconnected from the supply cylinder, the regulator must immediately be tagged as defective and removed from service.

4.1.7.6. When working with corrosive or toxic gases:

- a. All other provisions of this Plan regarding toxic chemicals must be met.
- b. The cylinder, regulator, and associated plumbing must be situated inside a fume hood or other appropriate protective enclosure while in use.
- c. The regulator *must* have been cleaned and serviced within the past six months, unless it has not been used since either its date of purchase or the date of its prior cleaning and servicing.
- d. It is recommended that a cross-purge arrangement be set up using argon or nitrogen to flush the regulator and valves after use of the corrosive or toxic gas, both to prevent

damage to the equipment and to avoid spillage of residual gas when the equipment is removed from the hood.

**4.1.8 Work with Reproductive Toxins, Carcinogens and Chemicals with High Toxicity.** The use of certain chemicals and operations may pose unusual hazards. This includes work with highly toxic materials, reproductive toxins, and select carcinogens, as such materials are defined in 29 CFR 1910.1200 Appendices A and B, and in 29 CFR 1910.1450, and also would include such operations as high-pressure reactions. The degree of the hazard will depend on the quantities of substances involved as well as the duration for which personnel may be exposed, and determination of the actual level of hazard requires informed judgment on the part of the supervisor as well as the laboratory worker. Work of a particularly hazardous nature may be undertaken only with prior approval from the supervisor. If there is a reasonable possibility that individuals other than the person performing the operation may be exposed or affected, the supervisor must provide written or e-mail notice to the Chemical Hygiene Officer regarding the location and duration of the activity. The following conditions precautions shall be followed for all work with these highly hazardous chemicals.

- a. Prior approval from the Lab Safety Officer must be obtained for work with these chemicals. Substitute with less hazardous chemicals where possible.
- b. The user will design the experiment such that the smallest amount of chemical that is consistent with the desired outcome is obtained and utilized.
- c. The Lab Safety Officer shall ensure that a written protocol is in place that describes in detail the work to be performed, the chemicals to be used, any other hazards that may be involved, and the protective measures that will be taken.
- d. All work with toxic chemicals that may expose the user or other individuals to toxic vapors or respirable dusts shall be performed in an operating fume hood, in a vacuum line, or similar device, which shall be equipped as necessary with HEPA or other suitable filters and traps.
- e. Determination of appropriate containment devices and personal protective equipment shall be made by the supervisor after consulting appropriate references and the CHO.
- f. At a minimum, splash goggles, gloves suitable for the hazard involved, and a long-sleeved lab coat shall be worn. Hands and arms shall be washed immediately after working with such chemicals.
- g. Two people must always be present during any work with highly-toxic chemicals.
- h. A designated work area, consisting of a hood, portion of a laboratory, or an entire laboratory room as necessary, shall be established for work with these substances.

- i. The designated work area shall be posted with signs identifying the hazardous material in use, and the boundaries of the work area shall be clearly marked.
- j. Only those persons trained to work with the chemicals may be allowed in the designated area.
- k. The work area is to be thoroughly cleaned and/or decontaminated after use.

#### **4.2 Control-Measures and Equipment.**

**4.2.1. Unattended Operations.** Leave lights on, place an appropriate sign on the door, and provide for containment of hazardous chemicals and/or toxic substances in the event of failure of utility service (such as cooling water or electricity) to an unattended operation. No operations involving the use of extremely hazardous materials may be allowed to run unattended without prior approval of the Chemical Hygiene Officer. Such approval will only be granted if the Chemical Hygiene Officer is convinced that precautions have been taken to ensure the safety of others. All unattended operations involving the use of especially hazardous materials will require posting of a sign that such operations are being conducted and that the room may not be entered by persons other than the person(s) conducting the operation. This sign shall also include the name and telephone number of the individual(s) responsible for the laboratory.

**4.2.2. Use of Hoods.** Use of a laboratory fume hood is recommended for any work with volatile chemicals. A fume hood is to be utilized for all chemical procedures which might result in release of hazardous chemical vapors, mists, or dusts. As a general rule, the hood shall be used for all chemical procedures involving substances which are appreciably volatile and have a Permissible Exposure Limit (PEL) less than 50 ppm, or where exposure by inhalation is likely to routinely exceed the ACGIH Threshold Limit Value (TLV) or other action level for that chemical; the PEL and TLV values for any hazardous material should be included on its MSDS.

