

HARVARD UNIVERSITY

Chemical Hygiene Plan



Part I. General Administration

Environmental Health and Safety

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General Administration

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Executive Summary

Chemical Hygiene Plan The Harvard University Chemical Hygiene Plan addresses the general hazards of common chemicals that may be present in your laboratory, and describes work practices, procedures and controls which are in place to protect you from those hazards. It is your responsibility to participate in laboratory safety training and to plan and conduct each operation or experiment in accordance with the general safety procedures, or those safety procedures specific to your laboratory or experiment. You should consult with your supervisor, chemical hygiene officer or principal investigator regarding specific safety practices to be used in your laboratory.

OSHA Lab Standard The Occupational Safety and Health Administration (OSHA) Lab Standard (29 CFR 1910.1450) is designed to enhance the safety of laboratory personnel through better information and work practices. As laboratory personnel, you already know that your technical skills are critical to your work. Knowing the hazards of the substances you work with and safe work practices is just as important. The key requirements of the Lab Standard that you should be aware of are as follows:

- You must have access to the Chemical Hygiene Plan.
- Material Safety Data Sheets (MSDS) must be available to you.
- You must be informed of the hazardous chemicals present in your laboratory and the operations in which they are involved.
- You must receive adequate training in working with hazardous chemicals.
- Chemical containers and chemical waste must be labeled properly.
- You must know how to detect the presence or release of a hazardous chemical.
- You must be provided with personal protective equipment (safety glasses, gloves, lab coat, for example).
- You must be provided with engineering controls (fume hood, for example).
- You must receive training in the proper procedures for responding to emergencies.
- You are entitled to a medical consultation, whenever there is an event, such as a spill or leak that increases your risk of chemical exposure.
- If there is reason to believe that the airborne concentration of a hazardous chemical may exceed established exposure limits, air monitoring may be required.
- You must be notified of the results of any air monitoring conducted.
- You are entitled to a copy of established exposure limits for hazardous chemicals.
- You are entitled to a complete copy of the OSHA Lab Standard.

1.0 FORWARD

Harvard University encourages and supports all programs, which promote safety, good health and well-being of University faculty, staff, students and visitors. The University is committed to providing a safe and healthful environment for all members of the Harvard community and to reducing injuries and illness to the lowest possible level. To assist academic institutions and businesses in enhancing the safety of laboratory personnel, the Occupational Safety and Health Administration (OSHA) published standard 29 CFR 1910.1450, "Occupational Exposure to Hazardous Chemicals in Laboratories". A copy of the standard and its appendices may be obtained by visiting the OSHA web site at www.osha.gov/SLTC/laboratories/standards.html. This regulation, known as the "Lab Standard", is designed to protect laboratory personnel from potential hazards associated with the use of laboratory chemicals. The key elements of the OSHA Lab Standard include the development and implementation of the following:

- Chemical Hygiene Plan (CHP)
- Employee Training and Information
- Hazard Identification
- Material Safety Data Sheet (MSDS) Use and Management
- Container Labeling
- Exposure Monitoring
- Medical Examinations and Consultation
- Methods of Exposure Control
- Personal Protective Equipment
- Laboratory Safety Equipment
- Chemical Waste Management
- Safeguards for Particularly Hazardous Substances
- Emergency Procedures
- Recordkeeping

The standard's intent is to ensure that laboratory personnel are apprised of the hazards of the chemicals in their work area, and that appropriate work practices and procedures are in place to protect laboratory personnel from chemical health and safety hazards. This Chemical Hygiene Plan has been prepared to provide guidance in safe laboratory operations for Harvard University laboratory personnel.

2.0 INTRODUCTION

2.1 Scope and Applicability

The policies and procedures set forth in this Chemical Hygiene Plan are applicable to all laboratory operations and personnel.

Laboratory operations are defined as handling or manipulation of hazardous chemicals in reactions, transfers, etc. in small quantities on a non-production basis.

Hazardous chemicals are defined as any elements, compounds or mixture of elements and/or compounds which have physical or health hazards associated with them.

Laboratory personnel include faculty, staff, research associates and assistants, technicians, teaching assistants, post-doctoral fellows, graduate and undergraduate students.

2.2 Purpose

This Chemical Hygiene Plan is designed to identify the safety practices that should be implemented when working with common hazardous chemicals found in the laboratory. These safeguards will protect laboratory personnel from unsafe conditions in most situations.

