

**THE UNIVERSITY OF MASSACHUSETTS BOSTON  
ENVIRONMENTAL HEALTH & SAFETY (EHS)  
MANUAL**

*(REVISED OCTOBER 2000)*

For most recent version go to: <http://omega.cc.umb.edu/~ehs/ehsindex.htm>

# THE UMB EHS MANUAL

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**1.0      UMASS BOSTON EH&S  
PROCEDURES/PROGRAMS/  
PLANS/CHECKLISTS**

## 1.1 THE UMB ENVIRONMENTAL HEALTH & SAFETY POLICY

*Office of the Chancellor*

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Boston, MA 02125-3393

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Tel: 617 287-6800

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Fax: 617 265-7243

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September 3, 1997

Memorandum for: University Community

Subject: Environmental Health and Safety Policy

I am pleased to present to you the new campus Environmental Health and Safety Policy. This policy was developed by the Chancellor's Environmental Health and Safety Committee and has been reviewed by University legal counsel, Faculty Council, and Executive Staff. You will find that this is an umbrella policy which states our commitment to health and safety, and outlines the related responsibilities of each member of the campus community.

I encourage you to distribute the policy widely and to use it as a springboard for departmental discussions of health and safety issues. The members of the Chancellor's Advisory Committee on Environmental Health and Safety are listed on the back page of this memorandum, and I also would encourage you to call any of the members to discuss any thoughts or concerns you may have about health and safety issues. Of course, the Office of Environmental Health and Safety is always available as a resource for the campus. The number is 7-5445.

This policy is an important step in establishing a campus commitment to environmental health and safety. Please join me in thanking the Committee for its valuable efforts in developing this policy.



Sherry H. Penney  
Chancellor

# **THE UMB ENVIRONMENTAL HEALTH & SAFETY POLICY**

## **Purpose**

The purpose of this policy is to assert the University's commitment to environmental health and safety (EH&S) and to clarify responsibilities for all administrators, faculty, staff, (hereafter referred to collectively as employees), students and committees involving environmental health and safety issues.

## **Management's Commitment Statement**

The environmental health and safety of University employees and students is a matter of paramount concern. The University is committed, to the extent that it is reasonable and within its control, to maintaining a healthful and safe environment for all employees, students and visitors on all areas of campus, and strongly encouraging all employees and students to observe safework and educational practices. To achieve those objectives, the University is continuing to develop and implement a comprehensive and effective environmental health and safety program. This program reflects the requirements of relevant federal, state and local laws and regulations, generally accepted standards and the dictates of common sense.

## **General Statement of Responsibility**

Environmental health and safety is a part of everyone's job and educational experience. Therefore, every University employee and student has an obligation to take all reasonable precautions to prevent injury to themselves and others, to comply with this policy and all approved EH&S standards and procedures. Failure to comply with this policy and all approved EH&S standards and procedures may result in action as established by University disciplinary and grievance procedures.

## **Management Responsibilities**

The overall responsibility for campus environmental health and safety rests with the Chancellor. In turn, the Chancellor has delegated to all Vice Chancellors, Deans, Chairpersons, Department Heads and Directors the responsibility for implementing and enforcing this policy and all applicable EH&S standards, procedures and requirements within their respective units. Fulfillment of management-level EH&S responsibilities and supportive actions is essential to create the organizational infrastructure necessary to foster the development of a positive campus safety culture. Managerial commitment serves to support the positive actions required of faculty, staff, students and others in the University community. To achieve this end, EH&S policies and procedures must be a high priority in all short- and long-range administrative projects, programs and budgets.

## **Supervisory Responsibilities**

Everyone with supervisory responsibilities must help establish and maintain safe work and educational environments for all employees, students, and visitors. Supervisory supportive actions also help management in the development of a safety culture. Supervisory involvement requires day-to-day attention to the activities and environments of all supervised individuals. Supervisors are expected to take all reasonable efforts within their control to

maintain safe working conditions through adherence to all EH&S safe work practices and procedures. Supervisors shall ensure that employees and students are trained to understand safe work practices, recognize potentially hazardous conditions and understand the remedial actions to control them. In addition, supervisors are expected to maintain pro-safety behavior and promote awareness to help employees and students take a safe course of action in unexpected situations.

### **Individual Responsibilities**

Ultimately, campus health and safety will depend upon the actions of each individual. Fulfillment of individual EH&S responsibilities and supportive actions is necessary to achieve full implementation of established University policies, programs and procedures. Everyone has an obligation to take all reasonable precautions to prevent injury to themselves and to their fellow employees and students. It is essential that individuals report all unsafe conditions and injuries to their supervisors or the EH&S Office.

### **EH&S Office Responsibilities**

The Vice Chancellor for Administration and Finance has delegated to the Director of the Environmental Health and Safety Office the responsibility and authority for overseeing overall compliance with applicable health and safety standards on campus. To achieve that end, the Director shall continually adopt generally-accepted standards of care, which include applicable federal and state regulations, nationally-recognized codes and established professional practices. The EH&S Office is responsible for developing, recommending, and then implementing, together with university administration, academic and service departments and individuals on campus, all policies, procedures, and practices pertinent to the maintenance of a safe and healthy work and educational environment. In addition, the EH&S Office shall oversee the development and provision of written manuals, guidelines and training, provide technical and service support, manage audit efforts, evaluate problems and recommend remedial measures and serve as primary liaison with regulatory agencies.

### **Environmental Health & Safety Advisory Committee Responsibilities**

The EH&S Advisory Committee serves as a forum for its broad-based, representative membership to discuss pertinent health and safety issues. The Committee's overall objective is to foster the development of a university-wide, positive health and safety culture by promoting the implementation of health and safety policies and programs for University employees and students. In coordination with the EH&S Director, the Committee is obligated to provide semiannual, progress reports to the Chancellor.

### **Other Committees**

The Radiation Safety Committee and three Institutional Review Board Committees for federally-mandated reviews of research involving Human Subjects, Vertebrate Animals and Recombinant DNA, report administratively to the Provost. They are responsible for reviewing and recommending specific operational policies and practices within their area of expertise. In addition, the four committee chairs may advise the EH&S Director and Advisory Committee regarding the application of relevant standards for hazard control.

## 1.2 UMB EMERGENCY RESPONSE PROGRAM

Policy and procedures for the control of chemical spills  
Emergency Response Plan  
7/14/1996

### **Objective:**

Accidental release of chemicals may pose a significant threat to immediately involved individuals, emergency response personnel, the public at large, and the environment. The purpose of this policy is to clearly define the responsibilities of all parties involved in such events at UMB, and the procedures established to minimize potential danger. Wherever feasible, such policies and procedures shall be consistent with the requirements of OSHA standard 29 CFR 1910.120(q) "Hazardous waste operations and emergency response.: Emergency response program to hazardous substance releases."

### **Incidental vs Emergency Releases.**

UMB is a chemically complex environment, utilizing a vast array of substances in facilities operations and particularly in teaching and research laboratories. Accidental release and spillage of chemicals is an inevitable, daily occurrence. The University will provide a trained and fully equipped Chemical Spill Control team, whose services are available on call on a 24-hour basis. However, it is expected that users of chemical substances will be able to competently and safely manage the majority of such spills without the assistance of the team. Small spills, termed Incidental Releases, may be addressed locally by laboratory, facilities administration, custodial or other personnel if the spill meets the following criteria:

The release is controlled, that is, is non-continuing, and not likely to migrate to adjacent areas or be released to the environment outside of the building.

The individuals conducting the clean-up normally occupy the area where the spill occurred, were involved in the event leading to the spill, or regularly work with the material spilled.

The size of the spill, and the hazard posed by the spilled chemical is such that no danger of bodily harm or toxic exposure to the individuals conducting the clean-up can occur.

Individuals conducting the clean-up fully know and understand the hazards posed by the spilled material, and the measures necessary to protect themselves from exposure or harm.

Individuals conducting the clean-up have access to all equipment necessary to conduct the clean-up, such as appropriate adsorbents, non-sparking tools, dikes, HEPA vacuums, and disposal bags, and training in their use.



Individuals conducting the clean-up have access to all necessary personal protective equipment, and have been trained in the selection and use of the equipment which is appropriate for the specific chemical spilled.

Any situation which does not meet all of the above criteria is termed an Emergency Release, and may be addressed only by members of the Chemical Spill Control team acting within the UMB Emergency Response Plan/Incident Command System. This plan addresses the following elements:

Pre-emergency planning and coordination with outside parties.

Personnel roles, lines of authority, training, and communication.

Emergency recognition and prevention.

Safe distances and places of refuge.

Site security and control.

Evacuation routes and procedures.

Decontamination.

Emergency medical treatment and first aid.

Emergency alerting and response procedures.

Critique of response and follow-up.

PPE and emergency equipment.

## 1. Pre-emergency planning and coordination with outside parties.

### AGENCY/PHONE

Massachusetts Emergency Management Agency (MEMA) (508)820-2000

### AGENCY/PHONE

Boston Emergency Management	<b>emergency</b>	911
	<b>non-emergency</b>	(617)343-2891
Office of the President (UMass)		(617)287-7000
Mayor, City of Boston		(617)635-4500
US Military/National Guard		(617)944-0500
Boston City Police	<b>emergency</b>	911
	<b>non-emergency</b>	(617)343-4200
Massachusetts State Police	<b>emergency</b>	(617)523-1212
	<b>non-emergency</b>	(617)727-6780

Boston Fire Department	<b>emergency</b>	911 or (617)536-1500
Suffolk County Sheriff		(617)725-8200
Boston Dept. of Health & Hospitals	<b>emergency</b>	911
	<b>non-emergency</b>	(617)534-5395
Massachusetts Fisheries, Wildlife and Environmental Law Enforcement		(617)727-3151
Department of Environmental Protection		(617)292-5500
Environmental Protection Administration		(617)565-3400
Federal Aviation Administration		(800)255-1111
US Coast Guard	<b>emergencies - search &amp; rescue</b>	(617)565-9200
	<b>emergencies</b>	(617)223-3201
National Response Center (NRC)		(800)424-8802
Toxic Chemical and Oil Spill-Boston Department of Public Works		(617)635-7555
Boston Edison	<b>emergency</b>	(617)262-4700
	<b>non-emergency</b>	(617)424-2000
Boston Gas Co.		(800)231-5325
Bell Atlantic	TTY Users	(800)439-2370
	Business Users	(800)941-9900
American Red Cross		(800)564-1234
Poison Control		(617)232-2120

## 2. Personnel roles, lines of authority, training, and communication.

Personnel roles, lines of authority, and communication shall proceed in accordance with the UMB Incident Command System. Under this system, a UMB official from the EH&S Office, trained in emergency response operations responding to a release assumes the duties of Incident Commander, co-ordinating all response activities and specifically delegating related activities. These may include hazard assessment, evacuation and site-security, clean-up operations and decontamination, public relations/communications and notification of outside authorities. In the event that more senior staff arrives on scene, authority automatically passes to that individual following briefing by the acting Incident Commander. In the event that the incident involves response by an official outside agent (Fire Department or BFD Hazardous Materials Response Team) authority passes to the most senior official of that agency; this does not apply to outside parties contracted by UMB to assist in the response however, which act in an advisory/operational capacity under the UMB Incident Commander.

All personnel involved in the emergency response shall be thoroughly familiar with the UMB Emergency Response Plan, Incident Command System, and Evacuation Plan; individuals serving as members of the Chemical Spill Control team shall in addition receive training, and be certified as specified in 29 CFR 120(q)(6)(iv) - Hazardous Materials Specialist:

### **Hazardous Materials Specialist**

Hazardous materials specialists are individuals who respond with and provide support to hazardous materials technicians. Their duties parallel those of the hazardous materials

technician, however, those duties require a more directed or specific knowledge of the various substances they may be called upon to contain. The hazardous materials specialist would also act as the site liaison with Federal, state, local and other government authorities in regards to site activities. Hazardous materials specialists shall have competency in the following areas and the employer shall so certify:

Know how to implement the local emergency response plan.

Understand classification, identification and verification of known and unknown materials by using advanced survey instruments and equipment.

Know the state emergency response plan.

Be able to select and use proper specialized chemical personal protective equipment provided to the hazardous materials specialist.

Understand in-depth hazard and risk techniques.

Be able to perform specialized control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available.

Be able to determine and implement decontamination procedures.

Have the ability to develop a site safety and control plan.

Understand chemical, radiological and toxicological terminology and behavior.

In addition to initial training and certification (24 hour EPA approved Emergency Response syllabus), the Hazard Materials Specialist will also undergo, as a minimum, 8 hours annual retraining. This may consist of quarterly 2-hour on-site drills or their equivalent.

### **Lines of Communication. - Initial Response**

As a general rule, employees and other building occupants at UMB have the right to seek the services of EH&S staff for consultation, and on-site audit when necessary, regarding any conditions, circumstances, or materials for which the nature or degree of hazard is uncertain. When the perceived hazard is considered non-acute, services may be obtained by a variety of mechanisms such as direct phone contact with the EH&S office or referral through supervisors, the Public Safety or Facilities Administration Office, or various Health and Safety Committees.

With regard to the reporting of a chemical spill, either to obtain an immediate site response by the Chemical Spill Control team or simply to obtain a consultation or hazard assessment prior to classifying the spill as Incidental or Emergency, all communication should be routed through Public Safety by dialing 911 (internal). Public Safety, which operates this line on a continuous 24-hour basis will then page the member of the Chemical Spill Control team who is currently on call. All calls of an emergency nature arising in laboratory or other areas of heavy chemical use or storage should be channeled

through this route, whether they involve chemical matters directly, or building-related failures such as plumbing failures or floods. Public Safety will monitor all such calls and notify both the on-call Chemical Spill Control team responder, and the Principal Investigator or Chemical Hygiene Officer responsible for the area.

Lines of Communication - Ongoing Emergency Response.

Individuals delegated by the acting Incident Commander (Safety Officer responsible for hazard assessment, Public Safety Officers responsible for site security and evacuation, supervisors of custodial or building-related remediation teams, agents contracted by UMB to carry out remediation) shall report directly to the Incident Commander as needed. The Incident Commander, prior to ordering or engaging in any response liable to disrupt employee or student activities or limit university services, and subject to feasibility, shall report to the Office of Administration and Finance and act under the direction and guidance of that Office. Information relating to the incident underway or past shall also be provided solely to that Office for dissemination both within and without the University by an appropriate route and agent.

### **3. Emergency recognition and prevention.**

#### **Releases to the environment.**

Few opportunities for environmental release exist at the Harbor Campus. In the event of such a release (e.g.. oil or fuel spill from University boats into the harbor, overturn or spill from non-university vehicles transporting hazardous materials), EH&S, with the aid of Public Safety will evacuate, isolate and cordon off the affected area. EH&S (Incident Commander) will be responsible for obtaining appropriate contract Emergency Response services, and carrying out all requisite notification to city, state and federal agencies.

## Chemical Spills - Laboratory-related.

When notified that a spill or release has occurred in a laboratory area, the responding EH&S Incident Commander will contact the Principal Investigator, Chemical Hygiene Officer, or their designate to obtain additional details of the potential product and severity of conditions likely to be encountered. Further chemical-specific information may then be obtained from the EH&S database, and additional sources as warranted. When this information has been obtained the Incident Commander must make three critical decisions;

Whether the chemicals or conditions involved preclude any possibility of safe entry by EH&S personnel. This might occur for example in the case of continued flooding, with active bottle breakage in a lab known to contain water-reactive metals, or in the case of flammable or explosive materials in the presence of active ignition sources or thermal reactions. These cases **require** evacuation, isolation of the area, and notification of appropriate city and state agencies.

Whether the chemical or conditions warrant the presence of suitability trained and equipped back-up personnel to effect rescue, and

Whether the chemical spilled or the conditions of the spill pose a respiratory hazard, requiring respiratory protection.

If the Incident Commander decides that back-up personnel is required, he/she shall arrange for that personnel. If the conditions likely to be encountered include significant respiratory hazard sufficient to require the use of the SCBA (self-contained breathing apparatus), **only** a member of the UMB Spill Control Team may be employed as a back-up. Similarly, any use of the SCBA **requires** that a similarly equipped member of the UMB spill-control team be employed as a back-up, stationed immediately outside of the contaminated area and in visual contact with the active first responder. **Under no circumstances may both operatives enter the contaminated area simultaneously to address the spill.** If the hazards which warrant back-up are physical only, for example unsafe footage due to damaged surfaces or spilled materials, a member of UMB Public Safety may serve as the back-up. The individual must be thoroughly informed as to the potential hazards, completely outfitted with personal protective equipment which is appropriate for the conditions and at least equivalent to that employed by the first-responder. The individual must be acquainted with the limitations of that equipment, and his/her role thoroughly explained. The individual is to remain outside the contaminated zone in visual contact with the first-responder, with all required PPE donned and secured. In the event of a mishap, or by the use of a pre-arranged signal, the individual shall enter the contaminated zone and immediately retrieve and remove the first-responder from the area. During this initial entry, carried out for the purpose of hazard assessment or stabilization of the incident by containment or other emergency abatement, **the individual serving as back-up shall not enter the contaminated area for any other reason than to effect rescue and removal of the first responder.**

If the Incident Commander determines that chemicals actively or potentially involved in the spill pose a respiratory hazard, the **minimum level of respiratory protection to be employed is a full-face PAPR** (positive pressure air-purifying respirator) equipped with

appropriate cartridges. Negative pressure full or half face respirators may not be employed in the initial response/hazard assessment phase of chemical spill control. The cartridges employed may be specifically selected for the airborne contaminant known to be present (from the current stock which includes HEPA, Organic Vapor/Acid Gas, Organic Vapor/Methylamine, and Formaldehyde); in situations where the contaminant is not clearly identified, combination cartridges (HEPA/Organic Vapor) shall be applied. This strategy, which deviates from the NIOSH Decision-Tree method employed for all other situations requiring respiratory protection, is based on typical volumes of chemicals encountered in laboratory situations, very brief exposures which occur during the initial hazard assessment stage of the response, and high levels of dilution encountered in laboratories on a continuous 24-hour basis due to chemical fume hood one-pass exhaust. SCBA is however available at the discretion of the Incident Commander. Careful consideration should be given to the potential toxicity and volume of the chemicals to be encountered, and to any conditions of temperature, pressure, architecture, and local conditions of ventilation which might result in higher levels of airborne contaminant than normally anticipated. In the event that SCBA is employed, a fully trained and outfitted back-up **must** be employed.

Additional PPE (to "B" level) is available and may be employed in the response, at the sole discretion of the Incident Commander. Since the conditions potentially encountered span the range from trivial to life-threatening, pre-existing information may be full or none, and all members of the UMB Spill Control Team are thoroughly trained in chemical emergency response, specified minimum levels of PPE are not appropriate. The Incident Commander is however reminded that information from involved parties in emergency situations is often inaccurate or unconsciously biased, and that particular consideration should be given to eye protection, and to gloving under uncertain and uncharacterized conditions. As general rule, when responding to incidents of unknown toxicity or volume, or toxicity, volume and physical characteristics known to present an airborne or skin contact hazard, initial entry should be made in a fully encapsulating Saranek jumpsuit, Butyl rubber gloves, and wearing a Full-Facepiece Positive Atmosphere Purifying Respirator outfitted with combination an appropriately selected cartridge, or a combination HEPA Filter/Organic Vapor cartridge. Depending on the description of the spill or other information supplied, the first responder may scale the initial response up or down.

#### **4. Safe distances and places of refuge.**

The Incident Commander, or designated Safety Officer, shall assess the potential for the spread of contamination based on the physical characteristics, quantity, and other circumstances of the spilled substance, and determine safe distances and places of refuge. For large volume spills occurring outside of buildings, the Table of Initial Isolation and Protective Action Distances from the current DOT Emergency Response Guidebook shall be used. In the case of spills occurring within laboratories and buildings, the main factor in isolation will be the direction and efficiency of airflow as established by the building ventilation systems. In laboratories which contain one-pass exhaust through functioning fume hoods, simply closing the door providing access to the affected space is usually sufficient. In the case of spills in corridors, mechanical rooms and other building spaces, consideration must be given to the effects of recirculating ventilation, the

likelihood of rapid contamination of the airspace in all areas served by the affected air handling unit, and the slower but significant effect of entrainment of the contaminant into laterally and vertically adjacent areas. If the area containing the spill is physically isolated by walls, doors, windows etc., the feasibility of manually blocking both supply and exhaust louvers should be considered to lessen the likelihood that building evacuation will be required. In the case that evacuation is required, the Incident Commander must monitor the clean-up and post clean-up with appropriate instrumentation, and establish that safe levels of contamination exist before reoccupation is permitted.

## **5. Site security and control.**

Prior to the arrival of Public Safety or Security personnel, the individuals creating the spill are responsible for ensuring that no one enters the immediately affected area.

## **6. Evacuation routes and procedures.**

It is the responsibility of the Incident Commander to evaluate the hazard posed by a chemical spill, and determine need for and extent of area or building evacuation. Public Safety staff are responsible for carrying out the evacuation according to the UMB Evacuation Plan.

## **7. Decontamination.**

The need for and methods of decontamination of the affected area, and all tools and equipment subsequently contaminated, must be determined by the Incident Commander. Custodial or other UMB personnel may be employed in carrying out the clean-up and decontamination, provided that they have been fully informed of the hazards associated with the spilled chemicals, are issued appropriate protective equipment, and are instructed in its proper use and limitations.

## **8. Emergency medical treatment and first aid.**

Emergency medical treatment will be provided by Boston City Health & Hospitals.

## **9. Emergency alerting and response procedures.**

The UMB Public Safety Office can be reached on any campus phone by dialing 911. When an emergency call is received they simultaneously dispatch an Officer to investigate the report, and if necessary, call in Boston Fire, Police or EMS. The first Officer assesses the situation and reports back to dispatch with further information.

## **10. Critique of response and follow-up.**

Consequent to all chemical spill incidents, the Incident Commander will complete the attached questionnaire. Copies will be provided to the members of the Chemical Spill Control team and the Director of Environmental Health & Safety. Either the Incident Commander, or the Director of EH&S may request a formal review, including as participants any individuals deemed relevant to the proceedings.

## **11. PPE and emergency equipment.**

All use of personal protective equipment shall be consistent with the requirements of 29 CFR 1910.132 through 29 CFR 1910.138. In brief, these regulations stipulate that selection of appropriate equipment be made following hazard assessment of the specific agent and incident, that equipment be properly fitted, and that the individual using the equipment has been instructed in its proper use and limitations.

In an Emergency Incident involving a chemical spill, only the members of the Chemical Spill Control team are permitted entry into the affected area, and they do so for the purpose of hazard assessment and evaluation. These individuals have a wide range of equipment at their disposal, and are specifically trained in its use, care and limitations. This training, and the instructions contained in section 3 of this document shall be considered compliant with the aforementioned federal regulations.



### 1.3 UMB RESPIRATORY PROTECTION PROGRAM

Revised 10/2000 - J. B. Dumser, PhD, CIH, UMB EH&S

This document sets forth the policies and procedures of the University of Massachusetts Boston Respiratory Protection Program, in accordance with the requirements of the Federal OSHA Standard found at 29 CFR 1910.132 and 134 (Revised 4/1998), incorporating the guidelines for maintenance contained in ANSI Z88.2-1992.

The undersigned is charged with direction of the UMB Respiratory Protection Program:

Name (Print): J. Brian Dumser

Signature: \_\_\_\_\_

Title: Associate Director, UMB EH&S \_\_\_\_\_ Date: \_\_\_\_\_

is responsible for all facets of this program and has authority to make necessary decisions to ensure success of the program. He/she is the sole person to amend these instructions.

A. This program establishes the procedures which ensure these essential elements:

- A1. The proper types of respirators are selected.
- A2. The employee is medically able to use the specific type of respirator indicated.
- A3. Fit testing is conducted properly.
- A4. Proper use is defined for specific conditions.
- A5. The respirators are properly cleaned, disinfected, stored, inspected, repaired and/or discarded.
- A6. SCBA's utilize adequate quality, quantity and flow of air.
- A7. The wearers are properly trained.
- A8. The program is regularly evaluated for effectiveness.

B. UMB is a University whose principal mission is education and research. As such, no chemical process or other manufacturing activities are carried out. Consequently, use of respirators is limited primarily to three situations:

- B.1 Routine maintenance and renovation of building structures and mechanical elements.
- B.2 Chemical and biological research laboratories.
- B.3 Spill-control and hazardous waste operations.

B.1. Routine maintenance and renovation of building structures and mechanical elements. Potential exposures to chemicals in concentrations sufficient to require the use of respiratory protection is limited in these situations by several factors including:

- a. The absence of friable asbestos-containing building materials on campus.
- b. Engineering controls including dedicated exhaust ventilation in paint shops,

- carpentry shops, welding shops, and vehicle maintenance garages.
- c. Comprehensive evaluation of building materials prior to demolition or renovation activities as required under...
- d. A permit-controlled confined space entry program which precludes entry into contaminated or oxygen deficient space.
- e. Intermittent, occasional, or short-duration nature of activities performed.