Laboratory ventilation should be normally not less than 20 cubic feet per minute air flow through each room. This flow rate is not considered sufficient to prevent accumulation of chemical vapors. Fume hoods should provide 80 to 120 linear feet per minute of air flow. Confirm adequate hood performance before use; keep the hood sash at the indicated level at all times except when adjustments within the hood are being made; keep materials stored in hoods to a minimum and do not allow these materials to block vents of air flow. Leave the hood "on" when it is not in active use if toxic substances are stored in it or if it is uncertain whether adequate general laboratory ventilation will be maintained when it is "off". Be alert to unsafe conditions and see that they are corrected when detected. The adequacy of hood performance shall be tested at least annually. To the extent feasible, each hood should have a continuous monitoring device to allow convenient confirmation of adequate hood performance before use. If this is not possible, work with substances of unknown toxicity should be avoided or other types of local ventilation devices should be provided.

### **4.3 Chemical Procurement, Distribution, and Storage**

**4.3.1 Procurement.** Lab Safety Officers shall insure that MSDSs are received for all chemicals ordered for their respective labs. Archived copies shall be maintained for 30 years as medical records. The College, through the Provost and Dean and the Chemical Hygiene Officer, retains the right to require that specific permission be granted before chemicals which will pose significant risks are procured. It also retains the right to limit the quantities of such chemicals or to deny the acquisition of such chemicals if the conditions do not exist for the proper handling and/or disposal of the chemical. (See the Hazardous Waste Management Policy and Procedures in Appendix B).

**4.3.2 Inventory.** All chemicals will be logged into the Chemistry database and shall include: material name, quantity, and expiration date, if applicable. Chemicals that are considered highly toxic, including known reproductive toxins, select carcinogens, and those that are highly toxic, should be flagged in the inventory system to alert users of their potential hazards.

**4.3.3 Chemical Storeroom.** Access to the chemical storeroom (Dickinson 206) will be limited to faculty and staff; students and student employees may not enter the storeroom owing to the myriad of potential chemical hazards.

**4.3.4 Chemical Storage.** Chemicals may be stored in the chemical storeroom and in individual teaching and research laboratories. The following steps are required to insure safe chemical storage regardless of specific location.

Chemicals should be stored, insofar as practical, in their original containers with labels intact. Labels shall not be removed or defaced. Bottles of chemicals should be placed on the storage shelves in such a way as to minimize the danger of bottles falling off the shelves. Chemicals shall be stored in a manner consistent with any particular precautions specified on its MSDS; for example, materials that need to be kept cold shall be stored in a suitable refrigerator or freezer, light sensitive chemicals will be stored in suitable containers, etc. Otherwise, except for the specific hazardous materials described below, chemicals may be stored in open shelves provided they are arranged in such a way to minimize the possibility that incompatible materials could come into contact; the Flynn System or similar arrangement scheme should be employed. (The Chemical Hygiene Officer should be consulted anytime uncertainty arises regarding such storage.) Substances that pose a particularly high health risk shall have additional warning labels that clearly indicate the nature of their hazards and should be stored in secured areas, with appropriate ventilation as needed. Research labs are considered to be secured areas. Flammable chemicals will be stored separately from other chemicals in special cabinets or rooms. All chemicals should be examined at least annually by the Lab Safety Officer to determine the need for replacement and the integrity of the container and label. Quantities stored will not exceed recommended limits noted in "Prudent Practices in the Laboratory," 2nd edition, Table 4.3.

Amounts stored within a laboratory should be as small as practical. To prevent accumulation of chemicals in laboratories and the associated hazards, chemicals are to be returned to the storeroom as soon as the need for the chemical no longer exists in a given laboratory.

**4.3.5 Distribution.** Chemicals that need to be transported out of a given laboratory should be labeled as required by the Hazard Communication Program. When chemicals are hand carried between rooms, the container will be placed in an outside container or bucket. When several bottles of chemicals are to be moved at the same time, the use of a laboratory cart is permitted provided that the bottles are properly contained on the cart. When transporting chemicals in a motor vehicle to field sites, all relevant Department of Transportation regulations must be followed.