There are instances, however, when the physical and chemical properties, the proposed use, the quantity used or the toxicity of a substance will be such that these controls may need to be modified. Professional judgment is essential in the interpretation and application of these procedures, and laboratories may modify or enhance these procedures to meet their specific uses and operational needs.

The Harvard University Laboratory Safety Program is based on the premise that every member of the research community shares the responsibility for safety. As part of the community, it is important for laboratory personnel to be familiar with the health and safety guidelines that apply to their work and to conduct that work in the safest possible manner. The Chemical Hygiene Plan is a resource to assist laboratory personnel in fulfilling these responsibilities.

2.3 Availability of Documents

This document identifies the ways in which Harvard University is complying with each portion of the OSHA Lab Standard. An official copy of the Harvard University Chemical Hygiene Plan is available at the EH&S web site at: www.uos.harvard.edu/ehs/ih/lp_chemical_safety_chp.shtml. For laboratory-specific procedures (e.g., Chemical Hygiene Plan Part III documents), contact the Chemical Hygiene Officer or Principal Investigator (PI) for that laboratory.

The Department of Environmental, Health and Safety is located at:

Cambridge/Allston Campus
46 Blackstone South
Cambridge, MA 02139
(617) 495-2060

Longwood Campus
HIM Building Room B-84
4 Blackfan Street
Boston, MA 02115
(617) 432-1720

A summary of the key requirements of the standard is available at www.osha.gov/SLTC/laboratories/standards.html

2.4 Plan Organization

Part I contains information regarding the general administrative components of the Chemical Hygiene Plan. This section outlines the purpose, scope and applicability of the plan. In addition, responsibilities, authority and resources are also defined. Training, medical surveillance, exposure monitoring, hazard identification, recordkeeping, plan evaluation and review and resources are detailed in this section.

Part II contains recommended general precautions for working with laboratory chemicals. These precautions address broad classes of chemicals and include information and guidance in the following areas:

- Common hazards
- General safe work practices
- Chemical storage
- Personal protective equipment
- Other safety equipment and engineering controls
- Work practices for particularly hazardous substances
- Chemical waste management
- Emergency procedures

Part III contains policies, procedures or precautions that are required by a specific campus, department or laboratory. This section is provided to enable individual laboratories to customize this Chemical Hygiene Plan for their operations. A Specific Safety Procedure (SSP) Template is contained in this section to provide assistance to laboratory personnel generating specific safety procedures.

2.5 General Principles

To provide for the safety of the Harvard community and to protect Harvard University and surrounding property from damage, the following general principles apply to all faculty, staff and students performing work in laboratories:

1. **Perform Hazard Assessment:** Prior to initiation of new experiments or procedures, assessment of potential hazards must be performed. Appropriate protective measures, including personal protective equipment and engineering controls, must be identified and implemented. Laboratories should develop process- or experiment-specific guidelines and protective procedures.
2. **Minimize Chemical Exposures:** Since few laboratory chemicals are without hazards, general precautions for chemical handling, storage and disposal should be implemented in all laboratories. Use of less hazardous materials, implementation of engineering controls whenever feasible, and use of personal protective equipment to avoid skin contact with or inhalation of chemicals is encouraged.
3. **Avoid Underestimation of Risk:** Even for substances with no known significant hazard, exposure should be minimized. For work with particularly hazardous substances, special precautions must be taken (such as those contained in Part II and/or Part III). All substances of unknown toxicity should be considered toxic.
4. **Provide Adequate Ventilation:** The best way to prevent exposure to airborne substances is to prevent their escape into the working atmosphere by using chemical fume hoods or other ventilation devices.
5. **Observe Established Standards:** The permissible exposure limits and threshold limit values established by OSHA and other organizations should be observed. Where a regulatory standard does not exist, other recognized exposure limits should be followed.
6. **Follow the Chemical Hygiene Plan:** Procedures described in this Chemical Hygiene Plan are designed to minimize or prevent exposure to hazardous chemicals. Implementation of the CHP should be a regular, continuing effort.