Consequently, the use of respirators by Facilities Administration, Utilities and Buildings and Grounds personnel engaged in the above tasks is, with few exceptions, considered to be voluntary on the part of the employee, and not required under 1910.134 or any other applicable State or Federal Standard. It is nonetheless the goal of the employer to minimize to all reasonable extent any exposure to noxious chemicals or other materials, whether specifically demonstrated to pose a hazard to health or not. Therefore, the University has established the following policy with regard to these activities:

All supervisors and individual employees are encouraged to request from EH&S a site-evaluation of any activity which they feel may warrant respiratory protection.

Dust masks (filtering facepieces), at a minimum meeting specifications for R95, exhalant valve, are made freely available to all employees on all shifts. These may be obtained on request from the Facilities Tool crib.

Annually, instructions (1910.134 App. D) will be presented, the limitations of these dust masks will be explained to all the above employees. Advantages and limitations of half-mask cartridge respirators will be emphasized, and it will be the policy of the University to provide such masks on request.

For employees choosing to use the dust masks only, no further requirements are established under this program.

Should the employee elect to use a cartridge respirator, elements of the program listed above under A2 (Medical Evaluation) and A5 (Cleaning and Maintenance) must be followed, as required by the Federal Statute. In addition, as University policy, elements under A3 (Fit Testing) and A7 (Training) will also be implemented.

In any case in which exposure to a substance above the OSHA-regulated PEL may be reasonably expected, or significant health effects may reasonably be expected due to exposure to an unregulated substance, work-site hazard analysis will be carried out and all elements of the Respiratory Protection Program will be implemented.

## B.2. Chemical and biological research laboratories.

All research laboratory activities are carried out under the UMB CH/EM program, which is strictly compliant with the requirements of a Chemical Hygiene Program as stipulated in OSHA CFR 1910.1045 (Occupational Exposures to Hazardous Chemicals in Laboratories). In particular, for each laboratory, a complete inventory of hazardous chemicals has been compiled, each chemical has been subjected to a complete analysis of physical and toxicological properties, and this data is available at the laboratory site. Every individual in the laboratory has been trained to use this data to generate standard

operating procedures which minimize the risk of exposure to hazardous chemicals under any specific conditions employed in the research protocol. As this data includes complete information on vaporization and aerosol generation capacity of each chemical employed, and the training emphasizes containment and the effective use of local exhaust ventilation, laboratory workers are able to either design protocols which preclude the potential for airborne exposures, or to recognize the conditions under which such exposures may be reasonably be expected to occur.

Consequently, under normal circumstances no respiratory protection is required for research laboratory activities. In the event that a significant exposure potential is recognized by the research personnel or by EH&S, work-site hazard analysis will be conducted by EH&S to identify the appropriate level of respiratory protection required, which will be provided and maintained by the University. Elements of the Respiratory Protection Program will be implemented as defined above, that is:

- " Appendix D information for the voluntary use of dust masks.
- " Elements A2, A3, A5, and A7 for the voluntary use of cartridge respirators (conditions which pose no hazard of exposure to toxic chemicals, but which may introduce physical hazards associated with the use of the respirator).
- " All elements of the program where exposure to hazardous chemicals may be reasonably anticipated to exceed OSHA regulated limits, or may reasonably anticipated to be harmful to the health.

### B.3. Emergency Response Spill-Control and Hazardous Waste Operations.

B.3.a Minor spills in laboratories or in maintenance operations. In accordance with the UMB CH/EM Program and CFR 1910.120(a)(3), incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the release area or by maintenance personnel, or where there is no safety or health hazard, are not considered to be Emergency Responses. Maintenance personnel and employees in laboratories have been trained to recognize, and are equipped to deal with such incidental spills. Inhalation exposure to hazardous chemicals would not be reasonably expected to occur under these circumstances, and no respiratory protection is required.

B.3.b Post Emergency Response Operations. On completion of an Emergency Response and stabilization of hazardous conditions, employees may be required to conduct clean-up or other operational or remedial activities in the affected area. In compliance with CFR 1910.(q)(11), these employees must be provided with training stipulated under CFR 1910.38(a) (Emergency and Fire Prevention Plan), CFR 1910.1200 (Hazard Communication) and CFR 1910.134 (Respiratory Protection). With regard to respiratory protection, levels of protection necessary will be determined based on the results of site hazard analysis. Elements of the Respiratory Protection Program implemented may thus include those stipulated for any of the conditions previously defined, that is, voluntary use of dust masks (App. D), voluntary use of cartridge respirators (A2,A3,A5,A7), or the mandatory use of specific respirators under situations reasonably expected to produce exposures to hazardous chemicals which exceed OSHA limits or which may endanger life or

health (A1-A8).

B.3.c. Chemical Spill Control Team. Response by employees from outside the immediate area to an incident which results or is likely to result in an uncontrolled release of a hazardous substance may only be carried out by employees who are equipped and trained under the requirements of CFR 1910 120(q). Currently, the following individuals meet these requirements and constitute the UMB Chemical Spill Control Team:

Zehra Schneider Graham - CHMM -Team Director  
Brian Dumser - CIH - Hazardous Materials Specialist

These individuals are trained initially and annually in accordance with CFR 1910 120(q)(6)(iii) as Hazardous Materials Specialist, and further possess the competencies listed under CFR 1910.120(q)(6)(v) qualifying each to assume the duties of Incident Commander in an emergency response event. As these individuals are expected to employ any respiratory protective devices up to and including SCBA, they are subject to all elements (A1-A8) of the Respiratory Protection Program. Further details with regard to Emergency Response protocol are found in the UMB Contingency Plan.

### **Program Elements**

A1. Respirator Selection. All selections will be made by the individual in charge of the UMB Respiratory Protection Program. Following an on-site hazard evaluation, these items will be considered in selecting the respirator :

- The nature of the hazard
- The physical and chemical properties of the air contaminant
- The adverse health effects of the respiratory hazard
- The relevant hazardous exposure level (PEL, STEL, TLV)
- The results of workplace sampling of airborne concentration of contaminants
- The nature of the work operation or process
- The period of time respiratory protection will be worn
- The potential stress of the work activities
- The warning properties of the hazardous chemical
- The physical characteristics, functional capabilities, and limitations of the various types of respirators

Only MSHA/NIOSH-certified respirators will be selected and used. Wherever appropriate, MSA Advantage respirators will be selected utilizing MSA GME-H cartridges which provide the widest range of contaminant capture and minimize exposures due to multiple chemical use, mis-selection, or unintentional unauthorized use by the employee. Wherever feasible, respirators will be provided to individuals for their sole use. In the event that an employee is required to use a respirator, and medical evaluation indicates the employee is capable of using a positive pressure, but not a negative pressure respirator, the University will provide a positive pressure respirator.

A2. Medical Evaluation. Prior to issuance of respirators, fit testing and training, all individuals utilizing cartridge respirators or SCBA will undergo medical evaluation to

establish their ability to wear such devices without undue physical harm. Services meeting the requirements found at CFR 1910.134(e)(2)(ii) will be provided, during normal working hours and at no cost to the employee, by a physician or other licensed health care provider (PHLCP) as defined in the OSHA Standard CFR 1910.134(b). Under most circumstances, this service will be provided by Dr. Edward Kowaloff, UMB Student Health Services. In that case, both questionnaire and physical examination will be required.

EH&S will administer the Respiratory Fitness questionnaire and provide that document as well as information defined under CFR 1910.134(e)(5)(i)(A-E), and a copy of this program to the PHLCP. EH&S will obtain and review the written recommendations of the PHLCP before any further actions are taken. Subsequent medical evaluations will be carried out on the advice of the PHLCP, the occurrence of signs or symptoms of medical conditions which may effect the employee's ability to wear a respirator, the request of the employee or the employee's supervisor, or at the discretion of the Administrator of the Respiratory Protection Program.

A3. Fit Testing. Irritant fume fit testing is the preferred method; isoamyl acetate may be employed in special circumstances (eg. respirators for which we do not stock particulate or combination cartridges.) Refer to Appendix A for details of the procedures employed. Fit testing will be repeated annually.

A4. Protocol for Specific Respirator Use. Written protocols defining the specific conditions of use intended for the provided respirator will be issued to the employee and to his/her supervisor for any required respirator use. At a minimum, the protocols will address the nature of the respiratory hazard intended to be controlled, a brief description of the work process or activity or the physical area addressed, the type of respirator and cartridge to be employed, and the cartridge change-out schedule. Verbal instructions, and the information contained in Appendix D, will be considered sufficient for voluntary respirator use.

A5. Respirator Maintenance. Respirators will be maintained in accordance with ANSI Z88.2-1992 (see Appendix C). While EH&S will provide any necessary equipment, responsibility for cleaning, inspection and storage rests with the employee. Any equipment which fails to pass inspection (visual or Fit Check) must not be used. Such equipment must be returned immediately to EH&S for replacement.

A6. SCBA. SCBA tanks are refilled by local vendors. EH&S will obtain necessary documentation certifying that the compressed air employed meets, at a minimum, Grade D specifications. SCBA will be inspected monthly.

A7. Training. Training will be provided prior to use and annually thereafter to all employees required to use respirators. The training will address all topics covered under CFR 1910.134(k):

- Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;
- What the limitations and capabilities of the respirator are;
- How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions;

How to inspect, put on and remove, use, and check the seals of the respirator;  
What the procedures are for maintenance and storage of the respirator;  
How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators; and

Retraining shall be administered when the following situations occur:

Changes in the workplace or the type of respirator render previous training obsolete;  
Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill;

Any other situation arises in which retraining appears necessary to ensure safe respirator use.

The basic advisory information on respirators, as presented in Appendix D of this section, shall be provided by the EH&S in written format, to employees who wear respirators when such use is not required by this section or by the employer (Voluntary Use).

A8. Program Evaluation. UMB shall conduct evaluations of the workplace as necessary to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective. Ideally, the individual(s) conducting the evaluation should be appropriately qualified to conduct such an evaluation, but not directly involved in the UMB Respiratory Protection Program. The evaluator(s) shall regularly consult employees required to use respirators to assess the employees' views on program effectiveness and to identify any problems. Any problems that are identified during this assessment shall be corrected. Factors to be assessed include, but are not limited to:

Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);  
Appropriate respirator selection for the hazards to which the employee is exposed;  
Proper respirator use under the workplace conditions the employee encounters; and  
Proper respirator maintenance.

# Appendices

## Appendix A Fit Testing Procedures

### A. Fit Testing Procedures -- General Requirements

The employer shall conduct fit testing using the following procedures. The requirements in this appendix apply to all OSHA-accepted fit test methods, both QLFT and QNFT.

1. The test subject shall be allowed to pick the most acceptable respirator from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.
2. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine an acceptable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, because it is only a review.
3. The test subject shall be informed that he/she is being asked to select the respirator that provides the most acceptable fit. Each respirator represents a different size and shape, and if fitted and used properly, will provide adequate protection.
4. The test subject shall be instructed to hold each chosen facepiece up to the face and eliminate those that obviously do not give an acceptable fit.
5. The more acceptable facepieces are noted in case the one selected proves unacceptable; the most comfortable mask is donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in the following item A.6. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.
6. Assessment of comfort shall include a review of the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:
  - (a) Position of the mask on the nose
  - (b) Room for eye protection
  - (c) Room to talk
  - (d) Position of mask on face and cheeks
7. The following criteria shall be used to help determine the adequacy of the respirator fit:
  - (a) Chin properly placed;
  - (b) Adequate strap tension, not overly tightened;
  - (c) Fit across nose bridge;

- (d) Respirator of proper size to span distance from nose to chin;
- (e) Tendency of respirator to slip;
- (f) Self-observation in mirror to evaluate fit and respirator position.

8. The test subject shall conduct a user seal check, either the negative and positive pressure seal checks described in Appendix B-1 of this section or those recommended by the respirator manufacturer which provide equivalent protection to the procedures in Appendix B-1. Before conducting the negative and positive pressure checks, the subject shall be told to seat the mask on the face by moving the head from side-to-side and up and down slowly while taking in a few slow deep breaths. Another facepiece shall be selected and retested if the test subject fails the user seal check tests.

9. The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface, such as stubble beard growth, beard, mustache or sideburns which cross the respirator sealing surface. Any type of apparel which interferes with a satisfactory fit shall be altered or removed.

10. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician or other licensed health care professional, as appropriate, to determine whether the test subject can wear a respirator while performing her or his duties.

11. If the employee finds the fit of the respirator unacceptable, the test subject shall be given the opportunity to select a different respirator and to be retested.

12. Exercise regimen. Prior to the commencement of the fit test, the test subject shall be given a description of the fit test and the test subject's responsibilities during the test procedure. The description of the process shall include a description of the test exercises that the subject will be performing. The respirator to be tested shall be worn for at least 5 minutes before the start of the fit test.

13. The fit test shall be performed while the test subject is wearing any applicable safety equipment that may be worn during actual respirator use which could interfere with respirator fit.

14. Test Exercises. (a) The following test exercises are to be performed for all fit testing methods prescribed in this appendix, except for the CNP method. A separate fit testing exercise regimen is contained in the CNP protocol. The test subject shall perform exercises, in the test environment, in the following manner:

(1) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally.

(2) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply, taking caution so as not to hyperventilate.

(3) Turning head side to side. Standing in place, the subject shall slowly turn his/her head from side to side between the extreme positions on each side. The head shall be held at each extreme momentarily so the subject can inhale at each side.

(4) Moving head up and down. Standing in place, the subject shall slowly move his/her head up and down. The subject shall be instructed to inhale in the up position (i.e.,



when looking toward the ceiling).

(5) Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song.

### Rainbow Passage

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(6) Grimace. The test subject shall grimace by smiling or frowning. (This applies only to QNFT testing; it is not performed for QLFT)

(7) Bending over. The test subject shall bend at the waist as if he/she were to touch his/her toes. Jogging in place shall be substituted for this exercise in those test environments such as shroud type QNFT or QLFT units that do not permit bending over at the waist.

(8) Normal breathing. Same as exercise (1).

(b) Each test exercise shall be performed for one minute except for the grimace exercise which shall be performed for 15 seconds. The test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried. The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.

## B. Qualitative Fit Test (QLFT) Protocols

### 1. General

(a) The employer shall ensure that persons administering QLFT are able to prepare test solutions, calibrate equipment and perform tests properly, recognize invalid tests, and ensure that test equipment is in proper working order.

(b) The employer shall ensure that QLFT equipment is kept clean and well maintained so as to operate within the parameters for which it was designed.

### 2. Isoamyl Acetate Protocol

Note: This protocol is not appropriate to use for the fit testing of particulate respirators. If used to fit test particulate respirators, the respirator must be equipped with an organic vapor filter.

#### (a) Odor Threshold Screening

Odor threshold screening, performed without wearing a respirator, is intended to determine if the individual tested can detect the odor of isoamyl acetate at low levels.

(1) Three 1 liter glass jars with metal lids are required.

(2) Odor-free water (e.g., distilled or spring water) at approximately 25 deg. C (77 deg.

F) shall be used for the solutions.

(3) The isoamyl acetate (IAA) (also known as isopentyl acetate) stock solution is prepared by adding 1 ml of pure IAA to 800 ml of odor-free water in a 1 liter jar, closing the lid and shaking for 30 seconds. A new solution shall be prepared at least weekly.

(4) The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well-ventilated to prevent the odor of IAA from becoming evident in the general room air where testing takes place.

(5) The odor test solution is prepared in a second jar by placing 0.4 ml of the stock solution into 500 ml of odor-free water using a clean dropper or pipette. The solution shall be shaken for 30 seconds and allowed to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution shall be used for only one day.

(6) A test blank shall be prepared in a third jar by adding 500 cc of odor-free water.

(7) The odor test and test blank jar lids shall be labeled (e.g., 1 and 2) for jar identification. Labels shall be placed on the lids so that they can be peeled off periodically and switched to maintain the integrity of the test.

(8) The following instruction shall be typed on a card and placed on the table in front of the two test jars (i.e., 1 and 2): "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."

(9) The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.

(10) If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA qualitative fit test shall not be performed.

(11) If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.

#### (b) Isoamyl Acetate Fit Test

(1) The fit test chamber shall be a clear 55-gallon drum liner, a harvard hood or canopy, or similar.

(2) Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors.

(3) After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well-ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.

(4) A copy of the test exercises and any prepared text from which the subject is to read shall be taped to the inside of the test chamber.

(5) Upon entering the test chamber, the test subject shall be given a 6-inch by 5-inch piece of paper towel, or other porous, absorbent, single-ply material, folded in half and wetted with 0.75 ml of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber. An IAA test swab or ampule may be substituted for the IAA wetted paper towel provided it has been demonstrated that the alternative IAA source will generate an IAA test atmosphere with a concentration equivalent to that generated by the paper towel method.

(6) Allow two minutes for the IAA test concentration to stabilize before starting the fit test exercises. This would be an appropriate time to talk with the test subject; to explain the fit test, the importance of his/her cooperation, and the purpose for the test exercises; or to demonstrate some of the exercises.

(7) If at any time during the test, the subject detects the banana-like odor of IAA, the test is failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.

(8) If the test is failed, the subject shall return to the selection room and remove the respirator. The test subject shall repeat the odor sensitivity test, select and put on another respirator, return to the test area and again begin the fit test procedure described in (b) (1) through (7) above. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait at least 5 minutes before retesting. Odor sensitivity will usually have returned by this time.

(9) If the subject passes the test, the efficiency of the test procedure shall be demonstrated by having the subject break the respirator face seal and take a breath before exiting the chamber.

(10) When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test, so that there is no significant IAA concentration buildup in the chamber during subsequent tests. The used towels shall be kept in a self-sealing plastic bag to keep the test area from being contaminated.

## 2. Irritant Smoke (Stannic Chloride) Protocol

This qualitative fit test uses a person's response to the irritating chemicals released in the "smoke" produced by a stannic chloride ventilation smoke tube to detect leakage into the respirator.

### (a) General Requirements and Precautions

(1) The respirator to be tested shall be equipped with high efficiency particulate air (HEPA) or P100 series filter(s).

(2) Only stannic chloride smoke tubes shall be used for this protocol.

(3) No form of test enclosure or hood for the test subject shall be used.

(4) The smoke can be irritating to the eyes, lungs, and nasal passages. The test conductor shall take precautions to minimize the test subject's exposure to irritant smoke. Sensitivity varies, and certain individuals may respond to a greater degree to irritant smoke. Care shall be taken when performing the sensitivity screening checks that determine whether the test subject can detect irritant smoke to use only the minimum amount of smoke necessary to elicit a response from the test subject.

(5) The fit test shall be performed in an area with adequate ventilation to prevent exposure of the person conducting the fit test or the build-up of irritant smoke in the general atmosphere.

### (b) Sensitivity Screening Check

The person to be tested must demonstrate his or her ability to detect a weak concentration of the irritant smoke.

(1) The test operator shall break both ends of a ventilation smoke tube containing stannic chloride, and attach one end of the smoke tube to a low flow air pump set to deliver 200 milliliters per minute, or an aspirator squeeze bulb. The test operator shall cover the other end of the smoke tube with a short piece of tubing to prevent potential

injury from the jagged end of the smoke tube.

(2) The test operator shall advise the test subject that the smoke can be irritating to the eyes, lungs, and nasal passages and instruct the subject to keep his/her eyes closed while the test is performed.

(3) The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its irritating properties and to determine if he/she can detect the irritating properties of the smoke. The test operator shall carefully direct a small amount of the irritant smoke in the test subject's direction to determine that he/she can detect it.

(c) Irritant Smoke Fit Test Procedure

(1) The person being fit tested shall don the respirator without assistance, and perform the required user seal check(s).

(2) The test subject shall be instructed to keep his/her eyes closed.

(3) The test operator shall direct the stream of irritant smoke from the smoke tube toward the face seal area of the test subject, using the low flow pump or the squeeze bulb. The test operator shall begin at least 12 inches from the facepiece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within six inches of the respirator.

(4) If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.

(5) The exercises identified in section I.A. 14. of this appendix shall be performed by the test subject while the respirator seal is being continually challenged by the smoke, directed around the perimeter of the respirator at a distance of six inches.

(6) If the person being fit tested reports detecting the irritant smoke at any time, the test is failed. The person being retested must repeat the entire sensitivity check and fit test procedure.

(7) Each test subject passing the irritant smoke test without evidence of a response (involuntary cough, irritation) shall be given a second sensitivity screening check, with the smoke from the same smoke tube used during the fit test, once the respirator has been removed, to determine whether he/she still reacts to the smoke. Failure to evoke a response shall void the fit test.

(8) If a response is produced during this second sensitivity check, then the fit test is passed.

### **Respirators work well, but only when they fit.**

The cartridge creates resistance to airflow, and if the seal to your face is not tight, most of the air will enter through the leak. Most of the air you breathe will then be contaminated.

**Every time you put the respirator on, perform these two fit checks:**

#### **A. Positive pressure check.**

Close off the exhalation valve and exhale gently into the facepiece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the seal. The respirator should pop-up like a balloon. Most leaks occur under the chin, and you'll feel a slight breeze on your neck, or at the bridge of your nose, which will tickle your eyelashes.

#### **B. Negative pressure check.**

Close off the inlet opening of the cartridge by covering with the palms of your hands, inhale gently so that the facepiece collapses slightly, and hold your breath for ten seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

### **While You re Working**

Conditions of the seal **will** change. It's a good habit to get into to check the fit using one or the other of the above tests regularly. Whatever works best for you - whenever you get a break from your immediate task, every 15 minutes or so, whenever you suspect there may be a leak, etc.. These tests are quick and effective, and they tell you when you need to adjust the fit.



## Appendix D Voluntary Use Of Respirators

### Information for Employees Using Respirators Information for Employees Using Respirators Standard

Respirators are an effective method of protection against design hazards. Respirators properly selected and worn. Respirator use is encouraged, even when exposure is below the exposure limit, to provide an additional level of protection for workers. However, if a respirator is used improperly, it can become a hazard to the worker. Sometimes exposure to hazards, even if it is below the limits set by OSHA standards. If your employer provides you with a respirator, you need to take certain steps to ensure that the respirator itself does not present a hazard. You should do the following:

1. Read and heed all instructions provided, including instructions for cleaning and care, and warnings regarding the respirator's limitations.
2. Choose respirators certified for use to protect against the hazard. NIOSH, the National Institute for Occupational Safety and Health, Department of Health and Human Services, provides a statement of certification that should appear on the respirator. It will tell you what the respirator is designed for and how much it can protect against.
3. Do not wear your respirator into atmospheres containing contaminants if your respirator is not designed to protect against them. For example, a respirator designed to filter dust particles will not protect you against gases or small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistreat or damage your respirator.

## 1.4 PROCEDURE FOR LABORATORY CLEAN-OUT OF HAZARDOUS MATERIALS

The following applies to all faculty, staff, post-doctoral fellows, and students working with hazardous materials.

Whenever a Principal Investigator or Laboratory Supervisor (or a Principal Investigator or Laboratory Supervisor on sabbatical or permanently), or moves to a different department (or moves to a different department prior to leave or move.

### Hazardous Chemical Disposal in Laboratories

Assure that all containers of chemicals are labeled with the contents. All containers must be securely closed. Beakers, flasks, evaporating dishes, etc. must be emptied of all materials and triple rinsed. All hazardous chemical wastes must be collected for disposal.

Check refrigerators, freezers, fume hoods, storage cabinets and Check refrigerator for chemical containers.

In shared spaces (such as refrigerators or freezers, stock rooms, etc.) remove hazardous materials used by the departing researcher.

For gas cylinders: remove regulators, replace cap and return to supplier. If cylinders are the non-returnable type (i.e., lecture bottles) contact EH&S.



## 1.5 EMERGENCY EVACUATION PROCEDURES

When a building alarm sounds, or when notified by identified designees, that a building is being evacuated:

Leave the building immediately. GO OUTDOORS.

Exit through the nearest stairwell. Follow the stairwell direction leads directly outdoors.

Maintain a safe distance from the evacuated building. If directed to a location at a greater distance.

Do not re-enter the building for any reason until authorized to do so by Public Safety.

Public Safety will keep you informed on building re-occupancy, Public Safety will keep transportation decisions.

### PERSONS WITH DISABILITIES NEEDING ASSISTANCE

If you need assistance, notify your instructor or supervisor.

Go to the nearest lobby phone located on every floor near the elevators.

Call Public Safety at 911. Describe the type of assistance you need. Call Public Safety at 911. Describe the type of assistance you need. Receive further instructions for your evacuation.

## 1.6 CHEMICAL SPILLS

### RISK ASSESSMENT AND EMERGENCY RESPONSE

For all emergency situations involving chemical spills and/or fire from chemical spills:

Ensure that all individuals in the affected area evacuate immediately.

Extinguish any open flame.

Notify Public Safety (911) of the location and situation. Public Safety will call EH&S and, if necessary, Boston Fire Department and/or EMS.

Tend to any injured personnel (refer to Appendix D)

Ensure that no one enters the area until it can be isolated by Security personnel.