#### ***4.4. Housekeeping, Maintenance, and Inspections.***

**4.4.1 Cleaning.** Floors within the laboratories are normally to be cleaned by the housekeeping staff of Buildings & Grounds. Regular cleaning of bench tops and tables is the responsibility of the Lab Safety Officers or their designees. In the event of spills, the Lab Safety Officer is required to supervise the cleaning and disposal of the spilled material. Disposal of chemical waste is handled by the Lab Safety Officer, in consultation with the Chemical Hygiene Officer when necessary.

**4.4.2 Inspections.** Formal housekeeping and chemical hygiene inspections will be held at least annually. It is the responsibility of the Chemical Hygiene Officer to schedule and conduct these inspections; Lab Safety Officers will be asked to help review labs other than their own in the course of these inspections. Records of inspection will be kept for at least 3 years.

Informal inspections are to be carried out continually in order to correct any deficiency as quickly as possible. Informal inspections are the responsibility of the Lab Safety Officer. In addition, inspections may be held from time to time by representatives of various Federal and State regulatory agencies. The Chemical Hygiene Officer, or his/her designee, should accompany these persons on the inspection tour.

**4.4.3 Maintenance.** The primary responsibility for noting the need for repair of malfunctioning equipment, including fume hoods and ventilation systems, rests with the Lab Safety Officer. These persons are charged with prompt reporting of any malfunctions in the safety related equipment to Buildings & Grounds or an appropriate external contractor. In addition, a regular program of inspection of safety related equipment will be conducted. Eye wash devices will be tested or inspected annually and regularly flushed, as recommended by the manufacturer; the Chemical Hygiene Officer shall arrange for these inspections. Safety showers will be tested annually by Buildings & Grounds personnel. Fume hoods will be inspected annually by the designee of the Chemical Hygiene Officer. Out-of-service equipment will be plainly marked so that persons in the area of the equipment will be aware that it is not in service. Out-of-service equipment will be repaired and put back into service as quickly as possible or removed from teaching areas. Appropriate lock out/tag out procedures will be followed.

**4.4.4 Passageways.** Stairways and hallways will not be used as storage areas for chemicals. Access to exits, emergency equipment, and utility controls will never be blocked by stored materials.

#### ***4.5 Access to Laboratories***

- 4.5.1. Faculty and Staff. Employees covered by this CHP have unrestricted access to the laboratory spaces in Dickinson Hall.
- 4.5.2. Students. Bennington students enrolled in courses have access only to the lab spaces scheduled for the course(s) in which they are enrolled. Faculty may give permission for students to work outside of regularly scheduled hours. During normal business hours (8:00 AM to 5:00 PM) labs are normally left unlocked to facilitate authorized student access. Outside of these hours, labs are normally kept locked but faculty can provide a list of students who have authorization to work in the space to Campus Safety; students need to arrange entry into the lab with a Campus Safety Officer directly.
- 4.5.3. Visitors and Guests. Access to a given lab space may be granted to visitors, or guests of individuals working in the lab, with the following restrictions. When any work is being performed in a laboratory, visitors or guests may enter the lab only with the direct verbal authorization of the faculty or staff member present; if no faculty or staff member is present, guests or visitors are not permitted to enter the laboratory. When labs are vacant, visitors must be accompanied by a member of the faculty or staff that is covered by this CHP or, in the case of visits by prospective students, a Bennington College admissions counselor. All visitors, regardless of the nature of the visit, must wear proper eye and foot protection as described in the CHP.

#### ***4.6 Medical Program***

**4.6.1 Compliance and Regulation.** Regular medical examinations, consultations, and surveillance of personnel will be provided as required by law or regulation. The cost of this surveillance will be borne by the College.

**4.6.2 Routine Surveillance.** Anyone whose work involves regular and frequent handling of a hazardous chemical, any person showing symptoms which may have been caused by exposure to hazardous materials in the workplace, any person involved in an incident creating the likelihood of a hazardous exposure, any person who is routinely exposed to hazardous chemicals above the action level, or in the absence of an action level, the PEL of an OSHA-regulated substance for which there are exposure monitoring and medical surveillance requirements, or any persons having a medical condition which is known to be aggravated by exposure to hazardous materials within the workplace may consult a licensed physician qualified in the area of occupational exposure to hazardous materials to determine on an individual basis whether a regular schedule of medical surveillance is desirable. The cost of such surveillance will be borne by the College.