3.0 ROLES AND RESPONSIBILITIES

3.1 Environmental and Safety Compliance Officers (ESCOs)

Under the authority delegated by the Deans and Senior University Administration, the ESCO for each school or administrative unit is responsible for promoting and maintaining a safe, healthful and environmentally responsible workplace. Specific responsibilities include:

- Ensuring the adequacy of technical and financial resources to conduct compliance programs in accordance with Harvard standards and regulatory requirements.
- Identifying personnel affected by specific compliance requirements.
- Communicating compliance program requirements to administration and faculty.
- Securing faculty and administration input for the development and implementation of compliance management programs.
- Communicating, periodically, compliance program status to the Harvard community, including program results, effectiveness and agendas.

3.2 Departments

Each department is responsible for supporting and promoting safe and compliant work practices in the laboratory. Department faculty and administration are responsible for facilitating the implementation of the Chemical Hygiene Plan within each department.

Department Chairs have overall responsibility for ensuring that all work performed within their departments complies with applicable health, safety and environmental requirements. The department chairs may implement this responsibility through delegation to principal investigators, other faculty, department administration or other departmental staff deemed appropriate.

The Department Faculty is responsible for:

- Collaborating with the administration, Environmental Health and Safety (EH&S) and others to identify effective means to implement the Chemical Hygiene Plan in the laboratory.
- Providing feedback to administration regarding compliance status.
- Ensuring that personnel receive required training, to implement the Chemical Hygiene Plan effectively.
- Coordinating and facilitating exchange of information regarding chemical hygiene issues with the research and teaching community.

Department Administration/Laboratory Directors are responsible for:

- Facilitating compliance with the Chemical Hygiene Plan requirements.
- Ensuring the appointment of a Chemical Hygiene Officer.
- Ensuring that compliance responsibilities are assigned and implemented for all areas and operations in the Department. These responsibilities include training, recordkeeping, reporting, program evaluation and plan revision.

Research Operations Managers (ROMs) at the Longwood Campus are responsible for:

- Communicating EH&S programs to the laboratories, Principal Investigators, and their appointed Safety Coordinators.
- Serving as the primary liaison between the EH&S Department and their basic science department.
- Monitoring compliance and safety issues within their department.

3.3 Principal Investigators (PIs)

Each Principal Investigator plays a critical role in the implementation of the Chemical Hygiene Plan. The PI has primary responsibility for chemical hygiene and EH&S compliance in his or her laboratory. These responsibilities include ensuring that:

- Laboratory personnel have adequate knowledge and information to recognize and control chemical hazards in the laboratory.
- Hazardous operations are defined and safe practices and protective equipment are designated and provided.
- Safe work practices, personal protective equipment and engineering controls are used to reduce the potential for exposure to hazardous chemicals.
- Laboratory personnel are informed of the potential hazards of the chemicals they use and are trained in safe laboratory practices, controls and emergency procedures.
- Laboratory personnel are informed of the signs and symptoms associated with exposures to hazardous chemicals used in their laboratory.
- Chemical waste is managed properly.
- Action is taken to correct work practices and conditions that may result in the release of hazardous chemicals.
- He or she grants approval, where required, prior to the use of particularly hazardous substances in the laboratory.
- Laboratory operations are supervised to ensure that the Chemical Hygiene Plan is being followed.
- Compliance with the CHP is maintained and documented.

3.4 Chemical Hygiene Officers (CHOs)

The Chemical Hygiene Officer (CHO) (e.g., Lab Supervisor, Safety Coordinator) is critical to the effective implementation of the Chemical Hygiene Plan. The CHO, working with the principal investigator is responsible for the adaptation and implementation of the Chemical Hygiene Plan in his or her laboratory, thus maintaining a safe work environment and ensuring compliance with regulatory requirements. The duties of the CHO include ensuring that:

- Appropriate training is provided to new and current laboratory personnel and is properly documented.
- Workers know and follow established safe work procedures and emergency procedures.
- Safety equipment and engineering controls are utilized.
- Appropriate personal protective equipment is utilized.
- Laboratory practices and safety and control equipment inspections are routinely conducted and properly documented.
- Copies of the up-to-date Chemical Hygiene Plan and chemical hazard reference material (e.g., MSDSs) are available to laboratory personnel.

- Procedures developed for new or particularly hazardous substances or operations are coordinated with input from the Chemical Hygiene Officer and the Environmental Health and Safety Department.
- Accidents and other potential exposure conditions are reported to the Chemical Hygiene Officer and the Environmental Health and Safety Department for further investigation, exposure monitoring or input regarding appropriate corrective action.
- Recommended actions are taken to correct any unsafe condition.