When these steps have been carried out, you may proceed to the next assessment of risk, and determination of an appropriate emergency response.

Identify all chemicals involved in the spill, the volumes, and any mixing.

Assess the physical conditions and anticipate any possible further destabilizing events.

Ensure that chemical waste does not enter drains.

**Individuals responsible for chemicals have been provided operational MSDS to aid in determining not only how to deal with a spill, but also whether or not to deal with it at all. The difference between incidental and emergency situations will determine the appropriate course of action.**

Each laboratory is equipped with a yellow 5-gallon bucket containing enough clean up materials to handle a small spill. The contents of each kit is listed in the following table.

Small Chemical Spill Kit Contents
Chemical Splash Goggles
Lids
Gloves (Nitrile)
Disposable Scoops
Neutrasorb
Neutrakit
Solusorb
Sorbent pads
Hazardous materials bags
Procedures for clean up

## 1.7 CHEMICAL SPILL CONTROL PROCEDURE

In the event of a chemical spill, please follow the procedure outlined below to minimize potential safety and health hazards.

- (1) IN THE EVENT OF A FIRE: Follow posted fire procedures.
- (2) WHEN FIRE HAS NOT RESULTED: Extinguish fire if possible using appropriate fire extinguishers, fire blankets and other sources of ignition. If unable to extinguish, evacuate all personnel in the spill area to leave with you.
- (1) Secure the door and post signs to discourage entry.
- (4) CONTACT 911 FOR ASSISTANCE: Be prepared to provide the following information:
  - a. Name and telephone number of person providing assistance.
  - b. Spill location.
  - c. Description of injuries, if any have occurred.
  - d. Name of chemical(s) spilled and biological agent or radioactive material involved.
  - e. Hazard type (toxic, flammable, corrosive, unknown).
  - f. Estimate of amount spilled.
  - g. Person in charge (e.g. P.I., Supervisor).
- (5) Wait for the Public Safety in a nearby safe area.
- (6)\* Clean up the spill with materials provided from the spill kit.
- (7) Properly bag and label waste disposal residues notify EH&S.

\*If Spiller is not able to clean up the spill because of an injury, the Spiller is responsible for its cleanup. UNDER NO CIRCUMSTANCES SHALL THE SPILLER BE RESPONSIBLE FOR CLEANUP OF A SPILL. MAINTENANCE OR PUBLIC SAFETY PERSONNEL SHALL BE RESPONSIBLE FOR CLEANUP.

## 1.8 THE UMB INTEGRATED CHEMICAL AND ENVIRONMENTAL MANAGEMENT (CH/EM) PLAN

The UMB Integrated CH/EM Plan combines the requirements of the Occupational Safety and Health Administration's (OSHA) Lab Standard and the Environmental Protection Agency's (EPA) Environmental Management Standard. The integrated plan is a comprehensive document that allows laboratory personnel at UMB to comprehensively protect the environment.

The central component of the OSHA Lab Standard and the Environmental Management Standard are the Chemical Hygiene Management Standard and the Environmental Management Plan respectively. Both are action plans which describe in detail the steps for reaching the goals set by the Standards. The CHP establishes appropriate standard operating procedures, methods of control, measurement, and use of equipment, medical examinations, and special precautions for work with particularly hazardous substances. The EMP establishes environmental objectives and targets, standard operating procedures for waste identification, transport of waste material, control measures, and waste prevention and inventory management.

Minimum requirements for the three key elements: Administrative, Operational, and Instructional are specified in 29 CFR 1910.1450, section 4.1). Additionally, Minimum Performance Criteria for the Environmental Management Plan are stipulated in 29 CFR 1910.1450, Subpart J, section 4.2).

The UMass Boston CH/EM Plan is available for viewing on the EH&S website at <http://omega.cc.umb.edu/~ehs/labindex.htm>

# 1.9 ANNUAL LABORATORY INSPECTION FORM (example)

University of Massachusetts - Boston  
 Environmental Health & Safety Office  
 Laboratory Safety Inspection Report

<b>DATE:</b>	<b>DEPARTMENT:</b>	<b>EH&amp;S INSPECTOR:</b>		
<b>LAB #:</b>		<b>PI:</b>		
<b>BUILDING:</b>	<b>FLOOR:</b>	<b>ROOM:</b>		
<b>TYPE OF LAB:</b>	research	teaching	storage	
<b>USE:</b>	light	moderate	heavy	
<b>1. NFPA Diamond</b>		present	not present	
<b>2. FIRE EXTINGUISHER(S)</b>		yes	no	
<b>3. FIRE BLANKET</b>		present	not present	missing
<b>4. DELUGE SHOWER</b>		clear	not clear	
<b>5. EYE WASH</b>		accessible	not accessible	
activated		yes	no	
aerated low		yes	no	
<b>6. CONNECTIONS</b>				
butyl tubing (bunsen burners)		good	cracked/frayed	
electrical		good	cracked/frayed/damaged	
<b>7. EGRESS PASSAGEWAYS</b>				
blocked by obstruction		yes	no	
narrowed		yes	no	
chemical/gas storage		yes	no	
emergency numbers posted		yes	no	

**8. COMPRESSED GAS CYLINDERS**

	<b>strapped</b>	<b>not</b>	<b>floor stabilized</b>
	<b>toxic</b>	<b>flammable</b>	
<b>proper strapping</b>		<b>available</b>	<b>not available</b>
<b>regulators closed (not in use)</b>		<b>yes</b>	<b>no</b>
<b>caps in place (no regulator)</b>		<b>yes</b>	<b>no</b>

**7. ENGINEERING CONTROLS**

<b>fume hood(s)</b>	<b>working</b>	<b>not</b>	<b>chemical storage</b>	<b>date last</b>
	<b>1.</b>			
	<b>2.</b>			
	<b>3</b>			

<b>biocabinet(s)</b>	<b>yes</b>	<b>no</b>	<b>date last insp.</b>
----------------------	------------	-----------	------------------------

<b>room pressure</b>	<b>positive</b>	<b>negative</b>
----------------------	-----------------	-----------------

<b>8. LASERS</b>	<b>yes</b>	<b>no</b>
------------------	------------	-----------

<b>sign</b>	<b>yes</b>	<b>no</b>
<b>class</b>		

<b>9. RADIATION</b>	<b>yes</b>	<b>no</b>
---------------------	------------	-----------

**10. CHEMICALS**

<b>CH/EM Plan</b>	<b>available</b>	<b>not</b>
<b>inventory w/in last year</b>	<b>yes</b>	<b>no</b>

<b>approx. quantity (all)</b>	<b>large</b>	<b>moderate</b>	<b>small</b>
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<b>approx. quantity (flammables)</b>	<b>large</b>	<b>moderate</b>	<b>small</b>
--------------------------------------	--------------	-----------------	--------------

<b>approved storage cabinet</b>			<b>approx.</b>
<b>type</b>	<b>size</b>		<b>quantity w/in</b>
<b>flammable</b>	<b>30</b>	<b>55 other</b>	
<b>corrosive</b>	<b>30</b>	<b>55 other</b>	

refrigerator	yes	no		
type	flammable	regular		
chemical storage	yes	no		
flammables	yes	no		
food present	yes	no		
labels on containers	yes	no		
container condition	good	poor		
closed containers	yes	no		
potentially reactive chemicals	present	not	unknown	
labeled	yes	no		
shelves	too high	crowded	ok	
floor storage of chemicals	yes	no		
broken glass				
stored safely	yes	no		
labeled		yes	no	
chem spill kit	present	not	needs refill	
<b>11. LABORATORY WASTE</b>				
containers				
2° containment	yes	no		
labeled	yes	no		
sink storage	yes	no		
segregated	yes	no		
closed	yes	no	in-line	
insp. log	yes	no		
<b>13. HOUSEKEEPING</b>	<b>EXCELLENT</b>	<b>GOOD</b>	<b>FAIR</b>	<b>POOR</b>
<b>14. GENERAL CONDITION</b>	<b>EXCELLENT</b>	<b>GOOD</b>	<b>FAIR</b>	<b>POOR</b>

# 1.10 UMASS BOSTON MONTHLY LABORATORY SAFETY INSPECTION CHECKLIST

PI \_\_\_\_\_ Dept. \_\_\_\_\_ Bldg. L \_\_\_\_\_ Location \_\_\_\_\_

1. All chemical bottles and containers are clearly labeled with full chemical name, well sealed and, for time-sensitive chemicals, have been checked for shelf life expiration dates. <i>(Lab)</i>	Yes	No	N/A
2. No chemicals are stored on floors, in aisles, on high shelves, in regular refrigerators or in incompatible groupings. Under sinks, storage of <i>dilute solutions</i> is allowed. <i>(Lab)</i>	Yes	No	N/A
3. Peroxide-forming chemicals have been tested and are labeled with dates of receipt, initial opening and periodic test. <i>(Lab)*</i>	Yes	No	N/A
4. Unstable nitro compounds (e.g., picric acid) are not dry in appearance. <i>(Lab)</i>	Yes	No	N/A
5. Laboratory waste containers are closed, properly labeled, in good condition, stored in a manner to prevent leaks, and all components in the same container are compatible. Containers are inspected monthly. <i>(Lab)*</i>	Yes	No	N/A
6. NFPA diamonds are on all outside doors, undamaged and accurate for all hazard codes. Radiation and biohazard signage is accurate and in place. <i>(EH&amp;S)</i>	Yes	No	N/A
7. Emergency showers have a reachable pull chain/handle and are completely accessible. <i>(Fac/Lab)</i>	Yes	No	N/A
8. Eyewash/drench hose connections are secure and have been activated until the water stream runs clear. <i>(Fac/Lab)</i>	Yes	No	N/A
9. Fire extinguishers are wall-mounted in their designated locations with intact tamper seals and location signs in place. <i>(EH&amp;S)</i>	Yes	No	N/A
10. Bunsen burner hose connections are undamaged and securely connected. <i>(Lab)</i>	Yes	No	N/A
11. Compressed gas cylinders are properly secured and have regulators closed when not in use. Without regulators connected, valve protection caps must be securely attached. <i>(Fac/Lab)</i>	Yes	No	N/A
12. All exit doors and the egress pathways leading to them are unobstructed. <i>(Lab)</i>	Yes	No	N/A
13. Electrical plugs/cords are not visibly damaged and do not cross aisles. <i>(Fac/Lab)</i>	Yes	No	N/A
14. Fume hood is working and inspected within the past 12 months. <i>(Fac/Lab)</i>	Yes	No	N/A
15. Good housekeeping practices are observed. <i>(Lab)</i>	Yes	No	N/A
16. Appropriate eye and hand protection equipment is available. <i>(Lab)</i>	Yes	No	N/A

A "Yes" or "N/A" response indicates compliance  
Responsibility for non-compliance items indicated within ( )

Call the EH&S Office at 7-5445 for assistance  
\*Labels available from the EH&S Office

\_\_\_\_\_  
**Signature of Individual Responsible for Safe Lab Practices**

\_\_\_\_\_  
**Inspection Date**

White Copy - Lab Department Copy - Keep on file for one year  
Yellow Copy - EH&S Copy (send via campus mail)

EH&S Office  
Revised August 2000



## 1.11 THE THE UMASS BOSTON SPILL PR THE UMASS BOSTON SPILL P COUNTERMEASURE PLAN (SPCC)

The SPCCThe SPCC Plan is requiredThe SPCC Plan is required under the Clean Water Act for "facil  
or handle oil and could reasonablyor handle oil and could reasonably or handle oil and could rea  
navigablenavigable waters." Specifically, an SPCC Plan is required if the facility stores more than  
42,00042,000 gallons of oil in underground42,000 gallons of oil in underground tanks, or 1,320 gallon  
or 660 gallons ofor 660 gallons of oil in a single container. For purposes of this regulation, "oil"or 660  
ofof any kind or in any form, including, but notof any kind or in any form, including, but not limited toof an  
andand oil mixed with waste other than dredged spoand oil mixed with waste other than dredged s  
tthree years or within one year of a change in design, construction, three years or with  
maintenance,maintenance, and are kept on file at the facility. Amaintenance, and are kept on file  
required elements described in 40 CFR 112.7:

- " a written description of any spills and correa written description of any spills and correc  
months, and plans for prevention of future spills;
- " predictionspredictions of direction, flow rate, and quantity of discharge for eachpredictions of di  
failurefailure where reasonable potential for equipment failure exists (e.g., overflow,  
rupture, leakage);
- " detailsdetails of appropdetails of appropdetails of appropriate containment or diversionary :  
from reaching navigable waters;
- " ifif installationif installation of containmentif installation of containment or diversionary structure  
contingencycontingency plan and a wrcontingency plan and a written cocontingency pla  
discharges is required;
- " documentationdocumentation documentation thdocumentation that the facility design, constru  
conforms with the requirements of 40 CFR 112.7 (e); and
- " certificationcertification by a professional engineer (PE) and apcertification by a profe  
approvals.

TheThe UMass Boston SPCC Plan is available The UMass Boston SPCC Plan is available for vi  
EH&S website at <http://omega.cc.umb.edu/~ehs/spccindex.htm>

## 1.12 THE THE UMASS BOSTON HAZARDOUS CHEM THE UMASS BOSTON HAZA RIGHT-TO-KNOW PROGRAM

A very large number of different chemicals are found at UM teaching laboratories, print shops, and custodial and building maintenance. These chemicals may pose acute or chronic health hazards. Some are flammable, explosive, corrosive or reactive. However, simple rules can virtually eliminate the risk.

Chemical handling in laboratories is closely regulated under an Environmental Management (CH/EM) Plan. All laboratories have received specific training in laboratory safety. Each laboratory has a complete set of informative factsheets for every chemical found. Whenever non-laboratory work must be performed, the employee must make sure that the lab's Principal Investigator or supervisor is present to warn of any hazards and prevent exposure to chemicals. **Never enter or work in a laboratory alone. If no one from the EH&S Office is available, contact the EH&S Office (7-5445) for assistance.** This rule also applies to structures connected to laboratories as well. Maintenance of ductwork or fansets, or to laboratory plumbing should not be carried out without consulting with EH&S. Any area in the university which contains a substantial quantity of hazardous chemicals will have a special symbol, the NFPA Diamond on the door.

Under the Massachusetts Right to Know Law, you are entitled to receive information or stored in your workplace. This information is available to you in the form of Safety Data Sheets (MSDS) - a technical factsheet of safe uses of the toxic products on the manufacturer who must give it to your employer. In turn, the manufacturer must give you, your union, or your doctor on request.

The Massachusetts Right to Know Law defines approximately 1200 chemicals that are regulated. These chemicals make up the standard there is a base list of about 1200 chemicals; other chemicals must be determined by the chemical manufacturer to determine if they are toxic or hazardous. Any chemical sold to your employer that has any of its regulated material. If you are exposed to a regulated material, you are entitled to the protections of the law. There are three sources of information available to you: 1) material safety data sheets (MSDS); 2) container labels; 3) training. The MSDS is the most important because it is the source of information for labeling containers and is the basis for training employees on exposures and safe handling practices for those chemicals.

## RIGHT to KNOW

### WORKPLACE NOTICE

---

**THE RIGHT TO KNOW LAW**, Chapter 111F of the Massachusetts General Laws, provides new rights to employees and community residents regarding the communication of information on toxic and hazardous substances.

Those rights include:

**WORKPLACE NOTICE** A notice must be posted in a central location in the workplace informing employees of their rights under the law. The notice must be available to non-English speaking employees. It must also be available to non-English speaking employees.

**TRAINING** Employers must provide an annual training program with toxic or hazardous substances. New employees must receive training within 60 days from date of hire. The training program must be in the form of verbal and/or written instruction. At a minimum, training must include an explanation of employee rights, the MSDS covering toxic or hazardous substances used, handled or stored in the workplace, applicable protective equipment, clothing and labeling of substances that are carcinogenic, mutagenic, teratogenic or neurotoxic. The employer must provide instruction which must be given with pay during the training.

**MATERIAL SAFETY DATA SHEET (MSDS)** The Material Safety Data Sheet is a document that provides information on each chemical used in the workplace. An employee or his or her designated representative has the right to obtain and examine the MSDS for any toxic or hazardous substance if the employee "is", "may be" or "has been" exposed, if the employee's request is made to the employer in writing. After four working days from the date the employee can refuse to work with the substance when two conditions exist:

1. The employer fails to furnish the employee with an MSDS and
2. the employer fails to furnish the employee with proof that the employer has made diligent efforts to obtain an MSDS, either from the manufacturer or the Commissioner of Labor and Industries.

Public employees classified as performing an essential service may not refuse to work with the substance.



## 1.13 THE THE UMASS BOSTON THE UMASS BOSTON AS THE UMASS MANAGEMENT PROGRAM

Asbestos is not commonly found on the UMass campus. Asbestos is not commonly found on the UMass campus under circumstances where it is, except in certain circumstances where it is, EH&S. During renovations, if questionable material is found, it is removed and sent out for analysis.

April 29, 1999 (revised)

Brian Dumser, PhD., CIH  
Asbestos Program Manager  
Assoc. Director, UMB EH&S  
Asbestos Management Planner AP51047  
Asbestos Inspector AI51046

### Section 1. Location of Asbestos Containing Building Materials.

The Harbor Campus of the University of Massachusetts Boston was built in the latter half of the 1970's, following EPA bans on the use of most asbestos containing building materials. Consequently, Asbestos Containing Building Materials (ACBM) are found in the following clearly defined situations and circumstances:

1. Sprayed-on fireproofing insulation, Service and Support mechanical rooms. Structural steel girders along walls descend to floor level. In one of the rooms a steel supporting element traverses half the room at floor level, and damaged debris is visible at its base. The other room and debris is visible at its base. The samples (PCM) in both rooms show fewer than 0.001 fibers/cm<sup>3</sup>. Currently being negotiated for the removal of all accessible asbestos in the rooms.
2. Certain small round spot-lighting fixtures (090) enclose an insulation gasket containing asbestos. These gaskets are moderately friable, except by direct intent.
3. Reheat coils located on HVAC ductwork above the Supply (150) and Quinn Administration (110) buildings contain a baffle at the interface with the duct. This pressed or woven mat contains asbestos. The material is in good condition, non-friable, when coils are removed for servicing. Following the first removal of the material, Transmission Electron Microscopic air sampling fibers were detected in samples of 1500, 1760 and 1840 liters of air.

4. Trimmed insulation blocks composed of chrysotile asbestos were found surrounding kitchen-range exhaust ducts at McCormack (020) 3<sup>rd</sup> floor Cafeteria. The insulation was further wrapped in floor cloth. During renovations to the area, following removal of the drop-ceiling, damage to the (non-asbestos) doth layer was noted at the junction of ducts, and where abraded by light fixtures. Although wipe samples showed no resultant surface contamination, the material was removed by a licensed asbestos abatement contractor. Outside the room, the duct enters to contain the ACM. It is not accessible to contain the ACM. It is not accessible to contain the ACM. Material indicate that, though friable, the condition is excellent and covering is intact and undamaged.
5. Roofing tar, and particularly roof flashing, has been removed by appropriate methods from the McCormack (020) and Science buildings. The McCormack (020) and Science building roofs. The only ACM roofing material is the Wheatley roof, which contains from 5 to 30% chrysotile asbestos.
6. Original floor tile and mastic have been found to contain approx 5% chrysotile asbestos. This material is non-friable and in good condition.
7. Various components of laboratories are composed of non-friable transite which contains asbestos in a cement matrix. These include chemical fume hoods and some benchtops.

## **Section 2. Notification.**

As noted above, the majority of ACM is in areas noted above, the majority of ACM is in areas noted above, the majority of ACM is in areas noted above. Facilities personnel who may potentially contact the material, location, hazards, and required procedures at least annually, both verbally during training sessions and in writing. Facilities supervisory personnel responsible for processing maintenance work orders must also be informed. Given the location of the material, signage is not required except in cases where doors to the penthouses are labeled with the standard asbestos warning.

## **Section 3. Surveillance.**

Walk-through surveillance and inspection by the Asbestos Abatement Unit is required at six month intervals in case # 1, supplemented by reports of Uti. Air monitoring is not required. Inspection of the condition of fume hoods and benchtops is carried out during each annual laboratory inspection, and is carried out during each annual laboratory inspection of the other situations reported require surveillance or monitoring.

#### **Section 4. Controls.**

In case # 1 above (fireproofing in penthouses) the two sole entry doors are locked. The single key is under the control of the person entering these rooms occurs periodically to test emergency generators, and is permitted only to specified Utilities personnel.

#### **Section 5. Work Practices.**

Case 1. Penthouse thermal insulation. Access is restricted to Penthouse personnel who are informed of the existence and nature of the hazard. During their activities (emergency generator testing) they shall not disturb the asbestos insulation, and air sampling has demonstrated that no airborne asbestos is present. Aside from caution, no special PPE is necessary.

Case 2. Light Gaskets. Electricians and Lampers have been informed that bulbs are not to be replaced in the Healy Library spotlighting.

Case 3. Six individuals from Utilities have been trained (Worker-DLI) and outfitted with appropriate respiratory and other PPE. A case that a chiller coil must be removed. Prior to beginning any work, the Asbestos Program Manager appropriate to the physical removal. Prior to making appropriate notification to Agencies including the Department of Environmental Protection, the work will be carried out by the trained utilities workers under the Asbestos Program Managers direct supervision. The coils will be disposed of in accordance with State and Federal law, and no attempt will be made to repair or refit the existing chiller unit.

Case 4. ACBM inaccessible

Case 5. Any roofwork or replacement is to be carried out under the supervision of the Asbestos Program Manager.

Case 6. Any removal or repair of vinyl flooring tile is to be carried out under the involvement of the Asbestos Program Manager. Prior to beginning any work, the Asbestos Program Manager appropriate notification to all relevant Agencies including the Department of Environmental Protection.

Case 7. All repairs and renovations in laboratories are carried out under the supervision of Environmental Health & Safety personnel under the supervision of the Asbestos Program Manager.

## Section 6. Worker Protection and Training.

All facilities and utilities personnel, and custodial supervisors are annually inspected for the presence of ACM in the facility, and requested to notify EH&S if they discover any procedure which may disturb the material. EH&S will investigate and sample for analysis any suspect ACM on student or employee. Six utilities worker, who may be student or employee. Six utilities worker, who are trained as trained as Asbestos Associated workers by the Department of Labor. These individuals have been fitted and trained in the Institutional Respiratory Protection program. To date, no action has been taken against them. The Asbestos Program Manager. The Asbestos Program Manager. He has received certification as Asbestos Foreman/Supervisor, and is certified in the Comprehensive Practice of Industrial Hygiene.



## **1.14 THE THE UMASS BOSTON BLOODBORNE THE UMASS BOSTON BLOODBORNE CONTROL PROGRAM**

The University of Massachusetts Boston (UMass Boston) is committed to providing a healthful work environment for our entire staff. In pursuit of this goal, the University has developed an Institutional Exposure Control Program (IECP) to eliminate or minimize occupational exposure to bloodborne pathogens. The IECP is a key document implementing and ensuring compliance with the standard, thereby protecting our employees, and includes the following components:

### **Determination of employee exposure**

Depending on job description, employees within the following departments may be considered to be potentially exposed to blood-borne pathogens:

- Student Health Services
- Department of Nursing
- Department of Athletics
- Office of Public Safety
- Early Learning Center

### **Implementation of various methods of exposure control, including:**

- Universal precautions
- Engineering and work practice controls
- Personal protective equipment
- Housekeeping
- Hepatitis B vaccination
- Post-exposure evaluation and follow-up
- Communication of hazards to employees and training
- Recordkeeping
- Procedures for evaluating circumstances surrounding an exposure incident

In addition to this institutional ECP, individual departments in which employees have been determined to occur retain on-site control programs tailored to that site, and is locally administered by that site, and is locally administered by that site, and is locally administered by that site. Training, initial and annual is provided by the Office of Training, initial and annual notification of the availability of post-exposure control services are provided by the Occupational Health Center, Boston Medical Center. Copies of any of the programs are available in the Health & Safety Office.

## 1.15 THE UMASS BOSTON LASER SAFETY PROGRAM

The purpose of the University of Massachusetts is to protect UMB personnel, guests, and property from the use of laser systems. UMB operates in accordance with 105 CMR 2000 (American National Standard for Safe Use of Lasers) by reference. The institution is registered with the Massachusetts Health Radiation Control Program.

Primary authority and responsibility for the development of the UMB Laser Safety Program rests with the UMB Laser Safety Program, authorized by the Provost and consists of a Laser Safety Officer with the Office of Environmental Health and Safety, a representative from the Faculty of Sciences, and all principal investigators involved in the operation of a laser or laser system of class 3b or class 4. The committee meets at the request of the LSO or any one of its members to address policy issues in need of clarification, or recommend the suspension, restriction, or termination of the operation of a laser or laser system if it deems that laser use is inadequate. The committee provides an annual report documenting its recommendations to the Provost. Copies of the program are available from the Environmental Health & Safety Office.