**4.6.3 First Aid.** In any situation requiring first aid attention, Campus Safety should be contacted (at extension 210). When the emergency is such that severe impairment of function or death may result

if help is delayed in arriving, the North Bennington Fire Department (at 8-911) should be called prior to Campus Safety. Hard copies of all relevant MSDSs should be secured as soon as possible. "Incident Report Forms" (Appendix A) should be readily available in all labs and completely as thoroughly as possible at the time of the accident.

**4.6.4 Information Provided to Physician.** In the event of an event or condition requiring the consultation with or examination by a licensed physician, the employer shall provide the following information to the physician:

- a. the identity of the hazardous chemical to which the employee may have been exposed,
- b. a description of the conditions under which the exposure occurred, including quantitative exposure data, if available, and
- c. a description of the signs and symptoms of exposure that the employee is experiencing, if any. The relevant MSDS(s) shall also be provided to the physician as quickly as possible.

**4.6.5 Information Provided by the Physician.** For any examination or consultation provided under this Plan, Bennington College shall obtain a written opinion from the examining physician which shall include the following:

- a. any recommendation for further medical follow-up;
- b. the results of the medical examination and any associated tests;
- c. any medical condition which may be revealed in the course of the examination which may place the employee at increased risk as a result of exposure to a hazardous workplace, and;
- d. a statement that the employee has been informed by the physician of the results of the consultation or medical examination and any medical condition that may require further examination or treatment.

#### ***4.7 Protective Apparel and Equipment***

**4.7.1 Safety Equipment.** All laboratories in which hazardous chemicals are used must be equipped with fire extinguishers, eye wash stations, and where feasible, drench showers. Employees, including student employees, working in these laboratories must be informed of their locations and trained in the proper use of the equipment at the time they first begin working in the laboratory. Emergency contact information must be posted in each lab.

**4.7.2 Personal protective equipment (PPE)** shall be provided by Bennington College to students and employees of the laboratories when and where necessary. The Lab Safety Officer has the responsibility to assess if hazards exist that require measures that go beyond eye and hand protection afforded by PPE on hand; if such assessment reveals a need for additional PPE, such as face shields, respirators, aprons, specialty gloves or boots, the College, through the Lab Safety Officer, will communicate selection decisions to each affected worker and select the PPE that properly fits each affected employee or student.

**4.7.3 Eye Protection** Appropriate eye protection must be worn by all persons, including students and visitors, in all laboratories where hazardous chemicals are used. Glasses must meet ANSI Z87.1-1989 standards. Safety glasses with side shields are the minimum protection; goggles are recommended in situations where splashes or projectiles are probably hazards. In addition to required eye protection, full-face shields should be worn when conducting particularly hazardous operations. Special glasses are required when working with lasers. Lab Safety Officers, in consultation with the Chemical Hygiene Officer, are responsible for specifying which level of eye protection is appropriate for particular labs.

Employees and students who wear contact lenses in the lab must have a bright red dot in the form of a sticker on the side of their glasses, goggles or other face/eye protection. This can inform co-workers and emergency rescuers that they are wearing contact lenses.

**4.7.4 Appropriate gloves** will be worn when the potential for contact with toxic materials exists. Inspect gloves before each use.

**4.7.5 Appropriate footwear** is required at all times in all labs; no sandals, open-toed shoes or perforated shoes are permitted in any laboratory.

**4.7.6 Blast shields** are available from the Chemistry Stockroom and should be employed in operations, including lecture demonstrations, that entail explosion hazards; the shields need to be inspected for damage prior to and after use. Report any damage to the Lab Safety Officer or Chemical Hygiene Officer.

**4.7.7 Respirators.** Use of respirators is discouraged; typically, any experiment or procedure that necessitates the use of a respirator under 29 CFR 1910.134 should be conducted in a sufficiently well-ventilated environment such that the use of a respirator is not required. If not feasible, lab supervisors should consult with the Chemical Hygiene Officer as necessary whenever respirator use is required.