3.5 Laboratory Personnel

Laboratory personnel are responsible for:

- Participating in laboratory safety training sessions.
- Being aware of the hazards of the chemicals they are working around or with, and safe storage, handling and disposal procedures.
- Planning and conducting each operation or experiment in accordance with established chemical hygiene procedures.
- Using appropriate safe work practices, personal protective equipment and engineering controls at all times.
- Reporting unsafe conditions to their supervisor or Chemical Hygiene Officer.

Laboratory personnel and principal investigators share responsibility for chemical safety in their laboratory, as well as informing visitors entering their laboratory of the potential hazards and safety precautions to be taken.

3.6 Environmental, Health and Safety Department (EH&S)

The primary responsibility of the Environmental, Health and Safety Department is to provide technical support and guidance to laboratory personnel for the development and management of environmental, health and safety programs. EH&S is responsible for reviewing and updating the common (non-lab specific) portions of this Chemical Hygiene Plan on an annual basis and distributing any required changes to appropriate University personnel. The EH&S Department offers the following services relating to chemical hygiene:

- Development and evaluation of safety procedures.
- Laboratory inspection and audits.
- Fume hood evaluation and inspection.
- Training and information dissemination.
- Hazardous waste disposal.
- Hazard and exposure assessments.
- Accident investigation.
- Emergency assistance.

An overview of EH&S and its services may be obtained by visiting the EH&S web site at: www.uos.harvard.edu/ehs.

4.0 INFORMATION AND TRAINING

Harvard University will provide laboratory personnel with information and training to ensure that they are apprised of the hazards of the chemicals present in their work area. The purpose of information and training is to ensure that all individuals at risk are adequately informed about the

work being performed in the laboratory, associated hazards and actions to be taken to protect themselves during normal operations, as well as emergencies.

4.1 General Requirements

Information that must be provided or made available to laboratory personnel includes:

- How to obtain copies of the [OSHA Lab Standard](#) and [Appendix A](#) and [Appendix B](#).
- The location and availability of the [Chemical Hygiene Plan](#).
- How to obtain Permissible Exposure Limits (PELs) at www.osha.gov/SLTC/pel/index.html for OSHA-regulated substances and the AGCIH Threshold Limit Values (TLVs) (e.g., by [contacting EH&S](#)) for hazardous substances not given OSHA PELs.
- Resources and reference sources for signs and symptoms associated with exposure to hazardous substances used in the laboratory (see Section 5.0 below for a general overview).
- The location and availability of known reference materials on hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory (see Section 4.2 below).

Training includes coverage of the following topics:

- Methods and observations that may be used to detect the presence or release of a hazardous chemical.
- Determining physical and health hazards of chemicals in the work area.
- Measures laboratory personnel can take to protect themselves from these hazards.
- Specific procedures to provide protection, including engineering controls, work practices and personal protective equipment.
- Emergency procedures.
- Explanation of Material Safety Data Sheets and container labeling.
- How to obtain and use chemical hazard information.
- Review of the components and implementation of the Chemical Hygiene Plan.

The Harvard University safety training program for laboratory personnel consists of two parts:

General Laboratory Safety Training that is offered by EH&S and addresses general laboratory safety practices.

Specific Laboratory Safety Training that addresses specific chemicals, experiments or procedures provided by the principal investigator and/or the laboratory supervisor/chemical hygiene officer.

To assist laboratories in development and documentation of specific safety procedures and training, a template is provided in Part III of this Chemical Hygiene Plan.

Safety information and training must be provided to personnel initially, upon assignment to a laboratory where hazardous chemicals are present, and also prior to assignments involving new hazardous chemicals and/or new laboratory work procedures. The Principal Investigator, during annual review of laboratory-specific safety procedures in Part III, will determine whether refresher information and training is warranted at that time.

Records of training must be maintained for all workers, on a training attendance sheet that includes the course name and outline, trainer's name and affiliation, date, and attendees' names.

General and customized training, as well as individual consultation, is available on a regular schedule and upon request by checking the EH&S web site at:

www.uos.harvard.edu/ehsapps/training/training.jsp

4.2 Chemical Safety Information Sources

The Laboratory Standard requires employers to provide chemical information to all laboratory personnel. Harvard University makes available numerous sources of chemical information for personnel working in laboratory settings.