## **2.0 STANDARD STANDARD STANDARD PROCEDURES**

## 2.1 BASIC STANDARD OPERATING HANDLING OF HAZARDOUS CHEMICALS IN THE LABORATORY

### GENERAL

Do not pipette by mouth.

#### Food, Drink, Cosmetics

Do not eat, drink, smoke, or apply cosmetics in the laboratory.

Do not store food in the laboratory refrigerator.

#### Sharps/Broken Glass

Do not leave exposed needles or micropipettes on the bench or in washing facilities.

Broken glass should be disposed of separately from other broken glass should be disposed in separate containers to prevent injury to cleaning personnel.

#### Chemical Spills

In event of a chemical spill or any other emergency, in event of a chemical spill or any other emergency, leave the lab and close the door, and phone 911. Ignition sources, leave the lab and close the door, and phone 911.

When procedures involve especially hazardous chemicals, create a 'decontamination' sign and post the above information clearly posted.

#### Housekeeping

Decontaminate, clean or sanitize work surfaces on a regular basis.

In the event of malfunctioning protective or building related equipment, phone EH&S

Keep all egress pathways and doorways free of obstructions. Hallways outside of laboratories should not be used for storage.

#### Working Alone

Avoid working with hazardous chemicals alone, at night and in isolation.

#### Access to Laboratories

Laboratories must be locked when unoccupied. Note that specific access limitations apply in the case of certain classes of laboratories.

#### Electrical

Ensure that all hose connections are secure, and that all hose connections are secure to pose minimal risk of accident.

Access to electrical equipment shut-offs e.g. Access to electrical equipment shut-offs e.g.

maintained free from obstructions to allow immediate access in an emergency. All receptacle outlets in laboratory spaces must be polarized and grounded.

Electrical extension cords may not be used as a permanent wiring method. Electrical extension cords used for 110/120 volt service shall be UL listed and equipped with a polarized three prong plug.

Electrical extension cords are visible and should not cross aisles and should not be wrapped around fixtures or piping.

#### Emergency Deluge Showers/Drench Hoses/Eye Wash Stations

Keep area under deluge showers and eye wash at least monthly until the water stream runs clear of any possible obstruction. Inspected annually.

Ensure proper and continuing drainage, e.g., in washing and rinsing sinks.

#### Fire Extinguishers

Fire extinguishers must be immediately accessible and clear of any obstructions. Fire extinguishers must be fully charged and wall mounted. Inspected monthly and tested annually.

#### Emergency Contact

Clearly label the equipment, bench, entry door or other area with the name of the individual carrying out the unattended operation and 24 hour contact number of the individual carrying out the unattended operation.

### **Personal Protection/Hygiene**

Assess the potential hazard posed by each chemical in every procedure. Assess the potential hazard posed by each chemical in every procedure. Use work practices, control devices and personal protective equipment which minimize exposure. In particular: When working with chemicals which are toxic, corrosive, or whenever you are in the vicinity of such chemicals, you must wear chemical splash resistant goggles as a result of any foreseeable accident, you must wear chemical splash resistant goggles.

#### Attire

Wear a lab coat or apron, cover legs and feet (no sandals or open-toe shoes), and avoid loose clothing and long hair.

#### Gloves

Remember that gloves are short-term protection. Wear gloves when handling hazardous materials. Remember that gloves are short-term protection. Wear gloves when handling hazardous materials. After use, wash your hands and remove gloves.

Remove Barrier Protection (gloves, labcoats or aprons, protective foot and headgear) before leaving the laboratory.

## **Hazardous Materials Handling and Storage**

### Open Containers

Do not leave open containers of caustics, corrosives, or other hazardous materials on the bench. All waste containers must be closed at the end of daily operations.

### Labels

Clearly label any containers of any substance which will remain at the laboratory. The label must include the name of the substance, the hazards of the substance, and your name.

### Chemical Storage

Segregate chemicals by hazard class. Store incompatible chemicals away from each other.

### Containers

Check the integrity of containers frequently, particularly those that contain waste material.

### Cylinder Storage

All cylinders must be secured by straps, chains or special floor stabilizers. Store in well-ventilated areas and place protective caps on when not in use. Do not store empty and full cylinders together. Insure that flammable and oxidizing gases are stored away from each other.

### Disposal of Chemicals

EH&S picks up materials from all laboratories on campus upon request. Until EH&S picks up materials they should be stored with appropriate labels and checked frequently.

## 2.2 BASIC STANDARD OPERATING PROCEDURE BASIC STANDARD OPERATING PROCEDURE STORAGE

The inherent safety and health hazards of laboratory chemicals require careful consideration for chemical storage. Practice the following procedures in order to minimize these dangers.

### General Requirements

1. Keep chemical storage to a minimum. Large quantities must not be stored unless the frequency of use warrants it and appropriate storage facilities are available.
2. Keep chemicals stored in the open in the lab work area for current work procedures.
3. Clearly label containers with the chemical's information. Labeling with chemical mixtures must be identified by percent or volume composition.
4. Label containers with the date received. Chemicals with shelf life must have the date opened and disposal date clearly displayed on the container.
5. Keep all containers well-sealed to avoid vaporization. Use aluminum foil, corks, corks wrapped with adequate tape. Glass-stoppered bottles may be used for short-term storage of solutions.
6. Rotate chemical stock. Before opening a new container check to be sure that another container of the same chemical is not already open.
7. Audit chemicals quarterly for shelf life and peroxidizable materials.
8. Store chemicals by arrangement in alphabetical order and compatible classifications.
9. Mark chemical storage areas prominently with chemical storage classifications.
10. Store glass bottles of chemicals on low shelves to minimize potential for spills and accidents.
11. Do not store containers, particularly 5 gallon bottles and metal cans, both full and empty, on the floor, in aisles, or under lab furniture.
12. Do not use laboratory hoods for long-term storage of chemicals.

13. Do not expose storage areas to temperature extremes which may damage containers or initiate adverse reactions.
14. Store chemicals away from heat sources such as flames.
15. Store chemicals, particularly acids, away from leaks and flooding. Water damage can deteriorate chemicals and initiate hazardous reactions.
16. Discourage storage under sinks particularly where there is a risk of water damage.



## 2.3 BASIC STANDARD OPERATING PROCEDURE FOR CHEMICAL SPILL CLEANUP

### I. Spill Assessment

Identify the chemical and select the appropriate cleanup material.

<u>Chemical Classification</u>	<u>Cleanup Material</u>
Organic and Flammable Liquids	Solusorb
Acids	Neutrasorb; Sodium Bicarbonate
Caustics	Neutracid 2
Mercury	Mercury Absorb Sponges; Cinnasorb; Resisorb
Unknowns	Vermiculite

### II. Precautions

1. Be aware of the safety and health hazards

- Acids and caustics can cause serious burns to exposed skin/eyes.
- Flammables/combustibles can cause fires/explosions.
- Many chemicals, particularly the organics, are toxic. Many chemicals, particularly the organics, are toxic and skin exposure.

2.2. Select and put on appropriate respiratory, eye, hand and2. Select and put on appropriate respiratory, eye, hand and proceeding with cleanup.

3. Do not step into spills.

### III. Cleanup Method

1. Apply cleanup material around the spill's perimeter first, and then inward.

2.2. Thoroughly mix the cleanup material and spill2. Thoroughly mix the cleanup material and spill until:

- Neutrasorb maintains a blue color throughout and all foaming stops.
- Sodium bicarbonate forms a slurry.
- Neutracid 2 maintains a yellow/yellow-green color throughout.
- Sold. Solusord. Solusorb appears dry and free running with very slight or undetectable odor.

3.3. Carefully scoop the spill material into a plastic disposal bag with plastic utensils.

**CAUTION:: NEUTRALIZED CAUSTICS AND ACIDS MAY PRODUCE: NEUTRALIZED CAUSTIC UNTIL MIXTURES HAVE COOLED BEFORE HANDLING.**

4.4. Thoroughly clean spill area until all spill residues are removed4. Thoroughly clean spill area with sponges and other contaminated materials into disposal bag.

5. Twist bag shut with a bag ties.
6. Label the disposal bag with the full chemical name(s) of the contents.
- 7.7. Contact 7. Contact EH&S for disposal arrangements. DO NOT THROW BAG AND CONTENTS INTO THE GENERAL TRASH CONTAINERS
8. Complete the CHEMICAL SPILL FORM and send to EH&S.

## 2.3.1 ORGANIC AND FLAMMABLE LIQUID ORGANIC AND FLAMMABLE PROCEDURE : SOLUSORB

Use for the cleanup of common organic liquids including flammable Use for the cleanup of common organic liquids below 100° F (See Reference List).

### PRECAUTIONS

1. Fires/explosions can occur when flammable/combustible liquids spill.
  - a. IMMEDIATELY remove all sources of ignition (e.g. bunsen burners)
  - b. IMMEDIATELY apply Solusorb to keep the vapor level down.
  - c. Wear nonconductive shoe covers for large floor spills.
2. Avoid inhalation of organic vapors and skin and eye contact:
  - a. In case of contact, IMMEDIATELY and a. In case of contact, IMMEDIATELY wash with water for at least 15 minutes.
  - b. Wear approved respiratory protection. Avoid contact with chemicals that cause eye irritation.
  - c. Wear protective chemical splash goggles and gloves.
  - d. Seek follow up medical attention for inhalation skin/eye exposures.
3. Do not step in the spill.

### CLEANUP METHOD

- 1.1. Apply Solusorb around the spill's perimeter first, and then apply Solusorb to the spill with Solusorb.
2. Thoroughly mix the Solusorb and liquid with the plastic utensils until:
  - a. the Solusorb regains its appearance as a dry, free running granular material.
  - b. solvent odor is very slight or undetectable.
3. Carefully scoop the spill material into a plastic disposal bag.
- 4.4. Thoroughly clean spill area until all solvent 4. Thoroughly clean spill area until all solvent 4. Thoroughly clean spill area until all solvent sponges and other contaminated materials into disposal bag.
5. Twist bag shut with a bag tie.
6. Label the disposal bag with the full chemical name(s) of the content.
- 7.7. Contact EH&S for disposal arrangements. DO NOT PUT INTO THE GENERAL TRASH CONTAINERS.
8. Complete the Chemical Spill form and send to EH&S.

## 2.3.2 ACID SPILL CLEANUP PROCEDURE : NEUTRASORB

### \*USE FOR THE CLEANUP OF:

Acrylic Acid	Hydrochloric Acid
3-Bromopropionic Acid	Iodoacetic Acid
Butyric Acid	Nitric Acid
Iso-Butyric Acid	Perchloric Acid
Deuterium Bromide	Periodic Acid
Deuterium Iodide	Phosphoric Acid
Fluoboric Acid	Propionic Acid
Fluosulfonic Acid	Pyruvic Acid
Formic Acid	Sulfuric Acid
Hydriodic Acid	Sulfurous Acid
Hydrobromic Acid	Thioacetic Acid

### \*USE SODIUM BICARBONATE FOR ALL OTHER ACIDS

### PRECAUTIONS

1. Acids can cause serious burns to exposed skin/eyes.
  - a. In case of contact, IMMEDIATELY flush skin/eyes with water for 15 minutes.
  - b. Remove contaminated clothing/shoes while rinsing.
  - c. Immediately seek followup medical attention.
2. Wear protective gloves and goggles.
3. Wear an approved respirator for CONCENTRATED acid spills.
4. Do not step in the spill. Wear protective booties if necessary.

### CLEANUP METHOD

1. Apply Neutrasorb around the spill's perimeter first, and then inward.
2. After foaming has stopped, carefully add Neutrasorb mix with plastic utensil until:
  - a. the mixture maintains a BLUE COLOR THROUGHOUT.
  - b. all foaming has stopped.

### COLOR CODE

Red/Pink	High acid content	Hazardous
Yellow/Buf	Low acid content	Hazardous
Blue	Acid neutralized	Safe

3. Carefully scoop the blue neutralized spill material

CAUTION: IF MATERIAL IS WARM, WAIT A FEW MINUTES FOR IT TO COOL.

4.4. Thoroughly clean spill area until all neutralized acid4. Thoroughly clean spill area until all neutralized acid and other contaminated materials into the disposal bag

5. Twist bag shut with a bag tie.

6. Label the disposal bag with the full chemical name(s) of the contents.

7.7. Contact EH&S for disposa7. Contact EH&S for disposal arrange7. Contact EH&S for disposal arrange7. Contact EH&S for disposal arrange7. INTO THE GENERAL TRASH CONTAINERS.

8. Complete the Chemical Spill Form and send to EH&S.

### 2.3.3 ACID SPILL CLEANUP PROCEDURE II: SODIUM BICARBONATE

#### \*USE FOR THE CLEANUP OF:

Acetic Acid	Hydrofluoric Acid
Acetic Anhydride	Oxalic Acid
Benzoic Acid	Phosphoric Anhydride
Citric Acid	Sulfur Trioxide

All other acids not listed for Neutrasorb

#### \*CAUTION; DO NOT USE FOR ACIDS LISTED FOR NEUTRASORB.

#### PRECAUTIONS

1. Acids can cause serious burns to exposed skin/eyes.
  - a. In case of contact, IMMEDIATELY flush skin/eyes with water for 15 minutes.
  - b. Remove contaminated clothing/shoes while rinsing
  - c. Seek followup medical attention.
2. Wear protective gloves and goggles.
3. Wear approved respirator for CONCENTRATED ACID SPILLS.
4. Do not step in the spill.

#### CLEANUP METHOD

1. Apply sodium bicarbonate around the spill's perimeter first, and then inward.
2. Mix with plastic utensils and add water if necessary to form a slurry.
3. Carefully scoop the slurry into a plastic disposal bag.
- 4.4. Thoroughly clean spill area 4. Thoroughly clean spill area until4. Thoroughly clean spill area until contaminated materials into disposal bag.
5. Twist bag shut with a bag tie.
6. Label the disposal bag with the full chemical name(s) of the contents.
- 7.7. Contact7. Contact EH&S for disposal arrangements. DO7. Contact EH&S for disposal arrangements INTO THE GENERAL TRASH CONTAINERS.
8. Complete the Chemical Spill form and send to EH&S.



## 2.3.5 MERCURY SPILL CLEANUP PROCEDURE MERCURY ABSORB SPONGES, CINNASORB AND RESISORB

Use for the cleanup of elemental mercury.

### PRECAUTIONS

1. Avoid inhalation of mercury vapor and skin and eye contact:
  - a. Wear disposable mercury respirator.
  - b. Wear protective chemical splash goggles and gloves.
  - c. Remove any exposed gold, copper or silver jewelry.
  - d. In case of contact, IMMEDIATELY wash with soap and water. In case of contact, IMMEDIATELY flush with THORNTON soap.
2. Do not step in the spill. If mercury spills on the floor surfaces, wear shoes. Do not step in the spill.

### CLEANUP METHOD

1. Cleanup MERCURY DROPLETS from accessible surfaces with mercury absorb sponge.
  - a. Pick up large mercury droplets with wide tape.
  - b. Dampen sponge with water and wipe up mercury SLOWLY to promote absorption. NOTE: The effectiveness of absorption is reduced if mercury is wiped up (turns a silver color).
2. Clean up MERCURY DROPLETS in deep cracks and crevices with Hg Absorb Powder (Cinnasorb).
  - a. Sprinkle the powder over the mercury and wet the powder. This procedure eliminates the hazard of inhaling mercury.
  - b. Leave the powder/mercury mix undisturbed.
  - c. Contact the Safety Department for follow-up evaluation and action.\*
3. If mercury spills inside an oven or other heat-generating unit:
  - a. Shut off the unit.
  - b. Advise lab personnel to affix a warning sign that reads "Mercury Contamination".
  - c. Contact the EH&S Department.
4. Absorb MERCURY VAPOR (airborne concentration) from deep cracks or other inaccessible areas with Resisorb Mercury Vapor Absorbent.
  - a. Sprinkle Resisorb into any cracks or areas where the presence of mercury is suspected.



- b. Leave undisturbed.
  - c. Contact the Safety Department for follow-up evaluation and action.\*
5. Thoroughly clean spill area with a sponge and warm soapy water.
6. Deposit used sponges, tape and other contaminated materials into a plastic disposal bag.
7. Twist bag shut with a bag ties.
8. Label disposal bag "Mercury Waste".
9. Contact EH&S for disposal arrangements.  
CONTENTS INTO GENERAL TRASH CONTAINERS.
10. Complete the Chemical Spill form and send to EH&S.

\*At this point, the spill has been stabilized and the follow-up evaluation does not need to be immediate

## 2.4 HAZARDOUS MATERIAL SPILL REPORT FORM

Name Reporting: \_\_\_\_\_

Campus Phone # 7- \_\_\_\_\_

Location of spill: Bldg. \_\_\_\_\_ Floor \_\_\_\_\_

Room \_\_\_\_\_

Material Spilled: \_\_\_\_\_

\_\_\_\_\_

Quantity: \_\_\_\_\_

Describe Incident: \_\_\_\_\_

\_\_\_\_\_

Injured: \_\_\_\_\_

\_\_\_\_\_

Describe injuries: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### **3.0 GUIDELINES AND PRECAUTIONS CHEMICAL STORAGE**

All chemicals in laboratories must be stored in appropriate classes. The following are the classes. Pay special attention to the different classes. The lists provided for the different classes are inclusive.

## 3.1 ACIDS

### Storage Precautions

Store large bottles of acids on low shelves or in acid cabinets.

Segregate oxidizing acids from organic acids, flammable and combustible materials.

Segregate acids from bases and active metals such as

Segregate acids from chemicals which could generate toxic gases upon reaction with sodium cyanide and iron sulfide.

Use bottle carriers for transporting acid bottles.

### STRONG OXIDIZING AGENTS

Chromic Acid  
Nitric Acid  
Perchloric Acid  
Sulfuric Acid

### ORGANIC ACIDS

Acetic Acid  
Benzoic Acid  
Chloroacetic Acid  
Phenol  
Propionic Acid

### ACIDS

Hydrochloric Acid  
Hydrofluoric Acid  
Phosphoric Acid

## 3.2 BASES

### Storage Precautions

Segregate bases from acids.

Store solutions of inorganic hydroxides in polyethylene containers.

Ammonium Hydroxide

Bicarbonates, Bicarbonates, salts of Potassium Bicarbonates, salts of Potassium  
others

Carbonates, salts of Calcium Carbonate, Sodium Carbonate and others.

Calcium Hydroxide

Potassium Hydroxide

Sodium Hydroxide

## 3.3 FLAMMABLES

### Storage Precautions

Store in approved safety cans or cabinets.

Segregate from oxidizing acids and oxidizers.

Keep away from any source of ignition: flames and/or localized heat or sparks.

Keep fire-fighting equipment readily available.

Store highly volatile flammable liquids in a specially equipped refrigerator.

### SOLIDS

Benzoyl Peroxide

Calcium Carbide

Phosphorus, Yellow

Picric Acid

### GASES

Acetylene

Ammonia

Butane

Carbon Monoxide

Ethylene Oxide

Formaldehyde

Hydrogen

Hydrogen Sulfide

Ethane  
Ethyl Chloride  
Ethylene

Methane  
Propane  
Propylene

### LIQUIDS

Acetaldehyde  
Acetone  
Acetyl Chloride  
Allyl Alcohol  
Allyl Chloride  
N-Amyl Acetate  
N-Amyl Alcohol  
Benzene  
N-Butyl Acetate  
N-Butyl Alcohol  
N-Butylamine  
Carbon Disulfide  
Chlorobenzene  
Cyclohexane  
Diethylamine  
Diethyl Carbonate  
p-Dioxane  
Ethanol  
Ethyl Acetate  
Ethyl Acrylate  
Ethylamine  
Ethyl Benzene  
Ethylene Dichloride  
Ethyl Ether  
Ethyl Formate  
Furan  
Gasoline  
Heptane  
Hexane  
Hydrazine

Isobutyl Alcohol  
Isopropyl Acetate  
Isopropyl Alcohol  
Isopropyl Ether  
Mesityl Oxide  
Methanol  
Methyl Acetate  
Methyl Acrylate  
Methylal  
Methyl Butyl Ketone  
Methyl Ethyl Ketone  
Methyl Formate  
Methyl Isobutyl Ketone  
Methyl Methacrylate  
Methyl Propyl Ketone  
Morpholine  
Naptha  
Nitromethane  
Octane  
Piperdine  
Propanol  
Propyl Acetate  
Propylene Oxide  
Pyridine  
Styrene  
Tetrohydrofuran  
Toluene  
Turpentine  
Vinyl Acetate  
Xylene

## **3.4 OXIDIZERS**

### Storage Precautions

Store in a cool, dry place.

Keep away from flammable and combustible materials.

Keep away from reducing agents such as zinc, alkaline metals and formic acid.

### SOLIDS

Ammonium Dichromate	Nitrates, salts of 4
Ammonium Perchlorate	Periodic Acid
Ammonium Persulfate	Permanganic Acid
Benzoyl Peroxide	Peroxides, salts of 5
Bromates, salts of 1	Potassium Dichromate
Calcium Hypochlorite	Potassium Ferricyanide
Ceric Sulfate	Potassium Permanganate
Chlorates, salts of 2	Potassium Persulfate
Chromium Trioxide	Sodium Bismuthate
Ferric Trioxide	Sodium Chlorite
Ferric Chloride	Sodium Dichromate
Iodates, salts of 3	Sodium Nitrite
Iodine	Sodium Perborate
Magnesium Perchlorate	Sulfates, salts of 6
Magnesium Dioxide	

1. Potassium Bromate, Sodium Bromate, etc.
2. Potassium Chlorate, etc.
3. Sodium Iodate, etc.
4. Ammonium Nitrate, Ferric Nitrate, etc.
5. Lithium Peroxide, Sodium Peroxide, etc.
6. Ferric Sulfate, Potassium Sulfate, etc.

### LIQUIDS

Bromine	Nitric Acid
Chromic Acid	Perchloric Acid
Hydrogen Peroxide	Sulfuric Acid

### GASES

Chlorine	Nitrogen Oxide
Chlorine Dioxide	Oxygen
Fluorine	Ozone
Nitrogen Dioxide	

## **3.5 WATER REACTIVE CHEMICALS**

WARNING:: These chemicals: These chemicals react with water to yield flammable or toxic: These chemicals

hazardous conditions.

### Storage Precautions

Store in a cool, dry place.

In case of fire, keep water away.

#### SOLIDS

Aluminum Chloride,anhydrous	Maleic Anhydride
Calcium Carbide	Phosphorus Pentachloride
Calcium Oxide	Phosphorus Pentasulfide
Ferrous Sulfide	*Potassium
*Lithium	*Sodium
Magnesium	

\*Lithium, Potassium and Sodium should be stored under Kerosene.

#### LIQUIDS

Acetyl Chloride  
Stannic Chloride  
Chlorosulfonic Acid  
Sulfur Chloride  
Phosphorus Trichloride  
Sulfuryl Chloride  
Silicon Tetrachloride  
Thionyl Chloride

## **3.6 PYROPHORIC SUBSTANCES**

**WARNING: pyrophoric substances ignite spontaneously upon contact with air.**

### STORAGE PRECAUTIONS

Store in a cool, dry place.

Boron	*Iron
*Cadmium	*Lead
*Calcium	*Manganese
*Chromium	*Nickel
*Cobalt	**Phosphorus, Yellow
Diborane	*Titanium
Dichloroborane	*Zinc
2-Furaldehyde	



\*Finely divided metals form a pyrophoric hazard.  
\*\* Phosphorus (yellow) should be stored and cut under water.

### 3.7 LIGHT-SENSITIVE CHEMICALS

#### Storage Precautions

Avoid exposure to light.

Store in amber bottles in a cool, dry place.

Bromine	Oleic Acid
Ethyl Ether	Potassium Ferrocyanide
Ferric Ammonium Citrate	Silver Salts-2
Hydrobromic Acid	Silver Iodide
Mercuric Salts-1	Mercurous Nitrate

1 Mercuric Chloride, Mercuric Iodide, etc.

2 Silver Acetate, Silver Chloride, etc.

### 3.8 PEROXIDE-FORMING CHEMICALS

**WARNING:: Under proper conditions, these chemicals will form: Under proper conditions, these which can be detonated by shock or heat.**

#### Storage Precautions

Store in airtight containers in a dark, cool, dry place.

Label containers with receiving, opening and disposal dates.

Dispose of peroxide forming chemicals in accordance with local regulations.

Test for the presence of peroxides periodically.

*Potassium	Tetrahydrofuran
Cyclohexane	Acetaldehyde
p-Dioxane	Acrylaldehyde
Ethyl Ether	Crotonaldehyde
Isopropyl Ether	

\*\* Potassium peroxide often exists in the crust\* Potassium peroxide often exists in the crust around\* Pot  
a knife the peroxide rapidly oxidizes the residual kerosene resulting in an explosion.

### 3.9 TOXIC COMPOUNDS

**WARNING:: These chemicals are dangerous or extremely dangerous to health: These chemicals can be fatal or cause  
lifelong damage to health when inhaled, swallowed or absorbed through the skin. Take proper precautions  
to avoid contact.**

#### Storage Precautions

Store according to hazardous nature of chemical using appropriate personal protective equipment when necessary.