#### **4.8 Records**

**4.8.1 Accident Reports.** Records of all accidents will be written and retained for at least ten years following the accident. Reports of all accidents are to be made on the "Incident Report Form." (Appendix B.) The Bennington College Safety Committee, and the offices of Campus Safety and Human Resources will maintain copies of all Incident Report Forms.

**4.8.2 Inventory records** for all substances will be maintained by the Chemical Hygiene Officer in order to know the identities, locations, and quantities of all chemicals on hand. Laboratory notebooks should be maintained in such a fashion as to record the usage of substances which pose a particularly high health risk and these notebooks are to be retained by the Lab Safety Officers indefinitely.

**4.8.3 Medical records** will be maintained by Human Resources for thirty years or as otherwise required by state and/or federal regulations in accordance with the requirements of state and federal regulations.

## ***4.9 Spills and Accidents***

**4.9.1 General Procedures for Spills.** All laboratory operations are to be carried out in accordance with accepted laboratory practices to ensure the prevention of accidental spills. Should a spill occur, immediate action is required of the person causing the spill, the nature of which will depend on the nature of the spilled material as described below.

- a. If no immediate health or safety risk is involved, the individual involved is responsible for minimizing the spread of the spill and to report the incident to the faculty or lab supervisor or the Lab Safety Officer. Except for minor spills, the Lab Safety Officer will notify the Chemical Hygiene Officer who will arrange for the cleanup of the spilled material according to accepted practices. Outside help will be called in to clean up the spill when the extent of the spill or the material involved in the spill are such that inside help is not capable of handling the situation.
- b. If the material spilled presents a serious health risk owing to its toxicity, or presents a physical hazard owing to a combination of the volume of the spill and the material's flammability, volatility, or other hazardous property, no action should be taken except to notify the Lab Safety Officer who will then notify appropriate emergency responders.

**4.9.2 Fire Alarms.** The fire alarm system is available to signal people to evacuate the building in the event of an emergency requiring that action. This alarm system shall be tested annually by Buildings & Grounds. The North Bennington Fire Department and Campus Safety will be notified of all instances when the fire alarm is activated as well as any corrective actions taken to prevent recurrences of similar incidents.

**4.9.3 Incident Reporting.** After any accident or incident that results in injury, or that which would be deemed a near miss of injury, an Incident Report Form (Appendix B) will be completed by the Lab Safety Officer and/or Chemical Hygiene Officer. All accidents or near accidents will be analyzed by the Bennington College Safety Committee and any recommendations arising from the analysis will be distributed to all who might benefit from the information. Also, as a follow up to any safety related Incident Reports, a written recommendation will be sent to the Chemical Hygiene Officer and a copy filed with the Incident Report for a permanent record. If corrective action is necessary, the Vice President of Business and Finance will also be copied with the recommendation.

## ***4.10 Waste Disposal Program***

The proper disposal of chemical wastes is necessary to protect people, plants, and animals from the harm that could be caused by the improper and careless disposal of these wastes.

**4.10.1 General Procedures.** Disposal of wastes from laboratories shall conform to the regulations outlined in the document "Hazardous Waste Management Policy and Procedures" (Appendix C). All Lab Safety Officers under the purview of this Chemical Hygiene Plan are responsible for the collection of these wastes from each of the respective laboratories, the identification of the wastes, and the storage of the wastes pending removal of the wastes by the chemical waste disposal company contracted by the College.

**4.10.2 Outdated chemicals** and those which bear no label will be placed, in their bottles, with the laboratory waste to be removed by the commercial waste disposal company.

**4.10.3 Disposal.** The College shall contract with a reputable waste disposal contractor who will show evidence that the disposal means used by that contractor are means that fall within the legal requirements and provide due consideration of the environmental consequences of waste disposal.

## 5. TRAINING

Training on the safe use of laboratory chemicals shall include methods of detecting the presence of hazardous chemicals, physical and health hazards of chemicals in the lab, and measures lab personnel can take to protect themselves from these hazards.

Employees shall be instructed by Lab Safety Officers on the hazards presented by the specific chemicals in use in the laboratory in which they work. They are to receive training at the time of initial assignment to the laboratory or laboratories and prior to any assignments that involve new exposure situations. Training for students, in regular courses or research tutorials, shall be conducted by faculty.

Training for employees shall include discussion of:

- The provisions of OSHA Laboratory Standard, 29 CFR 1910.1450;
- The location and availability of the Chemical Hygiene Plan;
- Signs and symptoms associated with exposure to the chemicals present in the laboratory;
- Standard operating procedures from the Chemical Hygiene Plan and other sources that are relevant to the individual's work in the laboratory;
- The permissible exposure limits for OSHA-regulated substances or recommended exposure values for other hazardous chemicals not regulated by OSHA that are present in the lab;
- Location and availability of appropriate reference materials on chemical hygiene and lab safety.

# Appendix A

## Laboratory Safety Personnel 2015-16

Chemical Hygiene Officer: John Bullock (Dickinson 203, x4472, [jbullock@bennington.edu](mailto:jbullock@bennington.edu))

Laboratory Safety Officers:

<i>Lab Name/Location</i>	<i>Lab Safety Officer</i>	<i>Contact Information</i>
Chemistry Lab Dickinson 205	Abbey Killam	Dickinson 103, ext. 4470 akillam@bennington.edu
Instrument Room Dickinson 218/219	Abbey Killam	Dickinson 103, ext. 4470 akillam@bennington.edu
Chemistry Research Lab Dickinson 208	Janet Foley	Dickinson 108, ext. 4463 jfoley@bennington.edu
Chemistry Research Lab Dickinson 203	John Bullock	Dickinson 103, ext. 4472 jbullock@bennington.edu
Physics Lab Dickinson 238	Hugh Crowl	Dickinson 104, ext. 4481 hcrowl@bennington.edu
Geology Lab Dickinson 232	Tim Schroeder	Dickinson 233, ext. 4496 tschroeder@bennington.edu
Cell Biology Lab Dickinson 110	Amie McClellan	Dickinson 111, ext. 4469 amcclellan@bennington.edu
Animal Physiology Lab Dickinson 106	Betsy Sherman	Dickinson 107, ext. 4466 sherman@bennington.edu
Ecology Lab Dickinson 143	Kerry Woods	Dickinson 149, ext. 4465 kwoods@bennington.edu
Biology Teaching Lab Dickinson 146/147	David Norman	Dickinson 109, ext. 4462 dnorman@bennington.edu

# Appendix B

## Incident Report Form

For apparently non-serious injuries or exposures: contact the Laboratory Safety Officer

For any injury or exposure which may seem serious or life-threatening:

- **first:** call 8-911 immediately with detailed information on the location of patient(s)
- **next:** call 210 to notify Campus Safety
- **next:** locate hard copy of relevant MSDS(s)

Describe incident/accident:

If Injuries or Exposures: (one sheet for each patient)

Name of patient: \_\_\_\_\_

Age: \_\_\_\_\_

Current medications: \_\_\_\_\_

Medical history: \_\_\_\_\_

Known allergies \_\_\_\_\_

Date: \_\_\_\_\_ Time of injury/exposure: \_\_\_\_\_

Best Estimate of Exposure:

Substance(s): \_\_\_\_\_

Duration and route of exposure: \_\_\_\_\_

(Inhalation, ingestion, injection, absorption)

**NOTE:** Transfer relevant MSDS(s) to emergency room or physician with patient.

## Signs and Symptoms

Symptoms reported by patient:

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Signs of injury and/or exposure as reported by bystanders:

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Actions taken on scene:

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Emergency Room Personnel: Please make a copy of this form for your records, if necessary, and return the original to: Human Resources, Bennington College, Bennington, VT 05201.

# Appendix C

## Hazardous Waste Disposal

### *Purpose*

The purpose of this policy is to 1) prevent haphazard or indiscriminate disposal of College-generated wastes that can pose a hazard to health and the environment, and 2) to provide for the proper and legal disposal of such wastes.

### *Definitions*

Generally, waste is defined as surplus, unneeded, or unwanted material. Lab workers have some latitude in declaring a substance as a waste, although some regulations limit this discretion. Anything that is abandoned or "inherently waste-like" (such as a spilled substance) is a waste.