Post emergency telephone number near telephone.

#### SOLIDS

Antimony Compounds	Oxalic Acid
Arsenic Compounds	Phenol
Barium Compounds	Phosphorus, Yellow
Beryllium Compounds	Phosphorus Pentachloride
Cadmium Compounds	Phosphorus Pentasulfide
Calcium Oxide	Picric Acid
Chromates, salts of	Potassium
Cyanides, salts of	Selenium Compounds
Fluorides, salts of	Silver Nitrate
Iodine	Sodium
Lead Compounds	Sodium Hydroxide
Mercuric Compounds	Sodium Hypochlorite

#### LIQUIDS

Aniline	Hydrochloric Acid
Bromine	Hydrofluoric Acid
Carbon Disulfide	Hydrogen Peroxide
Carbon Tetrachloride	Mercury
Chloroform	Nitric Acid
Chromic Acid	Perchloric Acid
p-Dioxane	Phosphorus Trichloride
Ethylene Glycol	Sulfuric Acid
Formic Acid	Tetrachloroethane
Hydrazine	Tetrachloroethylene
Hydrobromic Acid	

## GASES

Carbon Monoxide	Hydrogen Chloride
Chlorine	Hydrogen Cyanide
Cyanogen	Hydrogen Sulfide
Diborane	Nitrogen Dioxide
Fluorine	Ozone
Formaldehyde	Sulfur Dioxide
Hydrogen Bromide	

### **3.10 CARCINOGENS**

#### Storage Precautions

Label all containers as Cancer Suspect Agents.

Store according to hazardous nature of chemical, using appropriate Store according to h necessary.

Antimony Compounds	Acrylonitrile
Arsenic Compounds	Benzene
Benzidine	Chloroform
Beryllium	Dimethyl Sulfate
Cadmium Compounds	Dioxane
Chromates, salts of	Ethylene Dibromide
Beta-Naphthylamine	Hydrazine
Nickel Compounds	Nickel Carbonyl
Vinyl Chloride	

### **3.11 TERATOGENS**

#### Storage Precautions

Label all containers Teratogens

Store according to hazaStore according to hazardous nStore according to hazardous nat necessary.

Aniline	Mercury
Benzene	Nitrobenzene
Carbon Disulfide	Phosphorus

Carbon Monoxide  
Chlorinated Hydrocarbons  
Lead

Radioactive Substances  
Toluene  
Turpentine

### 3.12 QUANTITY LIMITATIONS IN LABORATORIES FOR FLAMMABLE AND COMBUSTIBLE CHEMICALS

**Flammable Liquid.** A liquid having a closed cup flash point below 100°F (37.8°C) and having a vapor pressure not exceeding 40 mm Hg at 100°F (37.8°C) known as a Class I liquid.

Class I liquids shall be subdivided as follows:

Class IA shall include those having flash points below 73°F (22.8°C) and a vapor pressure not exceeding 40 mm Hg at 100°F (37.8°C).

Class IB shall include those having flash points at or above 73°F (22.8°C) and below 100°F (37.8°C).

Class IC shall include those having flash points at or above 100°F (37.8°C) and below 140°F (60°C).

**Combustible Liquid.** A liquid having a closed cup flash point at or above 100°F (37.8°C) and a vapor pressure not exceeding 40 mm Hg at 100°F (37.8°C).

Combustible liquids shall be subdivided as follows:

Class II liquids shall include those having flash points at or above 100°F (37.8°C) and below 140°F (60°C).

Class IIIA liquids shall include those having flash points at or above 140°F (60°C) and below 200°F (93°C).

Class IIIB liquids shall include those having flash points at or above 200°F (93°C).

## Maximum Allowable Container Capacity

### RESEARCH LABORATORIES

Container Type	Flammable liquids			Combustible Liquids	
	IA	IB	IC	II	IIIA
<b>Glass</b>	1 pint <sup>1</sup> 500 ml	1 qt <sup>1</sup> 1 liter	1.1 gallon 4 liters	1.1 gallon 4 liters	5 gallons 20 liters
<b>Metal or Approved Plastic</b>	1.1 gallon 4 liters	5 gallons 20 liters	5 gallons 20 liters	5 gallons 20 liters	5 gallons 20 liters
<b>Safety Cans</b>	2.6 gallon 10 liters	5 gallons 20 liters	5 gallons 20 liters	5 gallons 20 liters	5 gallons 20 liters

<sup>1</sup>ForFor classFor class IA and IB flammables, glass containersFor class IA and IB flammables, glass con if the purity would be afif the purity would be adversely affeif the purity would be adversely affect would degrade the plastic or metal containers.

### INSTRUCTIONAL LABORATORIES

Container Type	Flammable liquids			Combustible Liquids	
	IA	IB	IC	II	IIIA
<b>Glass</b>	1 pint <sup>1</sup> 500 ml	1 qt <sup>1</sup> 1 liter	1.1 gallon 4 liters	1.1 gallon 4 liters	5 gallons 20 liters
<b>Metal or Approved Plastic</b>	1.1 gallon 4 liters	1.1 gallon 4 liters	1.1 gallon 4 liters	1.1 gallon 4 liters	5 gallons 20 liters
<b>Safety Cans</b>	2.1 gallon 8 liters	2.1 gallon 8 liters	2.1 gallon 8 liters	2.1 gallon 8 liters	5 gallons 20 liters

<sup>1</sup> In **instructional laboratory** work areas, no container for class IB, IC or II shall exceed a capacity of 1.1 gallon (4 liters), except for safety cans of (2.1 gallon 8 liters).

NFPA 30 and 45 (1996)

### 3.13 MAXIMUM QUANTITIES OF FLAMMABLE AND COMBUSTIBLE LIQUIDS PER 100 SQUARE FEET OF LABORATORY UNIT<sup>1</sup>

#### A. RESEARCH LABORATORIES

Laboratory Unit Class	Flammable or Combustible Liquid Class	<i>Excluding</i> Quantities in Storage Cabinets <sup>2</sup>		<i>Including</i> Quantities in Storage Cabinets <sup>2</sup>	
<b>B</b> <b>(Intermediate Hazard)</b>	<b>I</b> <b>I, II, IIIA</b>	20 liters 38 liters	5 gallons 10 gallons	38 liters 76 liters	10 gallons 20 gallons
<b>C</b> <b>(Low Hazard)</b>	<b>I</b> <b>I, II, IIIA</b>	7.5 liters 15 liters	2 gallons 4 gallons	15 liters 30 liters	4 gallons 8 gallons
<b>D</b> <b>(Minimal)</b>	<b>I</b> <b>I, II, IIIA</b>	4 liters 4 liters	1.1 gallon 1.1 gallon	7.5 liters 7.5 liters	2 gallon 2 gallon

<sup>1</sup>The area of offices and other contiguous areas of a laboratory unit are to be included when making this determination.

<sup>2</sup>for maximum container sizes, see Section 3.12

NFPA 45 Table 2.2 (1996) & Ray Richards, NFPA Code 45 Technical Committee Chair, 2000 ed., University of Alberta

## B. INSTRUCTIONAL LABORATORIES

Laboratories used for graduate or post-graduate research are not to be considered instructional laboratory units.

Laboratory Unit Class	Flammable or Combustible Liquid Class	<i>Excluding</i> Quantities in Storage Cabinets <sup>3</sup>		<i>Including</i> Quantities in Storage Cabinets <sup>3</sup>	
<b>B</b> (Intermediate Hazard)	<b>I</b> I, II, IIIA	10 liters 19 liters	2.5 gallons 5 gallons	19 liters 38 liters	5 gallons 10 gallons
<b>C</b> (Low Hazard)	<b>I</b> I, II, IIIA	7.5 liters 15 liters	2 gallons 4 gallons	15 liters 30 liters	4 gallons 8 gallons
<b>D</b> (Minimal)	<b>I</b> I, II, IIIA	4 liters 4 liters	1.1 gallon 1.1 gallon	7.5 liters 7.5 liters	2 gallon 2 gallon

<sup>3</sup>for maximum container sizes, see Section 3.12

NFPA 45 Table 2.2 (1996) & Ray Richards, NFPA Code 45 Technical Committee Chair, 2000 ed., University of Alberta



### 3.14 RELATED AND COMPATIBLE STORAGE GROUPS

The following lists are examples of some chemicals which may be stored together. These lists are meant to serve as examples and are not designed to be all inclusive.

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#### *Inorganic Family*

Metals, hydrides

Halides, sulfates, sulfites, thiosulfates, phosphates, halogens

Amides, nitrates (except ammonium nitrate), nitrites, azides

Hydroxides, oxides, silicates, carbonates, carbon

Sulfides, selenides, phosphides, carbides, nitrides

Chlorates, perchlorates, perchloric acid, hypochlorites, peroxides, hydrogen peroxide

Arsenates, cyanides, cyanates

Borate, chromates, manganates, permanganates

Nitric acid, other inorganic acids

Sulfur, phosphorus, arsenic, phosphorus pentoxide

#### *Organic Family*

Acids, anhydrides, peracids

Alcohols, glycols, amines, amides, imines, imides

Hydrocarbons, esters, aldehydes

Esters, ketones, ketenes, halogenated hydrocarbons, ethylene oxide

Epoxy compounds, isocyanates

Peroxides, hydroperoxides, azides

Sulfides, polysulfides, sulfoxides, nitrites

Phenols, cresols

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from- *Prudent Practices in the Laboratory: Handling and Disposal of Chemicals*, 1995. National Research Council

### 3.15 INCOMPATIBLE CHEMICALS (REACTIVE HAZARDS)

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Substances in the left hand column should be stored and handled so that they cannot accidentally contact corresponding substances in the right hand column under uncontrolled conditions.

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Acetic Acid	Chromic acid, nitric acid, peroxides, permanganates
Acetic Anhydride	Hydroxyl-containing compounds such as ethylene glycol, perchloric acid
Acetone	Concentrated nitric and sulfuric acid mixtures, hydrogen peroxide
Acetylene	Chlorine, bromine, copper, silver, fluorine, mercury
Alkali and alkaline earth metals, such as sodium, potassium, lithium, magnesium, calcium	Carbon dioxide, carbon tetrachloride, other polychlorinated hydrocarbons (also powdered aluminum prohibit the use of water, foam and dry chemical extinguishers on fires involving these metals - dry sand should be utilized)
Ammonium (anhydrous)	Mercury, chlorine, calcium hypochlorite, iodine, bromine, hydrogen fluoride
Ammonium nitrate  combustibles	Acids, metal powders, flammable liquids, chlorates, nitrates, sulfur, finely divided organics,
Aniline	Nitric acid, hydrogen peroxide
Arsenic materials	Any reducing agent
Azides	Acids
Bromine	Ammonia, acetylene, butadiene, butane, other petroleum gases, sodium carbide, turpentine, benzene, finely divided metals

Calcium oxide	Water
Carbon, activated	Calcium hypochlorite, other oxidants
Chlorates	Ammonium salts, acids, metal powders, sulfur, finely divided organics, combustibles
Chromic acid and chromium trioxide	Acetic acid, naphthalene, camphor, glycerol, turpentine, alcohol, other flammable liquids
Chlorine	Ammonia, acetylene, butadiene, butane, other petroleum gases, hydrogen, sodium carbide, turpentine, benzene, finely divided metals
Chlorine dioxide sulfide	Ammonia, methane, phosphine, hydrogen
Copper	Acetylene, hydrogen peroxide
Cumene hydroperoxide	Acids (organic or inorganic)
Cyanides	Acids
Flammable liquids	Ammonium nitrate, chromic acid, Hydrogen peroxide, nitric acid, sodium peroxide, halogens
Fluorine	Isolate from everything
Hydrazine	Hydrogen peroxide, nitric acid, any other oxidant
chlorine,	Hydrocarbons (benzene, butane, fluorine, bromine, chromic acid, propane, gasoline, turpentine, etc. peroxides
Hydrocyanic acid	Nitric acid, alkalis
Hydrofluoric acid (anhydrous) Hydrogen fluoride	Ammonia (aqueous or anhydrous)
Hydrogen peroxide	Copper, chromium, iron, most metals or their salts, any flammable liquid, combustible materials, aniline, nitromethane

Hydrogen sulfide	Fuming nitric acid, oxidizing gases
Hypochlorites	Acids, activated carbon
Iodine	Acetylene, ammonia (aqueous or anhydrous)
Mercury	Acetylene, fulminic acid <sup>a</sup> , ammonia
Nitrates	Acids
Nitric acid (concentrated)	Acetic acid, acetone, alcohol, aniline chromic acid, hydrocyanic acid, hydrogen sulfide, flammable gases, nitratable substances
Nitrites	Acids
Nitroparaffins	Inorganic bases, amines
Oxalic acid	Silver, mercury and their salts
Oxygen	Oils, grease, hydrogen, flammable liquids, solids and gases
Perchloric acid alcohol,	Acetic anhydride, bismuth and its alloys, paper, wood, grease, oil (all organics)
Peroxides, organic	Acids (organic or mineral), also avoid friction, store cold
Phosphorus (white)	Air, oxygen, alkalies, reducing agents
Phosphorus pentoxide	Alcohols, strong bases, water
Potassium	Carbon tetrachloride, carbon dioxide, water
Potassium chlorate	Acids (see also chlorates)
Potassium perchlorate	Acids (see also perchloric acid)
Potassium permanganate	Glycerol, ethylene glycol, benzaldehyde, sulfuric acid
Selenides	Reducing agents

Silver and silver salts acid <sup>a</sup> ,	Acetylene, oxalic acid, tartaric acid, fulminic ammonium compounds
Sodium	See - alkali metals
Sodium nitrite	Ammonium nitrate and other ammonium salts
Sodium peroxide	Any oxidizable substance, such as ethanol, methanol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerol,
ethylene	glycol, ethyl acetate, methyl acetate, furfural
Sulfides	Acids
Sulfuric acid	Chlorates, perchlorates, permanganates

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<sup>a</sup> produced in nitric acid-ethanol mixtures

from - *Hazards in the Chemical Laboratory*, 4th edition. 1986. Bretherick

### 3.16 FIFTEEN REASONS NOT TO STORE CHEMICALS ALPHABETICALLY

<u>Chemicals Stored Together</u>	<u>Possible Reaction</u>
1. Acetic acid & Acetaldehyde	Small amounts of acetic acid will cause the acetaldehyde to polymerize, thus releasing great quantities of heat.
2. Acetic anhydride & Acetaldehyde	Reaction can be violently explosive
3. Aluminum metal & ammonium nitrate	A potential explosive.
4. Aluminum & bromine vapor	Aluminum foil reacts with bromine vapor at room temperature and incandescens.
5. Ammonia vapor & bromine vapor	Unstable nitrogen tribromide is formed, explosion may result.
6. Ammonium nitrate & acetic acid	A mixture may result in ignition, especially if acetic acid is concentrated.
7. Cupric sulfide & cadmium chlorate	Will explode on contact.
8. Hydrogen peroxide & ferrous sulfide	Forms a vigorous, highly exothermic reaction.
9. Hydrogen peroxide & lead II or IV oxide	Violent, possibly explosive reaction.
10. Lead perchlorate & methyl alcohol	Forms an explosive mixture if agitated.
11. Lead sulfide & hydrogen peroxide	Vigorous, potentially explosive reaction.
12. Mercury II nitrate & methanol	May form mercury fulminate - an explosive.
13. Nitric acid & phosphorus	Phosphorus burns spontaneously

in the presence of nitric acid.

14. Potassium cyanide & potassium peroxide

A potentially explosive mixture if heated.

15. Sodium nitrate & sodium thiosulfate

A mixture of the dry materials can result in an explosion.

*from- the Chemical Safety Office, Risk Management Department, University of Vermont*

## **4.0 REGULATIONS**



## 4.1 OCCUPATIONAL EXPOSURE TO HAZARDOUS CHEMICALS IN LABORATORIES

### 4.1.1 Requirements of the Standard - Outline

29 CFR 1910.1450

- (a) Scope and Application.
- (b) Definitions
- (c) Do Not Exceed PEL's
- (d) Routine exposure triggers 6b Monitoring Requirements
  
- (e) CHEMICAL HYGIENE PLAN
  - (1) Must be Written
  - (2) Must be Available
  - (3) Must state SPECIFIC MEASURES addressing:
    - (i) STANDARD OPERATING PROCEDURES for Hazardous Chemicals.
    - (ii) CRITERIA used to design Eng. Controls, PPE selection and Work Practices. Emphasize Hazardous Chems.
    - (iii) Inspection and Maintenance for PE, esp. Fume Hoods.
    - (iv) Training Program
    - (v) CRITERIA for requiring Prior Approval
    - (vi) CRITERIA for Medical Consultation/Examination
    - (vii) Designation of a Chemical Hygiene Officer
    - (viii) Specific Considerations for Select Carcinogens, reproductive toxins and substances with high acute toxicity:
      - (A) Designated Area
      - (B) Containment
      - (C) Waste Removal
      - (D) Decontamination
  - (4) Review and Update at least Annually
  
- (f) TRAINING
  - (1) Warn employees of Hazards in THEIR WORK AREA.
  - (2) At Initial Assignment and prior to new assignment. Repeat as needed.
  - (3) Information:
    - (i) Contents of the Standard.
    - (ii) Location of Chemical Hygiene Program
    - (iii) OSHA PELs, ALs, STELs, Ceiling Limits, Skin Designations; ACGIH TLVs, STELs, Ceiling Limits, BEIs; NIOSH RELs, Ceiling Limits.
    - (iv) Symptoms of exposure to chemicals USED IN THE LABORATORY.
    - (v) Location of MSDS and Reference Material on:

Hazards  
Safe Handling  
Storage  
Disposal

for hazardous chemicals FOUND IN THE LABORATORY.

(4) Training.

(i) Must Include:

- (A) Methods of Detection: Employer / Employee
- (B) Physical and Health Hazards of chemicals IN THE WORK AREA.
- (C) Methods for Protection, including SPECIFIC PROCEDURES IMPLEMENTED BY EMPLOYER such as:

Appropriate Work Practices  
Emergency Procedures  
Personal Protective Equipment

- (ii) Applicable details of the CHP (e.g.. SOP's, Prior Approval protocols, and requirements for Select Carcinogens etc.

(g) Medical Consultation and Examination

(1) Must provide the opportunity if employee:

- (i) Shows signs or symptoms of exposure
- (ii) If Exposure Monitoring shows levels routinely above AL/PEL for a 6b substance, provide Medical Surveillance as required by the relevant 6b Standard
- (iii) If employee exposed as result of an accident.

(2) Directly supervised by Lic. Physician, no cost to employee.

(3) Inform Physician of:

- (i) Identity of the Hazardous Substance
- (ii) Conditions of exposure, sampling data if avail.
- (iii) Descriptions of symptoms

(4) Physician must provide a written opinion

(i) Including:

- (A) Recco for Follow-up visit
- (B) Results of exam and any tests
- (C) Any condition uncovered which might increase risk in case of future exposure to any chemical found at the site
- (D) Statement that the Employee has been fully informed of the results

- (ii) NOT to include findings unrelated to the exposure

(h) Hazard Identification.

(1) Labels and MSDS

- (i) Labels not to be defaced or removed
- (ii) Keep MSDS rec'd with shipments and make them available.  
Do not need to obtain them elsewhere.

(2) For substances developed in the laboratory:

(i) If composition known, determine Hazard per pgh (b) and train accordingly.

(ii) If composition not known, assume hazardous and train accordingly.

(iii) If for use outside of Laboratory, prepare MSDS

(i) Provide Respirators at no cost accng to 29 CFR 1910.134 if necessary to reduce exposure to below PELs.

(j) (1) Create and maintain records of exposure monitoring and Medical examination and Consultation for any employee so affected.

(2) Keep them for 30 years.

## 4.1.2 Full Text of the Standard

[Code of Federal Regulations]

[Title 29, Volume 6, Parts 1910.1000 to End]

[Revised as of July 1, 1999]

From the U.S. Government Printing Office via GPO Access

[CITE: 29CFR1910.1450]

[Page 484-538]

### TITLE 29--LABOR

#### PART 1910--OCCUPATIONAL SAFETY AND HEALTH STANDARDS

(Continued)--Table of Contents

##### Subpart Z--Toxic and Hazardous Substances

Sec. 1910.1450 Occupational exposure to hazardous chemicals in laboratories.

(a) Scope and application. (1) This section shall apply to all employers engaged in the laboratory use of hazardous chemicals as defined below.

(2) Where this section applies, it shall supersede, for laboratories, the requirements of all other OSHA health standards in 29 CFR part 1910, subpart Z, except as follows:

(i) For any OSHA health standard, only the requirement to limit employee exposure to the specific permissible exposure limit shall apply for laboratories, unless that particular standard states otherwise or unless the conditions of paragraph (a)(2)(iii) of this section apply.

(ii) Prohibition of eye and skin contact where specified by any OSHA health standard shall be observed.

(iii) Where the action level (or in the absence of an action level, the permissible exposure limit) is routinely exceeded for an OSHA regulated substance with exposure monitoring and medical surveillance requirements, paragraphs (d) and (g)(1)(ii) of this section shall apply.

(3) This section shall not apply to:

(i) Uses of hazardous chemicals which do not meet the definition of laboratory use, and in such cases, the employer shall comply with the relevant standard in 29 CFR part 1910, subpart Z, even if such use occurs in a laboratory.

(ii) Laboratory uses of hazardous chemicals which provide no potential for employee exposure. Examples of such conditions might include:

(A) Procedures using chemically-impregnated test media such as Dip-and-Read tests where a reagent strip is dipped into the specimen to be tested and the results are interpreted by comparing the color reaction to a color chart supplied by the manufacturer of the test strip; and

(B) Commercially prepared kits such as those used in performing pregnancy tests in

which all of the reagents needed to conduct the test are contained in the kit.

(b) Definitions--

Action level means a concentration designated in 29 CFR part 1910 for a specific substance, calculated as an eight (8)-hour time-weighted average, which initiates certain required activities such as exposure monitoring and medical surveillance.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Carcinogen (see select carcinogen).

Chemical Hygiene Officer means an employee who is designated by the employer, and who is qualified by training or experience, to provide technical guidance in the development and implementation of the provisions of the Chemical Hygiene Plan. This definition is not intended to place limitations on the position description or job classification that the designated individual shall hold within the employer's organizational structure.

Chemical Hygiene Plan means a written program developed and implemented by the employer which sets forth procedures, equipment, personal protective equipment and work practices that (i) are capable of protecting employees from the health hazards presented by hazardous chemicals used in that particular workplace and (ii) meets the requirements of paragraph (e) of this section.

Combustible liquid means any liquid having a flashpoint at or above 100 deg.F (37.8 deg.C), but below 200 deg.F (93.3 deg.C), except any mixture having components with flashpoints of 200 deg.F (93.3 deg.C), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.

Compressed gas means:

(i) A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70 deg.F (21.1 deg.C); or

(ii) A gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130 deg.F (54.4 deg.C) regardless of the pressure at 70 deg.F (21.1 deg.C); or

(iii) A liquid having a vapor pressure exceeding 40 psi at 100 deg.F (37.8 deg.C) as determined by ASTM D-323-72.

Designated area means an area which may be used for work with select carcinogens, reproductive toxins or substances which have a high degree of acute toxicity. A designated area may be the entire laboratory, an area of a laboratory or a device such as a laboratory hood.

Emergency means any occurrence such as, but not limited to, equipment failure, rupture of containers or failure of control equipment which results in an uncontrolled release of a hazardous chemical into the workplace.

Employee means an individual employed in a laboratory workplace who may be exposed to hazardous chemicals in the course of his or her assignments.

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

Flammable means a chemical that falls into one of the following categories:

(i) Aerosol, flammable means an aerosol that, when tested by the method described in 16 CFR 1500.45, yields a flame protection exceeding 18 inches at full valve opening, or a flashback (a flame extending back to the valve) at any degree of valve opening;

(ii) Gas, flammable means:

(A) A gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of 13 percent by volume or less; or

(B) A gas that, at ambient temperature and pressure, forms a range of flammable mixtures with air wider than 12 percent by volume, regardless of the lower limit.

(iii) Liquid, flammable means any liquid having a flashpoint below 100 deg.F (37.8 deg.C), except any mixture having components with flashpoints of 100 deg.F (37.8 deg.C) or higher, the total of which make up 99 percent or more of the total volume of the mixture.

(iv) Solid, flammable means a solid, other than a blasting agent or explosive as defined in Sec. 1910.109(a), that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change, or retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard. A chemical shall be considered to be a flammable solid if, when tested by the method described in 16 CFR 1500.44, it ignites and burns with a self-sustained flame at a rate greater than one-tenth of an inch per second along its major axis.