The following characteristics are associated with hazardous materials:

- (1) A material is ignitable (flammable) if it has any of the following characteristics:
  - it has a flashpoint of less than 60 C (140 F), or some other characteristic that has the potential to cause fire;
  - it is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture, or spontaneous chemical changes and, when ignited, burns vigorously and persistently so as to create a hazard;
  - it is a flammable compressed gas, or can form a flammable gas mixture;
  - is it an oxidizer that stimulates combustion of organic materials.
- (2) A material is corrosive if it is a liquid that has a pH of less than 2 or greater than 12.5 (or corrodes certain grades of steel).
- (3) The material is reactive; that is, it is normally unstable, reacts violently with water, is capable of detonation if exposed to some initiating source, or produces toxic gases.
- (4) The material 1) has an LD<sub>50</sub> less than 50 mg/kg (oral, rat), an LC<sub>50</sub> less than 2 mg/L (rat), or a dermal LD<sub>50</sub> less than 200 mg/kg (rabbit), or is otherwise capable of causing or significantly contributing to an increase in serious, irreversible, or incapacitating reversible, illness, or 2) is listed in Appendix VIII in 40 CFR 261.

### *Procedures*

The Bennington College hazardous waste management program has four basic components: waste minimization, identification, storage, and disposal.

#### **1. Minimization**

- a. Only those amounts of chemicals known to be needed should be ordered. "Economy of Scale" purchases should be avoided when the immediate foreseeable use of the chemical is not obvious.

- b. Procedures should be designed, where possible, to eliminate or minimize the amount of waste materials generated. This should preferably be included as part of the lab experiment for student laboratories.
- c. Whenever possible, spent solvents should be recovered and recycled by distillation or chromatographic purification for reuse.
- d. Aqueous solutions of acids and bases should be neutralized before flushing down the drain with large volumes of water.
- e. Solutions containing toxic heavy metals such as mercury, lead, chromium, silver, etc. should be precipitated and the metal recovered in solid form for subsequent disposal as a solid waste.
- f. Fume hoods should not be used as a means of disposal of volatile chemicals.
- g. Liquid organic wastes should be emptied into labeled plastic containers kept in vented metal cabinets in each laboratory.
- h. Highly reactive wastes, such as acid chlorides, should be converted to a less reactive form before disposing in the waste containers.

## **2. Identification**

- a. All wastes are to be clearly labeled with: contents, the name of the person who labeled it, and the date. Labels are to be as specific and thorough as possible. For example: "used degreaser, ARMCO-SD 70 from Geology Lab" tells more than simply "used degreased" or "waste solvent." Labels should include product or chemical name, suspected contaminants, and a note about the process which produced it.
- b. Every effort should be made to avoid an unlabeled waste container. If such a container is discovered, the lab supervisor should attempt to determine the most likely contents of the container by interviewing appropriate people. The substance should be analyzed only if there is a high degree of certainty that this can be done without risk. If this cannot be done, the substance must be disposed of as an "unknown" at considerable cost to the College.

## **3. Storage**

- a. Each laboratory is responsible for storing its own waste until it is transferred to a central location prior to being picked up by a disposal firm.
- b. Each generator (lab) may accumulate no more than 55 gallons of hazardous waste or 1 quart of acutely hazardous waste.
- c. The Code of Federal Regulations states that hazardous waste pick-ups are to occur within 90 days after the waste starts to accumulate (at the collection site) in order to avoid becoming a storage facility. All laboratories will be notified of the collection date so that wastes can be made available for pick-up.

## **4. Disposal**

Certain chemical wastes are not to be treated or disposed of on campus, but are shipped off campus. Wastes sent off campus include those that require special disposal permits, those subject to regulations specifying where and how they may be disposed, and those for which no on-campus

disposal system works. As noted above, these wastes can be accumulated for no more than 1 year at the generator/satellite locations. Once at the collection site, off-campus disposal must occur within 90 days.

### *Addendum*

#### **Samples of Hazardous Waste**

MPCA - Toxic and Hazardous Wastes. Toxic and hazardous wastes are waste materials including but not limited to poisons, pesticides, herbicides, acids, caustics, pathological wastes, radioactive materials, flammable or explosive materials, and similar harmful chemicals and wastes which require special handling and must be disposed of in a manner to conserve the environment and protect the public health and safety.