Flashpoint means the minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite when tested as follows:

(i) Tagliabue Closed Tester (See American National Standard Method of Test for Flash Point by Tag Closed Tester, Z11.24-1979 (ASTM D 56-79))-for liquids with a viscosity of less than 45 Saybolt Universal Seconds (SUS) at 100 deg.F (37.8 deg.C), that do not contain suspended solids and do not have a tendency to form a surface film under test; or

(ii) Pensky-Martens Closed Tester (see American National Standard Method of Test for Flash Point by Pensky-Martens Closed Tester, Z11.7-1979 (ASTM D 93-79))-for liquids with a viscosity equal to or greater than 45 SUS at 100 deg.F (37.8 deg.C), or that contain suspended solids, or that have a tendency to form a surface film under test; or

(iii) Setaflash Closed Tester (see American National Standard Method of Test for Flash Point by Setaflash Closed Tester (ASTM D 3278-78)).

Organic peroxides, which undergo auto accelerating thermal decomposition, are excluded from any of the flashpoint determination methods specified above.

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

Appendices A and B of the Hazard Communication Standard (29 CFR 1910.1200)

provide further guidance in defining the scope of health hazards and determining whether or not a chemical is to be considered hazardous for purposes of this standard.

Laboratory means a facility where the laboratory use of hazardous chemicals" occurs. It is a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis.

Laboratory scale means work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by one person. Laboratory scale" excludes those workplaces whose function is to produce commercial quantities of materials.

Laboratory-type hood means a device located in a laboratory, enclosure on five sides with a moveable sash or fixed partial enclosed on the remaining side; constructed and maintained to draw air from the laboratory and to prevent or minimize the escape of air contaminants into the laboratory; and allows chemical manipulations to be conducted in the enclosure without insertion of any portion of the employee's body other than hands and arms.

Walk-in hoods with adjustable sashes meet the above definition provided that the sashes are adjusted during use so that the airflow and the exhaust of air contaminants are not compromised and employees do not work inside the enclosure during the release of airborne hazardous chemicals.

Laboratory use of hazardous chemicals means handling or use of such chemicals in which all of the following conditions are met:

- (i) Chemical manipulations are carried out on a laboratory scale;
- (ii) Multiple chemical procedures or chemicals are used;
- (iii) The procedures involved are not part of a production process, nor in any way simulate a production process; and
- (iv) Protective laboratory practices and equipment" are available and in common use to minimize the potential for employee exposure to hazardous chemicals.

Medical consultation means a consultation which takes place between an employee and a licensed physician for the purpose of determining what medical examinations or procedures, if any, are appropriate in cases where a significant exposure to a hazardous chemical may have taken place.

Organic peroxide means an organic compound that contains the bivalent -O-O-structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms has been replaced by an organic radical.

Oxidizer means a chemical other than a blasting agent or explosive as defined in Sec. 1910.109(a), that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.

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

Protective laboratory practices and equipment means those laboratory procedures, practices and equipment accepted by laboratory health and safety experts as effective,

or that the employer can show to be effective, in minimizing the potential for employee exposure to hazardous chemicals.

Reproductive toxins means chemicals which affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis)

Select carcinogen means any substance which meets one of the following criteria:

- (i) It is regulated by OSHA as a carcinogen; or
  - (ii) It is listed under the category, known to be carcinogens, in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (latest edition); or
  - (iii) It is listed under Group 1 ( carcinogenic to humans ) by the International Agency for Research on Cancer Monographs (IARC) (latest editions); or
  - (iv) It is listed in either Group 2A or 2B by IARC or under the category, reasonably anticipated to be carcinogens by NTP, and causes statistically significant tumor incidence in experimental animals in accordance with any of the following criteria:
    - (A) After inhalation exposure of 6-7 hours per day, 5 days per week, for a significant portion of a lifetime to dosages of less than 10 mg/m<sup>3</sup>;
    - (B) After repeated skin application of less than 300 (mg/kg of body weight) per week;
- or
- (C) After oral dosages of less than 50 mg/kg of body weight per day.

Unstable (reactive) means a chemical which is the pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shocks, pressure or temperature.

Water-reactive means a chemical that reacts with water to release a gas that is either flammable or presents a health hazard.

(c) Permissible exposure limits. For laboratory uses of OSHA regulated substances, the employer shall assure that laboratory employees' exposures to such substances do not exceed the permissible exposure limits specified in 29 CFR part 1910, subpart Z.

(d) Employee exposure determination--(1) Initial monitoring. The employer shall measure the employee's exposure to any substance regulated by a standard which requires monitoring if there is reason to believe that exposure levels for that substance routinely exceed the action level (or in the absence of an action level, the PEL).

(2) Periodic monitoring. If the initial monitoring prescribed by paragraph (d)(1) of this section discloses employee exposure over the action level (or in the absence of an action level, the PEL), the employer shall immediately comply with the exposure monitoring provisions of the relevant standard.

(3) Termination of monitoring. Monitoring may be terminated in accordance with the relevant standard.

(4) Employee notification of monitoring results. The employer shall, within 15 working days after the receipt of any monitoring results, notify the employee of these results in writing either individually or by posting results in an appropriate location that is accessible to employees.

(e) Chemical hygiene plan--General. (Appendix A of this section is non-mandatory but provides guidance to assist employers in the development of the Chemical Hygiene Plan.)

- (1) Where hazardous chemicals as defined by this standard are used in the



workplace, the employer shall develop and carry out the provisions of a written Chemical Hygiene Plan which is:

(i) Capable of protecting employees from health hazards associated with hazardous chemicals in that laboratory and

(ii) Capable of keeping exposures below the limits specified in paragraph (c) of this section.

(2) The Chemical Hygiene Plan shall be readily available to employees, employee representatives and, upon request, to the Assistant Secretary.

(3) The Chemical Hygiene Plan shall include each of the following elements and shall indicate specific measures that the employer will take to ensure laboratory employee protection:

(i) Standard operating procedures relevant to safety and health considerations to be followed when laboratory work involves the use of hazardous chemicals;

(ii) Criteria that the employer will use to determine and implement control measures to reduce employee exposure to hazardous chemicals including engineering controls, the use of personal protective equipment and hygiene practices; particular attention shall be given to the

selection of control measures for chemicals that are known to be extremely hazardous;

(iii) A requirement that fume hoods and other protective equipment are functioning properly and specific measures that shall be taken to ensure proper and adequate performance of such equipment;

(iv) Provisions for employee information and training as prescribed in paragraph (f) of this section;

(v) The circumstances under which a particular laboratory operation, procedure or activity shall require prior approval from the employer or the employer's designee before implementation;

(vi) Provisions for medical consultation and medical examinations in accordance with paragraph (g) of this section;

(vii) Designation of personnel responsible for implementation of the Chemical Hygiene Plan including the assignment of a Chemical Hygiene Officer and, if appropriate, establishment of a Chemical Hygiene Committee; and

(viii) Provisions for additional employee protection for work with particularly hazardous substances. These include select carcinogens, reproductive toxins and substances which have a high degree of acute toxicity. Specific consideration shall be given to the following provisions which shall be included where appropriate:

(A) Establishment of a designated area;

(B) Use of containment devices such as fume hoods or glove boxes;

(C) Procedures for safe removal of contaminated waste; and

(D) Decontamination procedures.

(4) The employer shall review and evaluate the effectiveness of the Chemical Hygiene Plan at least annually and update it as necessary.

(f) Employee information and training. (1) The employer shall provide employees with information and training to ensure that they are apprised of the hazards of chemicals present in their work area.

(2) Such information shall be provided at the time of an employee's initial assignment to a work area where hazardous chemicals are present and prior to assignments involving new exposure situations. The frequency of refresher information and training shall be determined by the employer.

(3) Information. Employees shall be informed of:

- (i) The contents of this standard and its appendices which shall be made available to employees;
- (ii) The location and availability of the employer's Chemical Hygiene Plan;
- (iii) The permissible exposure limits for OSHA regulated substances or recommended exposure limits for other hazardous chemicals where there is no applicable OSHA standard;
- (iv) Signs and symptoms associated with exposures to hazardous chemicals used in the laboratory; and
- (v) The location and availability of known reference material on the hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory including, but not limited to, Material Safety Data Sheets received from the chemical supplier.

(4) Training.

(i) Employee training shall include:

(A) Methods and observations that may be used to detect the presence or release of a hazardous chemical (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);

(B) The physical and health hazards of chemicals in the work area; and

(C) The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.

(ii) The employee shall be trained on the applicable details of the employer's written Chemical Hygiene Plan.

(g) Medical consultation and medical examinations. (1) The employer shall provide all employees who work with hazardous chemicals an opportunity to receive medical attention, including any follow-up examinations which the examining physician determines to be necessary, under the following circumstances:

(i) Whenever an employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory, the employee shall be provided an opportunity to receive an appropriate medical examination.

(ii) Where exposure monitoring reveals an exposure level routinely above the action level (or in the absence of an action level, the PEL) for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements, medical surveillance shall be established for the affected employee as prescribed by the particular standard.

(iii) Whenever an event takes place in the work area such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure, the affected employee shall be provided an opportunity for a medical consultation. Such consultation shall be for the purpose of determining the need for a medical examination.

(2) All medical examinations and consultations shall be performed by or under the direct supervision of a licensed physician and shall be provided without cost to the employee, without loss of pay and at a reasonable time and place.

(3) Information provided to the physician. The employer shall provide the following information to the physician:

(i) The identity of the hazardous chemical(s) to which the employee may have been exposed;

(ii) A description of the conditions under which the exposure occurred including quantitative exposure data, if available; and

(iii) A description of the signs and symptoms of exposure that the employee is experiencing, if any.

(4) Physician's written opinion. (i) For examination or consultation required under this standard, the employer 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 chemical found in the 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.

(ii) The written opinion shall not reveal specific findings of diagnoses unrelated to occupational exposure.

(h) Hazard identification. (1) With respect to labels and material safety data sheets:

(i) Employers shall ensure that labels on incoming containers of hazardous chemicals are not removed or defaced.

(ii) Employers shall maintain any material safety data sheets that are received with incoming shipments of hazardous chemicals, and ensure that they are readily accessible to laboratory employees.

(2) The following provisions shall apply to chemical substances developed in the laboratory:

(i) If the composition of the chemical substance which is produced exclusively for the laboratory's use is known, the employer shall determine if it is a hazardous chemical as defined in paragraph (b) of this section. If the chemical is determined to be hazardous, the employer shall provide appropriate training as required under paragraph (f) of this section.

(ii) If the chemical produced is a byproduct whose composition is not known, the employer shall assume that the substance is hazardous and shall implement paragraph

(e) of this section.

(iii) If the chemical substance is produced for another user outside of the laboratory, the employer shall comply with the Hazard Communication Standard (29 CFR 1910.1200) including the requirements for preparation of material safety data sheets and labeling.

(i) Use of respirators. Where the use of respirators is necessary to maintain exposure below permissible exposure limits, the employer shall provide, at no cost to the employee, the proper respiratory equipment. Respirators shall be selected and used in accordance with the requirements of 29 CFR 1910.134.

(j) Recordkeeping. (1) The employer shall establish and maintain for each employee an accurate record of any measurements taken to monitor employee exposures and any medical consultation and examinations including tests or written opinions required by this standard.

(2) The employer shall assure that such records are kept, transferred, and made available in accordance with 29 CFR 1910.20.

(k) Dates--(1) Effective date. This section shall become effective May 1, 1990.

(2) Start-up dates. (i) Employers shall have developed and implemented a written Chemical Hygiene Plan no later than January 31, 1991.

(ii) Paragraph (a)(2) of this section shall not take effect until the employer has developed and implemented a written Chemical Hygiene Plan.

(l) Appendices. The information contained in the appendices is not intended, by itself, to create any additional obligations not otherwise imposed or to detract from any existing obligation.

[55 FR 3327, Jan. 31, 1990, 55 FR 7967, Mar. 6, 1990, 55 FR 12111, Mar. 30, 1990]

## 4.2 ENVIRONMENTAL MANAGEMENT STANDARD

### PART 262--STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE

1. The authority citation for part 262 continues to read as follows:

Authority: 42 U.S.C. 6906, 6912, 6922-6925, 6937, and 6938.

#### Subpart A--General

2. Section 262.10 is amended by adding paragraph (j) to read as follows:

Sec. 262.10 Purpose, scope, and applicability.

\* \* \* \* \*

(j) (1) Universities that are participating in the Laboratory XL project are the University of Massachusetts Boston in Boston, Massachusetts, Boston College in Chestnut Hill, Massachusetts, and the University of Vermont in Burlington, Vermont ( Universities ). The Universities generate laboratory wastes (as defined in Sec. 262.102), some of which will be hazardous wastes. As long as the Universities comply with all the requirements of subpart J of this part the Universities' laboratories that are participating in the University Laboratories XL Project as identified in Table 1 of this section, are not subject to the provisions of Secs. 262.11, 262.34(c), 40 CFR Parts 264 and 265, and the permit requirements of 40 CFR Part 270 with respect to said laboratory wastes.

Table 1.--Laboratory XL Project Participant Information

Institution	Approx. number of labs	Departments participating	Location of current hazardous waste accumulation areas
Boston College, Chestnut Hill, MA	120	Chemistry, Biology, Geology, Physics, Psychology	Merkert Chemistry Bldg. 2609 Beacon St., Boston Higgins Building, 140 Commonwealth Ave., Chestnut Hill, MA.

University of Ma Boston Boston, MA.	150	Chemistry, Biology, Psychology, Anthropology, Geology and Earth Sciences, and Environmental, Coastal and Ocean Sciences	Science Building (Bldg.#080); McCormack Bldg. (Bldg. #020); and Wheatley Bldg (Bldg #010), 100 Morrissey Blvd., Boston, MA.
University of Vermont Burlington, VT.	400	Colleges of: Agriculture and Life Sciences, Arts and Sciences, Medicine , and Engineering and Mathematics; and Schools of: Nursing, Allied Health Sciences and Natural Resources.	Given Bunker, 89 Beaumont Ave. Burlington, VT.

(2) Each University shall have the right to change its respective departments or the on-site location of its hazardous waste accumulation areas listed in Table 1 of this section upon written notice to the Regional Administrator for EPA-Region I and the appropriate state agency. Such written notice will be provided at least ten days prior to the effective date of any such changes.

3. Part 262 is amended by adding Subpart J to read as follows:

Subpart J--University Laboratories XL Project--Laboratory Environmental Management Standard

Sec.

262.100 To what organizations does this subpart apply?

262.101 What is in this subpart?

262.102 What special definitions are included in this subpart?

262.103 What is the scope of the laboratory environmental management standard?

262.104 What are the minimum performance criteria?

262.105 What must be included in the laboratory environmental management plan?

262.106 When must a hazardous waste determination be made?

262.107 Under what circumstances will a university's participation in this environmental management standard pilot be terminated?

262.108 When will this subpart expire?

Sec. 262.100 To what organizations does this subpart apply?

This subpart applies to an organization that meets all three of the following conditions:

(a) It is one of the three following academic institutions: The University of Massachusetts Boston in Boston, Massachusetts, Boston College in Chestnut Hill, Massachusetts, or the University of Vermont in Burlington, Vermont ( Universities ); and

(b) It is a laboratory at one of the Universities (identified pursuant to Sec. 262.105(c)(2)(ii)) where laboratory scale activities, as defined in Sec. 262.102, result in laboratory waste; and

(c) It complies with all the requirements of this subpart.

#### Sec. 262.101 What is in this subpart?

This subpart provides a framework for a new management system for wastes that are generated in University laboratories. This framework is called the Laboratory Environmental Management Standard. The standard includes some specific definitions that apply to the University laboratories. It contains specific requirements for how to handle laboratory waste that are called Minimum Performance Criteria. The standard identifies the requirements for developing and implementing an environmental management plan. It outlines the responsibilities of the management staff of each participating university. Finally, the standard identifies requirements for training people who will work in the laboratories or manage laboratory waste. This Subpart contains requirements for RCRA solid and hazardous waste determination, and circumstances for termination and expiration of this pilot.

#### Sec. 262.102 What special definitions are included in this subpart?

For purposes of this subpart, the following definitions apply:

Acutely Hazardous Laboratory Waste means a laboratory waste, defined in the Environmental Management Plan as posing significant potential hazards to human health or the environment and which must include RCRA P wastes, and may include particularly hazardous substances as designated in a University's Chemical Hygiene Plan under OSHA, or Extremely Hazardous Substances under the Emergency Planning and Community Right to Know Act.

Emergency means any occurrence such as, but not limited to, equipment failure, rupture of containers or failure of control equipment which results in the potential uncontrolled release of a hazardous chemical into the environment and which requires agency or fire department notification and/or reporting.

Environmental Management Plan (EMP) means a written program developed and implemented by the university which sets forth standards and procedures, responsibilities, pollution control equipment, performance criteria, resources and work practices that both protect human health and the environment from the hazards presented by laboratory wastes within a laboratory and between a laboratory and the hazardous waste accumulation area, and satisfies the plan requirements defined elsewhere in this Subpart. Certain requirements of this plan are satisfied through the use of the Chemical Hygiene Plan (see, 29 CFR 1910.1450), or equivalent, and other relevant plans, including a waste minimization plan. The elements of the Environmental Management Plan must be easily accessible, but may be integrated into existing plans, incorporated as an attachment, or developed as a separate document.

Environmental Objective means an overall environmental goal of the organization

which is verifiable.

Environmental Performance means results of the data collected pursuant to implementation of the Environmental Management Plan as measured against policy, objectives and targets.

Environmental Target means an environmental performance requirement of the organization which is quantifiable, where practicable, verifiable and designed to be achieved within a specified time frame.

Hazardous Chemical means any chemical which is a physical hazard or a health hazard. A physical hazard means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive. A health hazard means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system and agents which damage the lungs, skin, eyes or mucous membranes.

Hazardous Chemical of Concern means a chemical that the organization has identified as having the potential to be of significant risk to human health or the environment if not managed in accordance with procedures or practices defined by the organization.

Hazardous Waste Accumulation Area means the on-site area at a University where the University will make a solid and hazardous waste determination with respect to laboratory wastes.

In-Line Waste Collection means a system for the automatic collection of laboratory waste which is directly connected to or part of a laboratory scale activity and which is constructed or operated in a manner which prevents the release of any laboratory waste therein into the environment during collection.

Laboratory means, for the purpose of this Subpart, an area within a facility where the laboratory use of hazardous chemicals occurs. It is a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis. The physical extent of individual laboratories within an organization will be defined by the Environmental Management Plan. A laboratory may include more than a single room if the rooms are in the same building and under the common supervision of a laboratory supervisor.

Laboratory Clean-Out means an evaluation of the chemical inventory of a laboratory as a result of laboratory renovation, relocation or a change in laboratory supervision that may result in the transfer of laboratory wastes to the hazardous waste accumulation area.

Laboratory Environmental Management Standard means the provisions of this Subpart and includes the requirements for preparation of Environmental Management Plans and the inclusion of Minimum Performance Criteria within each Environmental



Management Plan.

Laboratory Scale means work with substances in which containers used for reactions, transfers and other handling of substances are designed to be safely and easily manipulated by one person.

Laboratory Scale excludes those workplaces whose function is to produce commercial quantities of chemicals.

Laboratory Waste means a hazardous chemical that results from laboratory scale activities and includes the following: excess or unused hazardous chemicals that may or may not be reused outside their laboratory of origin; hazardous chemicals determined to be RCRA hazardous waste as defined in 40 CFR Part 261; and hazardous chemicals that will be determined not to be RCRA hazardous waste pursuant to Sec. 262.106.

Laboratory Worker means a person who is assigned to handle hazardous chemicals in the laboratory and may include researchers, students or technicians.

Legal and Other Requirements means requirements imposed by, or as a result of, governmental permits, governmental laws and regulations, judicial and administrative enforcement orders, non-governmental legally enforceable contracts, research grants and agreements, certification specifications, formal voluntary commitments and organizational policies and standards.

Senior Management means senior personnel with overall responsibility, authority and accountability for managing laboratory activities within the organization.

Universities means the following academic institutions; University of Vermont, Boston College, and the University of Massachusetts Boston, which are participants in this Laboratory XL project and which are subject to the requirements set forth in this Subpart J.

Sec. 262.103 What is the scope of the laboratory environmental management standard?

The Laboratory Environmental Management Standard will not affect or supersede any legal requirements other than those described in Sec. 262.10(j). The requirements that continue to apply include, but are not limited to, OSHA, Fire Codes, wastewater permit limitations, emergency response notification provisions, or other legal requirements applicable to University laboratories.

Sec. 262.104 What are the minimum performance criteria?

The Minimum Performance Criteria that each University must meet in managing its Laboratory Waste are:

(a) Each University must label all laboratory waste with the general hazard class and either the words "laboratory waste" or with the chemical name of the contents. If the

container is too small to hold a label, the label must be placed on a secondary container.

(b) Each University may temporarily hold up to 55 gallons of laboratory waste or one quart of acutely hazardous laboratory waste, or weight equivalent, in each laboratory, but upon reaching these thresholds, each University must mark that laboratory waste with the date when this threshold requirement was met (by dating the container(s) or secondary container(s)).

(c) Each university must remove all of the dated laboratory waste from the laboratory for delivery to a location identified in paragraph (i) of this section within 30 days of reaching the threshold amount identified in paragraph (b) of this section.

(d) In no event shall the excess laboratory waste that a laboratory temporarily holds before dated laboratory waste is removed exceed an additional 55 gallons of laboratory waste (or one additional quart of acutely hazardous laboratory waste). No more than 110 gallons of laboratory waste total (or no more than two quarts of acutely hazardous laboratory waste total) may be temporarily held in a laboratory at any one time. Excess laboratory waste must be dated and removed in accordance with the requirements of paragraphs (b) and (c) of this section.

(e) Containers of laboratory wastes must be:

(1) Closed at all times except when wastes are being added to (including during in-line waste collection) or removed from the container;

(2) Maintained in good condition and stored in the laboratory in a manner to avoid leaks;

(3) Compatible with their contents to avoid reactions between the waste and its container; and must be made of, or lined with, materials which are compatible with the laboratory wastes to be temporarily held in the laboratory so that the container is not impaired; and

(4) Inspected regularly (at least annually) to ensure that they meet requirements for container management.

(f) The management of laboratory waste must not result in the release of hazardous constituents into the land, air and water where such release is prohibited under federal law.

(g) The requirements for emergency response are:

(1) Each University must post notification procedures, location of emergency response equipment to be used by laboratory workers and evacuation procedures;

(2) Emergency response equipment and procedures for emergency response must be appropriate to the hazards in the laboratory such that hazards to human health and the environment will be minimized in the event of an emergency;

(3) In the event of a fire, explosion or other release of laboratory waste which could threaten human health or the environment, the laboratory worker must follow the notification procedures under paragraph (g)(1) of this section.

(h) Each University must investigate, document, and take actions to correct and prevent future incidents of hazardous chemical spills, exposures and other incidents that trigger a reportable emergency or that require reporting under paragraph (g) of this section.

- (i) Each University may only transfer laboratory wastes from a laboratory:
  - (1) directly to an on-site designated hazardous waste accumulation area. Notwithstanding 40 CFR 263.10(a), each University must comply with requirements for transporters set forth in 40 CFR 263.30 and 263.31 in the event of a discharge of laboratory waste en route from a laboratory to an on-site hazardous waste accumulation area; or
  - (2) to a treatment, storage or disposal (TSD) facility permitted to handle the waste under 40 CFR part 270 or in interim status under 40 CFR parts 265 and 270 (or authorized to handle the waste by a state with a hazardous waste management program approved under 40 CFR part 271) if it is determined in the laboratory by the individuals identified in Sec. 262.105(b)(3) to be responsible for waste management decisions that the waste is a hazardous waste and that it is prudent to transfer it directly to a treatment, storage, and disposal facility rather than an on-site accumulation area.
- (j) Each University must ensure that laboratory workers receive training and are provided with information so that they can implement and comply with these Minimum Performance Criteria.

Sec. 262.105 What must be included in the laboratory environmental management plan?

- (a) Each University must include specific measures it will take to protect human health and the environment from hazards associated with the management of laboratory wastes and from the reuse, recycling or disposal of such materials outside the laboratory.
- (b) Each University must write, implement and comply with an Environmental Management Plan that includes the following:
  - (1) The specific procedures to assure compliance with each of the Minimum Performance Criteria set forth in Sec. 262.104.
  - (2) An environmental policy, or environmental, health and safety policy, signed by the University's senior management, which must include commitments to regulatory compliance, waste minimization, risk reduction and continual improvement of the environmental management system.
  - (3) A description of roles and responsibilities for the implementation and maintenance of the Laboratory Environmental Management Plan.
  - (4) A system for identifying and tracking legal and other requirements applicable to laboratory waste, including the procedures for providing updates to laboratory supervisors.
  - (5) Criteria for the identification of physical and chemical hazards and the control measures to reduce the potential for releases of laboratory wastes to the environment, including engineering controls, the use of personal protective equipment and hygiene practices, containment strategies and other control measures.
  - (6) A pollution prevention plan, including, but not limited to, roles and

responsibilities, training, pollution prevention activities, and performance review.

(7) A system for conducting and updating annual surveys of hazardous chemicals of concern and procedures for identifying acutely hazardous laboratory waste.

(8) The procedures for conducting laboratory clean-outs with regard to the safe management and disposal of laboratory wastes.

(9) The criteria that laboratory workers must comply with for managing, containing and labeling laboratory wastes, including: an evaluation of the need for and the use of any special containers or labeling circumstances, and the use of laboratory wastes secondary containers including packaging, bottles, or test tube racks.

(10) The procedures relevant to the safe and timely removal of laboratory wastes from the laboratory.

(11) The emergency preparedness and response procedures to be implemented for laboratory waste.

(12) Provisions for information dissemination and training, provided for in paragraph (d) of this section.

(13) The procedures for the development and approval of changes to the Environmental Management Plan.

(14) The procedures and work practices for safely transferring or moving laboratory wastes from a laboratory to a location identified in Sec. 262.104(i).

(15) The procedures for regularly inspecting a laboratory to assess conformance with the requirements of the Environmental Management Plan.

(16) The procedures for the identification of environmental management plan noncompliance, and the assignment of responsibility, timelines and corrective actions to prevent their reoccurrence.

(17) The record keeping requirements to document conformance with this Plan.

(c) Organizational responsibilities for each university. Each University must:

(1) Develop and oversee implementation of its Laboratory Environmental Management Plan.

(2) Identify the following:

(i) Annual environmental objectives and targets;

(ii) Those laboratories covered by the requirements of the Laboratory Environmental Management Plan.

(3) Assign roles and responsibilities for the effective implementation of the Environmental Management Plan.

(4) Determine whether laboratory wastes are solid wastes under RCRA and, if so, whether they are hazardous.

(5) Develop, implement, and maintain:

(i) Policies, procedures and practices governing its compliance with the Environmental Management Plan and applicable federal and state hazardous waste regulations.

(ii) Procedures to monitor and measure relevant conformance and environmental performance data for the purpose of supporting continual improvement of the Environmental Management Plan.

(iii) Policies and procedures for managing environmental documents and records

applicable to this Environmental Management Standard.

(6) Ensure that:

(i) Its Environmental Management Plan is available to laboratory workers, vendors, employee representatives, visitors, on-site contractors, and upon request, to governmental representatives.

(ii) Personnel designated by each University to handle laboratory wastes and RCRA hazardous waste receive appropriate training.

(iii) The Environmental Management Plan is reviewed at least annually by senior management to ensure its continuing suitability, adequacy and effectiveness. The reviews may include, but not be limited to, a consideration of monitoring and measuring information, Laboratory Environmental Management Standard performance data, assessment and audit results and other relevant information and data.

(d) What are the Information and Training Requirements for Each University?

(1) Each University must ensure that laboratory workers receive training and are provided with the information to understand and implement the elements of each University's Environmental Management Plan that are relevant to the laboratory workers' responsibilities.

(2) When must each University ensure that laboratory workers receive training and information?

(i) Each University must provide the information to each laboratory worker when he/she is first assigned to a work area where laboratory wastes may be generated.

(ii) Each University must ensure that each laboratory worker has had training within six months of when he/she is first assigned to a work area where laboratory wastes may be generated. Each University must retrain a laboratory worker when a laboratory waste poses a new or unique hazard for which the laboratory worker has not received prior training and as frequently as needed to maintain knowledge of the procedures of the Environmental Management Plan.

(3) Each University must provide an outline of training and specify who is to receive training in its Environmental Management Plan.

(4) Each University must ensure that laboratory workers are informed of:

(i) The contents of this Subpart and the Laboratory Environmental Management Plan(s) for the laboratory(ies) in which they will be performing work;

(ii) The location and availability of the Environmental Management Plan;

(iii) Emergency response measures applicable to laboratories;

(iv) Signs and indicators of a hazardous substance release;

(v) The location and availability of known reference materials relevant to implementation of the Environmental Management Plan; and

(vi) Environmental training requirements applicable to laboratory workers.

(5) Each University must ensure that Laboratory workers have received training in:

(i) Methods and observations that may be used to detect the presence or release of a hazardous substance;

(ii) The chemical and physical hazards associated with laboratory wastes in their work area;

(iii) The relevant measures a laboratory worker can take to protect human health and

the environment; and

(iv) Details of the Environmental Management Plan sufficient to ensure they manage laboratory waste in accordance with the requirements of this Subpart.

(6) Requirements pertaining to Laboratory visitors:

(i) Laboratory visitors, such as on-site contractors or environmental vendors, that require information and training under this standard must be identified in the Environmental Management Plan.

(ii) Laboratory visitors identified in the Environmental Management Plan must be informed of the existence and location of the Environmental Management Plan.

(iii) Laboratory visitors identified in the Environmental Management Plan must be informed of relevant policies, procedures or work practices to ensure compliance with the requirements of the Environmental Management Plan.

(7) Each University must define methods of providing objective evidence and records of training and information dissemination in its Environmental Management Plan.

Sec. 262.106 When must a hazardous waste determination be made?

(a) For laboratory waste sent from a laboratory to an on-site hazardous waste accumulation area, each University must evaluate the laboratory wastes to determine whether they are solid wastes under RCRA and, if so, determine pursuant to Sec. 262.11 (a) through (d) whether they are hazardous wastes, as soon as the laboratory wastes reach the University's Hazardous Waste Accumulation area(s). At this point each University must determine whether the laboratory waste will be reused or whether it must be managed as RCRA solid or hazardous waste.

(b) For laboratory waste that will be sent from a laboratory to a TSD facility permitted to handle the waste, each University must evaluate such laboratory wastes to determine whether they are solid wastes under RCRA and, if so, determine pursuant to Sec. 262.11 (a) through (d) whether they are hazardous wastes, prior to the 30-day deadline for removing dated laboratory waste from the laboratory.

(c) Laboratory waste that is determined to be hazardous waste is no longer subject to the provisions of this subpart and must be managed in accordance with all applicable provisions of 40 CFR Parts 260 through 270.

Sec. 262.107 Under what circumstances will a university's participation in this environmental management standard pilot be terminated?

(a) EPA retains the right to terminate a University's participation in this Laboratory XL project if the University:

- (1) Is in non-compliance with the Minimum Performance Criteria in Sec. 262.104; or
- (2) Has actual environmental management practices in the laboratory that do not conform to its Environmental Management Plan; or
- (3) Is in non-compliance with the Hazardous Waste Determination requirements of

Sec. 262.106.

(b) In the event of termination, EPA will provide the University with 15 days written notice of its intent to terminate. During this period, which commences upon receipt of the notice, the University will have the opportunity to come back into compliance with the Minimum Performance Criteria, its Environmental Management Plan, or the requirements for making a hazardous waste determination at Sec. 262.106 or to provide a written explanation as to why it was not in compliance and how it intends to return to compliance. If, upon review of the University's written explanation, EPA then re-issues a written notice terminating the University from this XL Project, the provisions of paragraph (c) of this section will immediately apply and the University shall have 90 days to come into compliance with the applicable RCRA requirements deferred by Sec. 262.10(j). During the 90-day transition period, the provisions of this subpart shall continue to apply to the University.

(c) If a University withdraws from this XL project, or receives a notice of termination pursuant to this section, it must submit to EPA and the state a schedule for returning to full compliance with RCRA requirements at the laboratory level. The schedule must show how the University will return to full compliance with RCRA within 90 days from the date of the notice of termination or withdrawal.

Sec. 262.108 When will this subpart expire?

This subpart will expire on September 30, 2003.

[FR Doc. 99-25137 Filed 9-27-99; 8:45 am]

### **4.3 GENERAL LAWS OF MASSACHUSETTS CHAPTER 111F. HAZARDOUS SUBSTANCES DISCLOSURE BY EMPLOYERS.**

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Chapter 111F: Section 1. Definitions.

Section 1. In this chapter, the following words shall have the following meanings:--

"Article", a finished product or manufactured item: (1) which is formed to a specific



shape or design during manufacture, (2) which has end use function(s) dependent in whole or in part upon its shape or design during end use, and (3) which has either no change of chemical composition during its end use or only those changes of composition which have no commercial purpose separate from that of the article, except that fluids and particles are not considered articles regardless of shape or design unless inert or totally encapsulated.

"CAS number", the identification number assigned by the Chemical Abstracts Service to specific chemical substances.

"Chemical name", the scientific designation of a substance in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry or the system developed by the Chemical Abstracts Service.

"Common name", any designation or identification such as code name, code number, trade name, or brand name used to identify a substance other than by its chemical name.

"Community resident", any resident of a municipality in which an employer manufactures, processes, uses or stores toxic or hazardous substances as defined in this section.

"Container", any receptacle or formed or flexible covering for the storage or transport of toxic or hazardous substances including but not limited to a bag, barrel, bottle, box, can, carton, cylinder, drum, pipe, storage tank, both mobile and stationary, vessel or vat.

"DEP", the department of environmental protection.

"DOL", the department of labor and workforce development.

"DPH", the department of public health.

"Designated representative", an employee's treating physician upon written authorization by said employee, and the employee's collective bargaining agent who is certified, or is recognized by the employer of the employee without regard to written employee authorization. No other individual or organization shall be eligible to serve as a designated representative.

"Employee", any person employed on or after the effective date of this chapter who is, has been, or may be exposed under normal operating conditions or foreseeable emergencies to any toxic or hazardous substance in a workplace. In the case of a deceased or legally incapacitated employee, the employee's spouse, guardian or executor may exercise all the employee's rights under this chapter. For purposes of this

chapter, any person whose employment is terminated for any reason after the effective date of this chapter is an employee.

"Employer", any person, firm, corporation, partnership, association or other entity engaged in a business or in providing services, including the commonwealth and any of its political subdivisions, that manufactures, processes, uses or stores toxic or hazardous substances, but not including the employment of domestic workers or casual laborers employed at the place of residence of the employer. Independent contractors shall be deemed the sole employer of their employees, even when said employees are performing work at the workplace of another employer as defined herein.

"Expose" or "exposure", any situation arising from or related to the work operation of an employer where an employee or a community resident may ingest, inhale, absorb through the skin or eyes or otherwise come into contact with a toxic or hazardous substance.

"Impurity", a toxic or hazardous substance which is unintentionally present with another substance or mixture.

"Label", the written, printed and graphic information displayed on or affixed to the container of a toxic or hazardous substance; or the placards, signs, or operating instructions which communicate the information required by section seven herein.

"Manufacturer", a person who produces, synthesizes, extracts, or otherwise makes a toxic or hazardous substance.

"Massachusetts substance list", a compilation of toxic or hazardous substances which are to be subject to the provisions of this chapter.

"Material safety data sheet" or "MSDS", the written document which sets forth the following information for a toxic or hazardous substance:

- (a) The chemical name, any common names, and the CAS number of the toxic or hazardous substance.
- (b) The hazards or other risks in the use of the toxic or hazardous substance, including:
  - (1) the potential for fire, explosion, corrosivity, and reactivity;
  - (2) the acute and chronic health effects of risks from exposure; including the medical conditions that might be aggravated by exposure; and
  - (3) the potential routes of exposure and symptoms of overexposure.

(c) The proper precautions, handling practices, necessary personal protective equipment, and other safety precautions in the use of or exposure to the toxic or hazardous substances, including appropriate emergency treatment in case of overexposure at hazardous levels.

(d) The emergency procedures for spills, fire, disposal and first aid.

(e) A description in lay terms, of the specific potential health risks posed by the toxic or hazardous substance intended to alert any person reading this information, including but not limited to carcinogenic, mutagenic, teratogenic, or neurotoxic effects, for substances so designated on the Massachusetts substance list, pursuant to section four (c) of this chapter.

(f) The month and year that the information was compiled and the name, address, and emergency telephone number of the manufacturer responsible for preparing the information.

"Medical emergency", a serious medical condition which poses an imminent threat to a person's health, caused or suspected to have been caused, by accidental exposure to a toxic or hazardous substance, and which requires immediate treatment by a physician.

"Mixture", any solution or intimate admixture of two or more substances, at least one of which is present as a toxic or hazardous substance, as designated pursuant to section four, which do not react chemically with each other.

"Municipal coordinator", the fire chief or fire commissioner, or the public health commissioner or public health officer of a city or town as designated by the chief municipal officer of said city or town; provided, however, that in towns, the board of selectmen may designate one of its members, or may appoint any qualified resident of the town to act as municipal coordinator. For the purposes of this chapter, chief municipal officer shall mean in a city, the mayor; in a Plan D or Plan E government, the city or town manager; in a town, the board of selectmen.

"NFPA Code", the color and number system identifying the category and degree of fire hazard of a substance as adopted by the National Fire Protection Association in "Standard System For the Identification of Fire Hazards of Materials", NFPA 704 in effect on the effective date of this chapter, and as amended from time to time thereafter.

"Research laboratory", a workplace or a work area of a workplace used primarily for research, development, nonroutine testing or experimentation activity in which toxic or hazardous substances are used by or under the direct supervision of a technically qualified individual. Provided, however, that a research laboratory shall not be involved

in the production or manufacture of goods for direct commercial sale.

"Technically qualified individual", a person who, because of education, training, or experience, understands the health risk associated with the toxic or hazardous substance or mixture handled by or under his or her supervision, and is familiar with the personal protective procedures to be followed in the use or handling of such substances.

"Trade secret", any formula, pattern, device, or compilation of information which is used in an employer's or manufacturer's business, and which gives said employer or manufacturer an opportunity to obtain an advantage over competitors who do not know or use it.

"Toxic or hazardous substance", any chemical substance or mixture of substances in a gaseous, liquid or solid state which is listed in the Massachusetts substance list compiled in compliance with the provisions of section four, and which is manufactured, processed, used or stored in the workplace, but which shall not include alcoholic beverages as defined in section one of chapter one hundred and thirty-eight, or articles intended for personal consumption by employees in the workplace, or consumer articles packaged for distribution to, and used by, the general public, or articles sold or used in retail food establishments and all other retail trade establishments, exclusive of articles used in processing and repair areas, or substances being transported in interstate commerce.

"Work area", a room or defined space in a workplace where toxic or hazardous substances are produced, used and where employees are present in the course of their employment.

"Workplace", an establishment or business of an employer at one geographic location at which work is performed and containing one or more work areas, but not including a police station or public armory in which ammunition is stored. In the case of the commonwealth or any of its political subdivisions acting as an employer, the workplace shall be defined as all work areas wholly owned or controlled by the commonwealth or said subdivisions; in the case of an independent contractor, the workplace shall be defined as all work areas wholly owned or controlled by said independent contractor; provided however, that employees of the commonwealth, or any of its political subdivisions, or an independent contractor shall have certain rights to examine MSDS's as provided in section eleven (f).

Section 2. The responsibility for administering the provisions of this chapter, and for assuring an appropriate state response to alleged violations thereof, shall be assigned in the following manner:

(a) The commissioner of DPH shall be responsible for the administration of sections

four through six, twelve and twenty, which relate to the establishment and amendment of the Massachusetts substance list, the dissemination of information pertaining to toxic or hazardous substances, the granting of certain waivers or alternative conditions to the disclosure requirements contained in this chapter, and trade secrets.

(b) The commissioner of DOL shall be responsible for the administration of sections seven through eleven, and thirteen through fifteen, which define the rights and duties of employees and employers under this chapter.

(c) The commissioner of DEP, on behalf of the commonwealth, and the municipal coordinator of each city or town, on its behalf, shall be responsible for the administration of sections sixteen through nineteen, which relate to requests by state officials, municipal officials, and community residents for actions and information available under this chapter.

The commissioners of the DPH, DOL, and DEP shall have the authority to promulgate rules and regulations necessary to carry out their respective responsibilities under this chapter. In order to avoid the promulgation of conflicting rules and regulations, the commissioners shall take such steps as are necessary to assure that proposed rules and regulations are consistent with the rules and regulations of the other departments with responsibilities under this chapter in conformance with the statutory responsibilities set forth herein. Said rules and regulations shall be promulgated in accordance with chapter thirty A, no later than one hundred and eighty days after the date of enactment of this chapter.

Section 3. (a) If any of the commissioners with responsibilities under this chapter have cause to believe that an employer or manufacturer has wrongfully failed to comply with any provision of this chapter for which that commissioner has been delegated responsibility, that commissioner may, within one hundred and twenty days of the alleged violation or within one hundred and twenty days from the date on which the commissioner obtained knowledge of the violation, undertake an investigation.

The commissioner shall immediately notify the employer or manufacturer by certified mail, return receipt requested, that an investigation will be undertaken and shall also include in the notice a statement detailing the nature of the alleged violation and when it was alleged to have occurred. The employer or manufacturer may respond to the notice of the commissioner, but must do so within twenty days. The commissioner shall consider all matters in mitigation or extenuation of the alleged violation during the course of the investigation. If such commissioner shall determine after such investigation that good cause does not exist to believe that a wrongful violation of the provisions of this chapter has occurred, he or she shall within ten days notify the employer or manufacturer of such finding.

If such commissioner shall determine after such investigation that good cause does

exist to believe that a wrongful violation of the provisions of this chapter has occurred, he shall immediately notify the employer or manufacturer of such finding, and shall immediately endeavor to eliminate the alleged violation by conference, conciliation, and persuasion. In case of failure so to eliminate the alleged wrongful violation by conference, conciliation, and persuasion, the commissioner may order such remedial action as may be appropriate including the issuance of a cease or desist order to any recurrence. The commissioner may also request the attorney general to enforce any order issued or any fine or penalty authorized by this section in the appropriate court of the commonwealth. In such enforcement action the court shall have jurisdiction to restrain violations and to levy penalties as provided herein.

Any employer or manufacturer aggrieved by an order of any commissioner pursuant to this section may obtain judicial review thereof in the Superior court for the county in which the alleged violation of this chapter which is the subject of the commissioner's order occurred. The order of the commissioner shall be reviewed in accordance with the standards for review provided in section fourteen of chapter thirty A.

Any employer or manufacturer who wrongfully fails to comply with or otherwise violates the provisions of this chapter shall be liable for a civil penalty not to exceed two hundred and fifty dollars for each day that each such violation continues.

(b) If any of the commissioners with responsibilities under this chapter have cause to believe that an employer or manufacturer has willfully and intentionally violated any provisions for which that commissioner has been delegated responsibility, that commissioner may report such alleged violation to the attorney general and may request that the attorney general bring an action in the appropriate court of the commonwealth to restrain such violations and to seek such penalties as are provided herein.

Any person who willfully and intentionally violates the provisions of this chapter shall be guilty of a misdemeanor and shall be punished, for a first offense, by a fine of not more than five hundred dollars for each day that such violation continues, or by imprisonment for not more than thirty days or both; for a subsequent offense, by a fine of not more than one thousand dollars for each day that such violation continues, or by imprisonment for no more than ninety days, or by both such fine and imprisonment.

(c) This chapter shall not be construed to create any independent private right of action, and the responsibility for enforcement of this chapter shall lie exclusively with the attorney general.

(d) This chapter shall not be construed to enlarge or diminish any rights or privileges created by collective bargaining agreements or any other provisions of law.

Section 4. (a) For the purpose of this chapter, the commissioner of DPH shall establish

the Massachusetts substance list and make said list available to manufacturers, employers, municipal coordinators, and the commissioners of DOL and DEP. Substances on the list may be designated by their chemical name or common name(s), and CAS number. Only those substances specifically enumerated on the list shall be subject to the provisions of this chapter, and no articles as defined in section one shall be included on the list. The commissioner of DPH shall prepare and amend the list according to the following procedures, and shall promulgate said list pursuant to the rulemaking provisions of chapter thirty A on an annual basis. The annual list shall become effective ninety days after its promulgation. In the case of substances which are extraordinarily hazardous and a threat to public health, the commissioner of DPH may promulgate emergency amendments to the list according to the laws of the commonwealth, provided that appropriate procedures for amending the list, as specified in this section, are followed.

(b) The list shall consist initially of all chemical substances enumerated in any of the following designated source lists, exclusive of generic categories:

1. Environmental Protection Agency  
Restricted Use Pesticides - 40 CFR 162.30
2. International Agency for Research on Cancer  
(Sublist: "Substances found to have at least sufficient evidence of carcinogenicity in animals")
3. National Toxicology Program  
List of chemicals published in the Annual Report on Carcinogens
4. Occupational Safety and Health Administration  
Toxic and Hazardous Substances - 29 CFR 1910, Subpart Z
5. National Institute for Occupational Safety and Health/Occupational Safety and Health Administration  
Occupational Health Guidelines for Chemical Hazards
6. American Conference of Governmental Industrial Hygienists  
Threshold Limit Value for Chemical Substances and Physical Agents in the Workplace
7. National Fire Protection Association  
Hazardous Chemicals Data (NFPA 49)
8. National Fire Protection Association  
Fire Hazard Properties of Flammable Liquids, Gases, Volatile Solids (NFPA 325 M)(All items rated II through IV as health hazards or III through IV as flammability or reactivity hazards.)
9. Environmental Protection Agency  
Carcinogen Assessment Group's List of Carcinogens
10. National Cancer Institute  
(Substances that meet the NTP criteria for significant carcinogenic effect.)

(c) The commissioner, in promulgating the Massachusetts substance list and its amendments shall designate on said list any substance which is a carcinogen, mutagen, teratogen, or neurotoxin, based on a preponderance of substantial and valid scientific evidence.

(d) For the purposes of this chapter, a toxic or hazardous substance is present in any mixture if it is one per cent or more of the mixture or two per cent if the toxic or hazardous substance exists as an impurity in the mixture; provided, however, that the commissioner of DPH may, by regulation, raise the concentration requirement for a toxic or hazardous substance which he or she finds is not toxic or hazardous at the threshold levels; and may lower the concentration requirement for a toxic or hazardous substance including carcinogens, mutagens, teratogens, and neurotoxins for which there is valid and substantial scientific evidence that the substance is extraordinarily hazardous.

The manufacturer of a toxic or hazardous substance shall notify the commissioner of DPH of any valid evidence which indicates either: that the concentration requirement for a toxic or hazardous substance is higher than what is necessary to protect employees who work with, or may be exposed to, the substance; or that the concentration levels should be lowered because there is valid and substantial evidence that the substance is extraordinarily hazardous.

The provisions of this chapter shall not apply to impurities which develop as intermediate materials during chemical processing but are not present in the final mixture, and to which employee or community resident exposure is unlikely.

(e) The commissioner of DPH shall amend the Massachusetts Substance List by adding, in place of the generic categories excluded pursuant to subsection (b) of this section, those specific toxic or hazardous substances which fall within said generic categories and which, in his judgment, should be subjected to the provisions of this act. Provided that such amendment shall be made only after opportunity has been provided for public comment and hearing pursuant to the rulemaking provisions of chapter thirty A and upon the commissioner's finding that according to the preponderance of the evidence, substantial and valid scientific evidence exists that any substances added pursuant to this subsection may result in an acute or chronic risk to human health or safety.

(f) Any substance added to or deleted from the source lists designated in subsection (b) of this section by the agency responsible for preparing and amending said list shall be added to, or deleted from, the Massachusetts substance list as part of its annual amendment by the commissioner of DPH.

(g) Further amendments to the Massachusetts substance list may be established by the commissioner of DPH, pursuant to the following process:



The commissioner shall publish a notice of intent to add a substance to the Massachusetts substance list. This notice shall identify the proposed substance and shall inform interested persons of their right to request a proceeding pursuant to this section. Any person showing that he may be substantially and specifically affected by the proposed addition to the substance list may file a request for such hearing provided that such request is filed in writing with the commissioner within thirty days of the date that the notice was published.

Upon receipt of a request for a hearing, the commissioner shall set a hearing date. Reasonable notice of the hearing shall be afforded all persons requesting a hearing and shall include statements of the time and place of the hearing. Parties shall have sufficient notice of the issues involved to afford them reasonable opportunity to prepare evidence and argument.

The commissioner shall allow any other interested person to participate by presentation of argument orally or in writing, or for any other limited purpose, as the agency may order.

Unless otherwise provided by law, the commissioner, or his hearing officer, need not observe the rules of evidence observed by courts, but shall observe the rules of privilege recognized by law. Evidence may be admitted and given probative effect only if it is the kind of evidence on which reasonable persons are accustomed to rely in the conduct of serious affairs. The commissioner may exclude unduly repetitious evidence.

Every party shall have the right to call and examine witnesses, to introduce exhibits, and to submit rebuttal evidence. Cross-examination shall not be allowed.

All evidence, including any records, investigation reports, and documents in the possession of the agency of which it desires to avail itself as evidence in making a decision, shall be offered and made a part of the record in the proceeding, and no other factual information or evidence shall be considered. Documentary evidence may be received in evidence in the form of copies or excerpts, or by incorporation by reference.

The commissioner shall make available an official record, which shall include testimony and exhibits, and which may be in narrative form, but need not arrange to transcribe shorthand notes or sound recordings unless requested by a party. If so requested, the commissioner may, unless otherwise provided by any law, require the party to pay the reasonable costs of the transcript before the agency makes the transcript available to the party.

A decision to place a substance on the list pursuant to this subsection, must be based upon the commissioner's finding that according to the preponderance of the evidence, substantial and valid scientific evidence exists that the substance poses an acute or chronic risk to human health or safety. The commissioner's decision shall be in

writing or stated in the record. The decision shall be accompanied by a statement of reasons for the decision, including determination of each issue of fact or law necessary to the decision. Parties to the proceeding shall be notified in person or by mail of the decision, of their right to appeal the decision to the Superior court and the time limits on their right to appeal. A copy of the decision and of the statement of reasons shall be delivered or mailed upon request to each party and to his attorney of record.

Any person aggrieved by the decision of the commissioner may appeal such decision to the Superior court for Suffolk county. The standards for review shall be in accordance with the standards provided in section fourteen of chapter thirty A.

(h) Substances not present on the Massachusetts substance list established pursuant to this section shall not be subject to the provisions of this chapter.

(i) The commissioner of DPH shall be responsible for the dissemination of all information available on the nature and hazards of toxic or hazardous substances, from the chemical substances information networks of the federal environmental protection agency, the health hazard evaluation program of the national institute of occupational safety and health and any and all other information sources. DPH shall promptly assist employers, employees, community residents, municipal coordinators and state personnel with inquiries concerning the toxic or hazardous nature of such substances. DPH shall assist DLI in its responsibilities with respect to preparing or obtaining MSDS information pursuant to section nine (b).

Section 5. The preparer of an MSDS may omit from the MSDS the chemical name, common name, or CAS number if the release of said information which would disclose a trade secret as defined by this chapter. The preparer shall provide all other information on the properties and effects of the hazardous substance required for the MSDS and shall indicate which category of information is being withheld on trade secret grounds. An employer may withhold from a label of a container as required by section seven the chemical name of a substance if said name is a trade secret as defined in section one.

(a) In order to make a trade secret claim pursuant to this section, a manufacturer or other preparer of an MSDS must submit to the commissioner of DPH a duplicate of the MSDS which excludes the information claimed as a trade secret, and shall also submit a complete justification and statement of the grounds on which the information is claimed to be a trade secret, at the same time he provides the MSDS to DEP pursuant to section sixteen. Provided that said complete justification and statement of the grounds shall not be required to include the information claimed to be a trade secret. (Amended by 1990, 177, Sec. 193 eff. 8-7-90.)

(b) If the commissioner of DPH has cause to believe that the data withheld is not a trade secret and that good cause exists for requiring the withheld information, he or she

shall notify the preparer of the MSDS by certified mail.

(c) The commissioner of DPH shall determine whether such withheld information is protected as a trade secret within fifteen days after receipt of the duplicate MSDS, justification and statement, and shall notify by certified mail the preparer of the MSDS and any party who has requested the withheld information of that determination. If the commissioner of DPH determines that the withheld information is not protected as a trade secret, the final notice shall also specify a date, not sooner than fifteen days after the date of mailing of the final notice, when the withheld information shall be made available to the commissioner of DEP. (Amended by 1990, 177, Sec. 193 eff. 8-7-90.)

If the commissioner of DPH determines that the withheld information is a trade secret, he or she shall notify by certified mail the preparer of the MSDS and any party who has requested the withheld information, and immediately return to the preparer of the MSDS all information and documents submitted concerning the validity of the trade secret claim.

(d) Prior to the date specified in the final notice the preparer of the MSDS may appeal all adverse determinations in the Superior court for the county in which the employer's workplace is located or in Suffolk county. The order of the commissioner shall be reviewed in accordance with the standards for review provided in section fourteen of chapter thirty A. Filing a timely appeal under this section shall act as an automatic stay of the preparer's obligation to supply the withheld information.

(e) Any information reported to or otherwise obtained by the commissioner of DEP or any of his representatives or employees, which is exempt or protected from disclosure under any provisions of this chapter, may be disclosed to an officer or employee of the United States, in connection with the official duties of such officer or employee under any law for the protection of health. (Amended by 1990, 177, Sec. 193 eff. 8-7-90.)

(f) Information certified to by appropriate officials of the United States, as necessarily kept secret for national defense purposes, shall be accorded the full protections against disclosure as specified by such official or in accordance with the laws of the United States.

Section 6. A research laboratory, as defined in section one, shall be exempt from the provisions of this chapter. In order to qualify a work area of a workplace or a workplace as a research laboratory, an employer shall file a sworn statement with the commissioner of DPH which shall include sufficient information pertaining to the workplace or area and the personnel employed therein to enable the commissioner to determine whether the workplace or work area is qualified for the research laboratory exemption, and assurance that the employer has notified the employees of said workplace or work area that this exemption is being claimed.

If the commissioner fails to receive sufficient information to determine whether a workplace or work area qualifies as a research laboratory, or if the commissioner has reason to believe that the workplace or work area does not qualify as a research laboratory, or that the operation of the workplace or work area for which a research laboratory exemption has been claimed poses a threat to the health and safety of employees employed at that workplace or work area, he shall notify the employer in writing and offer the employer an opportunity for a hearing pursuant to chapter thirty A of the General Laws. If the employer fails to substantiate his claim that a workplace or work area is a research laboratory and that said laboratory is being operated in a manner which does not pose a threat to the health and safety of employees employed at that workplace or work area, the commissioner may issue an order revoking the research laboratory exemption in part, or in its entirety for that workplace or work area. The commissioner of DPH may establish by regulation the conditions under which a research laboratory may retain its exemption. An employer may appeal an order of revocation pursuant to the procedures of chapter thirty A.

Section 7. (a) Except as otherwise provided by this section, an employer shall label with the chemical name each container in his or her workplace containing a toxic or hazardous substance. Said label shall also contain the proper NFPA Code applicable to any contents of the container for which an NFPA Code has been published in NFPA 49, Hazardous Chemical Data, but only in those instances where the container contains more than five gallons or thirty pounds of materials to which the NFPA Code is applicable.

(b) The employer is not required to label any container of a toxic or hazardous substance weighing five pounds or less or having a volume of one gallon or less; and is not required to label any container of a toxic or hazardous substance if said substance constitutes less than one per cent of the contents of the container, or two per cent if the toxic or hazardous substance exists as an impurity in a container, subject to the provisions for revised concentration requirements specified in section four (d) of this chapter.

(c) The employer is not required to label any container if the container is currently labeled pursuant to regulations promulgated by the United States Department of Transportation, or pursuant to the Federal Insecticide, Fungicide and Rodenticide Act (61 Stat. 163, 7 U. S. C. Sec. 121 et seq.); the Atomic Energy Act; or the Food, Drug and Cosmetics Act. The commissioner of DPH may by regulation certify containers labeled pursuant to any other federal act as labeled in compliance with this chapter.

(d) The employer is not required to label any container of ten gallons or less in volume into which a toxic or hazardous substance or mixture is transferred by an employee from labeled containers and which is intended only for the immediate use of the employee who performed the transfer.

(e) In cases where a pipe or piping system, a fixed storage tank, or a reaction vessel is used, on a regular basis, for different toxic or hazardous substances at different times, an employer may choose to convey the information required by this section by posting signs, placards, or operating instructions, rather than affixing labels. Provided that for any pipe or piping system, the information required by this section shall be provided at points where direct employee exposure to the toxic or hazardous substances contained in said pipe or piping system is likely to occur under normal operating conditions.

(f) The employer may elect to withhold from any label otherwise required by this section the names of chemicals which qualify as trade secrets pursuant to section five. In the event such an election is made, the employer must instead place on the label a reference to the MSDS prepared for such substance and must otherwise comply with the labeling provisions of this section. When a substance has been designated a carcinogen, mutagen, teratogen, or neurotoxin pursuant to section four (c) of this chapter, and the name of said substance is withheld from the label as a trade secret pursuant to this subsection, the label shall display the letter "C", "M", "T", or "N", indicating the substance is, respectively, a carcinogen, mutagen, teratogen, or neurotoxin.

Section 8. The manufacturer of any toxic or hazardous substance shall prepare and provide direct purchasers of said toxic or hazardous substances with an MSDS which, to the best of the manufacturer's knowledge, is current, accurate, and complete, based on information then reasonably available to the manufacturer.

Any person other than a manufacturer who sells a mixture of toxic hazardous substance as defined in this chapter shall provide its direct purchasers of the mixture at the time of sale with a copy of the most recent MSDS or equivalent information.

Any person who produces a mixture may, for the purposes of this section, prepare and use a mixture MSDS, subject to the provisions of section ten.

A manufacturer who is responsible for preparing and transmitting an MSDS under the provisions of this section shall revise said MSDS, on a timely basis, as appropriate to the importance of any new information which would affect the contents of the existing MSDS, and in any event within one year of such information becoming available to the manufacturer.

Any employer who receives, compiles, or prepares new information which would serve to update the MSDS for any toxic or hazardous substance present in his workplace, and who has filed a copy of said MSDS with DEP and the municipal coordinator pursuant to section sixteen of this chapter, shall file an updated MSDS containing said new information on a semi-annual basis, and shall concurrently update his own copy of said MSDS. (Amended by 1990, 177, Sec. 194 eff. 8-7-90.)

Section 9. (a) Any person subject to the provisions of section eight shall be relieved of the obligation to provide a specific purchaser of a toxic or hazardous substance with a MSDS if he has a record of having provided the specific purchaser with the most recent version of the MSDS; or if the substance is labeled pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act; the Atomic Energy Act; the Food, Drug and Cosmetics Act; or if the article is one sold at retail and is incidentally sold to an employer or the employer's employees, in the same form, approximate amount, concentration, and manner as it is sold to consumers, and, to the seller's knowledge, employee exposure to the article is not significantly greater than the consumer exposure occurring during the principal consumer use of the article.

(b) If an employer is not supplied with an MSDS by a manufacturer or an intermediate seller for a toxic or hazardous substance pursuant to the mandates of section eight, said employer shall within a reasonable amount of time after discovering that an MSDS has not been supplied use diligent efforts to obtain said MSDS from the manufacturer or intermediate sellers. For purposes of this paragraph, "diligent efforts" shall mean a prompt inquiry by the employer to the manufacturer or intermediate seller of the toxic or hazardous substance requesting the MSDS with a copy of the request and any written response from the manufacturer or intermediate seller to be filed with the commissioners of DPH and DLI.

Provided, however, that for an independent contractor, or the commonwealth or any of its political subdivisions acting as an employer, "diligent efforts" shall mean a prompt inquiry to the workplace employer, rather than the manufacturer or intermediate seller, in cases where the relevant workplace is not wholly owned or controlled by the employing independent contractor, the commonwealth, or said political subdivisions.

If after having used diligent efforts an employer still fails to obtain an MSDS, he shall request the commissioner of DLI to obtain said MSDS on his or her behalf. The commissioner of DLI shall, in such cases, obtain any available assistance from the commissioner of DPH or DEP in locating or compiling an up-to-date MSDS for the toxic or hazardous substance. (Amended by 1990, 177, Sec. 195 eff. 8-7-90.)

Section 10. A manufacturer or employer may provide the information required by section eight of this chapter on an entire mixture, instead of on each toxic or hazardous substance in it, when all of the following conditions exist:

(a) Hazard test information exists on the mixture itself, or adequate information exists to form a valid judgment of the hazardous properties of the mixture itself and the MSDS indicates that the information presented and the conclusions drawn are from some source other than direct test data on the mixture itself, and that an MSDS on each constituent hazardous substance identified on the MSDS is available upon request.

(b) Provision of information on the mixture will be as effective in protecting employee health as information on the ingredients.

(c) The toxic or hazardous substances in the mixture are identified on the MSDS unless it is either unfeasible to describe all the ingredients in the mixture or the identity of the ingredients is itself a valid trade secret; provided, that in either case the reason why the hazardous substances in the mixture are not identified shall be stated on the MSDS.

A single mixture MSDS may be provided for more than one formulation of a product mixture if the information provided pursuant to section fourteen does not vary for the formulation.

An employer who has used diligent efforts as defined herein and who has made a documented request to the commissioner of DLI pursuant to this section shall not be found in violation of sections eleven, fourteen or sixteen of this chapter with respect to the MSDS which was not supplied by the manufacturer or intermediate seller as required by section eight of this chapter.

Nothing contained in this chapter shall be construed to require an employer to conduct studies to develop new information.

Section 11. (a) Every employer who manufactures, processes, uses or stores toxic or hazardous substances in the workplace shall provide a MSDS for each product which is present in said workplace. All MSDS's shall be available at a central location in the workplace.

(b) A completed federal OSHA Form 20 material safety data sheet shall constitute prima facie evidence of compliance with the requirements of this chapter relative to material safety data sheets, provided that said form includes a description of the acute and chronic health risks associated with exposure to the substance described.

(c) Any employee or his designated representative, may request in writing and shall have the right to examine and obtain the MSDS's for the toxic or hazardous substances to which he is, has been or may be exposed. The employer shall provide the MSDS within four working days, subject to the provisions of section nine (b). The employer may adopt reasonable procedures for acting upon such requests to avoid interruption of normal work operations.

(d) If an employee who has requested an MSDS pursuant to this section has not received said MSDS within four working days subject to the provisions of section nine (b), that employee may refuse to work with the substance for which he has requested the MSDS, until said MSDS is provided. Provided, however, that nothing contained herein shall be construed to permit any employee of the commonwealth or any of its

political subdivisions to refuse to perform essential services.

(e) Every employer who manufactures, processes, uses or stores toxic or hazardous substances in the workplace shall post a notice in a central location in the workplace informing employees of their rights under this section.

(f) For the purposes of this section and section fourteen, an independent contractor, or the commonwealth or any of its political subdivisions shall maintain MSDS's for their own workplaces only, as defined in section one; provided, however, that employees of such employers, insofar as they are exposed in the course of their employment to toxic or hazardous substances in other workplaces, shall have the right to examine MSDS's for those substances to which they are exposed from the workplace employer through a written request to their own employer.

Section 12. An employer or the preparer of an MSDS shall provide said MSDS, including information withheld as a trade secret, immediately on a confidential basis to an employee's treating physician who states in writing that in his professional judgment said employee's medical condition may be the result of occupational exposure to a toxic or hazardous substance present in the employee's workplace; provided, however, that such treating physician shall be required to sign concurrently, or in the case of geographical separation within twenty-four hours a confidentiality agreement, the form of which shall be promulgated by the commissioner of DPH. This agreement shall restrict the use of information to health purposes, prohibit disclosure of the information to anyone other than the treating physician and necessary medical personnel, and may provide for compensation or other legally appropriate relief for any competitive harm which may result from a breach of the agreement.

Section 13. No person shall discharge or cause to be discharged or otherwise discipline or in any manner discriminate against any employee for the reason that such person has exercised any right, made any claim or filed any complaint or suit or has instituted, or caused to be instituted, any proceeding under this chapter, or has testified, or is about to testify in any proceeding in his own behalf or on behalf of others; nor shall any pay, seniority or other benefits be lost by or denied to any such employee who has exercised any right provided by this chapter.

An employee who believes that he has been discharged, disciplined or in any other manner discriminated against by his employer for reason or reasons of exercising rights under this chapter may, within one hundred and eighty days of such violation or within one hundred and eighty days after obtaining knowledge that a violation did occur, file a verified complaint with the commissioner of DOL. A copy of the verified complaint shall also be sent by certified mail, return receipt requested, by the employee or his attorney to the employer at the time of filing with the commissioner of DOL. The employer, if he so chooses, may file with the commissioner of DOL an answer to the verified complaint, but must do so within twenty days of the receipt of the verified



complaint from the employee or his attorney.

Upon receipt of a verified complaint and an answer, if one is so filed within the time period set forth in this section, the commissioner of DOL shall undertake an investigation of the alleged violation. If after a preliminary investigation, the commissioner determines that there is insufficient cause to believe a violation occurred, he shall so notify the complainant and employer within ten days of such determination. The employee or his attorney may, within ten days of such notice, request in writing with a copy to the employer an adjudicatory hearing pursuant to the provisions of chapter thirty A of the General Laws.

If after a preliminary investigation, the commissioner of DOL determines that there is cause to believe a violation occurred, he or she shall so notify the complainant and employer within ten days, and shall conduct an adjudicatory hearing pursuant to chapter thirty A of the General Laws. If after such a hearing, the commissioner determines that the employer did violate the provisions of this chapter, he may take such remedial action as is appropriate, including the issuance of a cease or desist order or the ordering of any other affirmative steps to correct the violation and prevent its recurrence.

Any time an employee exercises the rights specified in subsection (d) of section eleven of this chapter, and files a complaint pursuant to this section and section three of this chapter, the commissioner of DOL shall hold an adjudicatory hearing to resolve said complaint within ten days.

Any person aggrieved by the determination of the commissioner may appeal such determination in the Superior court for the county in which the employer's workplace is located. Such determination shall be reviewed in accordance with the standards for review provided in section fourteen of chapter thirty A.

Section 14. Employers subject to the provisions of this chapter shall be required to maintain as records for a period of thirty years only the MSDS's required by section eleven. Such records shall be made available within a reasonable period of time to each former employee, or his designated representative for examination and copying.

Section 15. Employers shall furnish employees with instruction on the nature and effects of those hazardous substances present in the workplace either in written form or in training programs as may be appropriate. Such instruction shall be in nontechnical language but may be generic to the extent appropriate and related to the job. Such instruction shall include the chemical name and any common names, unless withheld from an MSDS as a trade secret, of the toxic or hazardous substance to which an employee may be exposed under normal operating conditions, the location of the substance in the workplace, appropriate first aid treatment and antidotes in the event of improper exposure or overexposure, the proper and safe handling of said substance,

the health effects of said substance as described in the relevant MSDS, and the rights and duties of employees as set forth in this chapter. Employers shall provide their current employees with instruction as described herein within ninety days of the effective date of this chapter and annually thereafter, and for employees hired thereafter, within the first month of employment, and annually thereafter.

Section 16. Every employer subject to the provisions of this chapter shall file with the regional office of DEP for the region in which the workplace of the employer is located, and upon request with the municipal coordinator for the city or town in which the workplace of the employer is located, a copy of an MSDS for each toxic or hazardous substance listed on the Massachusetts substance list and present in the employer's workplace. The municipal coordinator shall retain said MSDS's for at least five years and the regional office of DEP shall retain said MSDS's for forty years. (Amended by 1990, 177, Sec. 196 eff. 8-7-90.)

Section 17. The commissioner of DEP shall make a copy of an MSDS available to DOL or DPH upon request, and may make a copy of an MSDS available to any other agency of the commonwealth, but only upon written request including a justification by the requesting agency that the information contained in the MSDS is essential to the performance of a duty to protect the public health and safety imposed by statute or regulation. Provided, however, that when such action is taken by the commissioner of DEP upon such request, he shall notify the employer or employers who provided the MSDS. And provided, further, that in the event of an imminent threat to public health or safety, the commissioner of DEP shall waive the requirement for written request and justification.

Section 18. (a) A community resident in a city or town in which an employer subject to the provisions of this chapter is located, who has reason to believe that the utilization of a toxic or hazardous substance in the workplace by the employer is or may be endangering public health or safety, may file a petition with the municipal coordinator requesting an investigation. The petition shall state the grounds upon which the resident bases his belief that a toxic or hazardous substance is or may be endangering the public health and safety and shall inform the municipal coordinator of any information or data of which the resident has knowledge and which would assist the municipal coordinator in an investigation.

(b) The municipal coordinator shall within fifteen days review the petition and information submitted by the community resident to determine whether an investigation is warranted, and he may within ten additional days conduct an investigation of the charges contained in the petition pursuant to the authority provided by existing statutes, ordinances, or by-laws. The municipal coordinator shall notify the employer by certified mail, return receipt requested, of the filing of a petition within five days of said filing with the municipal coordinator and shall afford the employer an opportunity to comment on the petition and submit information or data which the employer deems pertinent to the

petition.

(c) If upon review of the information and data submitted by the community resident and the employer, the information available under this chapter and the data obtained in the municipal coordinator's investigation, should he have determined to conduct one pursuant to the provisions of this section, the municipal coordinator determines that action is required to protect the public health and safety, he shall promptly notify the commissioner of DEP of his findings and may take such action or request the commissioner to take such actions as are authorized by statute, ordinance or by-law to protect the public health and safety. If the commissioner is requested to take action by the municipal coordinator pursuant to this section, he may take such actions as are necessary to protect the public health and safety. The commissioner shall also, where appropriate, provide relevant MSDS's to the petitioning resident provided, however, that the commissioner of DEP determines that said request is not frivolous or intended to harass the employer. The commissioner's decision on release of the MSDS to the petitioning community resident shall be made within fifteen working days. Simultaneously, the municipal coordinator shall notify the community resident of the determination and shall provide the resident with a summary of the information contained in the petition, the response of the employer, the reasons for the determination, and a statement of the specific actions proposed by local or state officials to alleviate the danger to the public health or safety.

(d) If upon review of the information and data submitted by the community resident and the employer, and the information available through this chapter and the data obtained in the municipal coordinator's investigation, should he have determined to conduct one pursuant to the provisions of this section, the municipal coordinator determines that no action is required in order to protect the public health and safety, he shall promptly forward to the commissioner of DEP for review, a report of the investigation including a summary of the information or data obtained by the municipal coordinator and the basis for the conclusion that no further action is required in response to the petition. Simultaneously, the municipal coordinator shall notify the community resident of his determination and shall provide the resident with a summary of the information contained or supplied with the petition, the response of the employer, and the reasons for the determination.

(e) If upon review of a petition of a community resident, the municipal coordinator determines that no investigation is necessary, he shall promptly notify the commissioner of DEP of his decision and the reason for the determination. Simultaneously, the municipal coordinator shall notify the petitioning community resident that no investigation will be made and the reasons for this determination.

(f) Any petitioning community resident who believes that the response of the municipal coordinator to the petition does not adequately address the matters contained therein may request in writing within fifteen days of such response that the commissioner

of DEP review said response and take such action as the commissioner deems appropriate. The commissioner shall also, where appropriate, provide the relevant MSDS's to the petitioning resident, provided, however, that the commissioner of DEP determines that said request is not frivolous or intended to harass the employer.

The commissioner shall review the request of the petitioning resident and make a determination thereon within fifteen days of its filing. The commissioner shall promptly notify the employer of the petitioning community resident's request within five days of its filing, and shall notify said employer of any release of an MSDS at the time of said release.

(g) A community resident or employer aggrieved by an action of the municipal coordinator or the commissioner of DEP may appeal such determinations in the Superior court for the county in which the resident resides or in which the employer's workplace is located. The determinations shall be reviewed in accordance with the standards for review provided in section fourteen of chapter thirty A. (Amended by 1990, 177, Sec. 198 eff. 8-7-90.)

(h) Except as provided in section nineteen, any municipal official other than the municipal coordinator shall be deemed a community resident and shall have those rights and obligations provided to community residents herein.

(i) Nothing contained herein shall be construed to confer additional or reduce current powers of local public officials under existing laws, ordinances, or by-laws.

Section 19. A municipal coordinator who has obtained an MSDS from an employer pursuant to section sixteen may make available to another municipal official for the city or town in which the workplace of the employer is located, a copy of an MSDS, if he determines that an imminent threat to public health or safety exists for which immediate access to information contained in the MSDS is critical to that other municipal official's performance of a duty imposed by statute, regulation, ordinance, or by-law. The municipal coordinator shall so inform the employer of the release of the MSDS to another municipal official.

Section 20. (a) A preparer shall provide an MSDS without trade secret information immediately on a confidential basis to a community resident's treating physician who states in writing that said resident's medical condition may be the result of exposure to a toxic or hazardous substance present in the said employer's workplace; provided, however that such treating physician shall be required to sign concurrently a confidentiality agreement, the form of which shall be established by the commissioner of DPH. This agreement shall restrict the use of information to health purposes, prohibit disclosure of information to anyone other than the treating physician and necessary medical personnel, and may provide for compensation or other legally appropriate relief for any competitive harm which may result from a breach of the agreement.

(b) A preparer shall provide the information withheld from an MSDS as a trade secret immediately on a confidential basis to a community resident's treating physician who states in writing that a medical emergency as defined in section one exists with respect to the resident; provided, however, that such treating physician shall be required to sign concurrently, or in the case of geographical separation, within twenty-four hours a confidentiality agreement, the form of which shall be established by the commissioner of DPH. This agreement shall restrict the use of information to health purposes, prohibit disclosure of the information to anyone other than the treating physician and necessary medical personnel, and may provide for compensation or other legally appropriate relief for any competitive harm which may result from a breach of this agreement.

Section 21. (a) Any information provided to state or local agencies or instrumentalities by manufacturers and employers pursuant to the provisions of this chapter, and any information provided to their public agencies or coordinator pursuant to this chapter shall not be a public record for the purposes of chapter sixty-six of the General Laws.

(b) Any person who has obtained possession of or has access to information pursuant to the provisions of this chapter shall not disclose said information to any person not specifically authorized to receive it hereunder. Violation of this provision shall be punishable by a fine of not more than five thousand dollars or imprisonment for not more than one year, or both. Provided, however, that disclosure by an employee to his or her spouse, or to a fellow employee exposed to the same toxic or hazardous substance as is involved in the disclosure, shall not constitute a violation of this chapter.