Laboratory personnel can identify basic chemical hazards by means of the product *labeling* on incoming chemical containers as required by the OSHA's Hazard Communication Standard. Laboratory personnel are instructed to label temporary containers with the chemical name and hazard type. *Laboratory door placards/signs* such as those required by some local fire departments (e.g., Boston) provide a visual indicator of the type and degree of hazards.

More detailed chemical hazard information is provided by means of a number of sources. Several links to on-line source can be found on the EH&S MSDS web page at www.uos.harvard.edu/ehs/msds/. For personnel unfamiliar with MSDSs, there is a quick reference sheet available there that outlines the sections of a standard MSDS. The MSDS web page also allows links to Canadian Center for Occupational Health and Safety, which in addition to manufacturer MSDSs provides *Chemical Information Sheets* for select chemicals. *International Chemical Safety Cards* available at www.cdc.gov/niosh/ipcs/nicstart.html also provide chemical information. Additional sources of information on chemicals and other laboratory hazards are also found on the EH&S Laboratory Safety web page at www.uos.harvard.edu/ehs/ih/lp.shtml.

In addition to online resources, EH&S maintains a library of current materials on various topics pertaining to laboratory health and safety. These materials include published exposure limits and their documentation, select health and safety standards, performance standards and codes from various professional organizations, as well as books on numerous health and safety topics including toxicology, chemical properties and laboratory safety.

The industrial hygiene staff is available to provide technical support regarding the use of hazardous chemicals laboratories. If laboratory personnel have questions regarding chemical safety, they can call EH&S at 5-2060 (Cambridge/Allston) or 2-1720 (Longwood Campus).

5.0 SIGNS AND SYMPTOMS OF CHEMICAL EXPOSURE

The hazards of laboratory chemicals can be ascertained by referring to labels and chemical hazard reference material (e.g., MSDSs and International Chemical Safety Cards). In addition, the ability to recognize the signs and symptoms of chemical exposure is important. Then, if adverse effects do arise despite all precautions taken to avoid exposure, those effects can be recognized early and appropriate action taken.

If chemical exposure has occurred you should:

- Seek prompt medical attention at University Health Services or a local hospital.
- Contact the principal investigator, Chemical Hygiene Officer and/or EH&S.

Some signs and symptoms of chemical exposure include:

- Skin that has become dried, whitened, reddened, swelled, blistered, and itchy or exhibits a rash.
- A chemical odor. Many chemicals can be smelled at concentrations well below harmful levels. On the other hand, a chemical may be present without a detectable odor.
- A chemical taste. Some chemicals have characteristic tastes.
- Tearing or burning of the eyes.
- Burning sensations of the skin, nose or throat.
- Cough.
- Headache or dizziness.

These general symptoms may also be associated with conditions other than chemical exposure. The signs and symptoms of exposure to specific chemicals are contained in the “Health Hazard Information” section of the MSDS and other chemical hazard reference material. Laboratory personnel should be aware of the signs and symptoms of exposure to the chemicals they use.

6.0 MEDICAL EXAMINATION AND CONSULTATION

6.1 Examination/Consultation Determination

Harvard University is required to provide laboratory personnel who work with hazardous chemicals an opportunity to receive medical attention, including physician-determined follow-up examinations, when any of the following conditions are met:

- The worker develops signs or symptoms associated with a hazardous chemical used in the laboratory.
- Exposure monitoring reveals consistent worker exposure greater than the action level (or in the absence of an action level, the applicable OSHA exposure limit) for a chemical.
- Whenever a leak, spill, explosion or other occurrence results in the likelihood of hazardous exposure to the worker.
- When respiratory protective equipment is required.
- When medical surveillance requirements for OSHA regulated-substances must be met.
- At the discretion of the principal investigator, Chemical Hygiene Officer, or EH&S.

6.2 Exposure Information

A licensed physician providing care to a potentially exposed worker must be provided the following information:

- The identity of and MSDS(s) for the hazardous substance(s) to which the worker may have been exposed;
- The conditions that surrounded the exposure; and
- The signs and symptoms of exposure that the worker is experiencing, if any.

6.3 Examination Criteria and Frequency

Medical exam criteria will be determined by the licensed physician performing or directly supervising the exam. Where medical exam guidance exists, such as for OSHA-regulated substances, the Chemical Hygiene Officer will provide the information required by the substance-specific

standard (e.g., 29 CFR 1910.1048(l) for formaldehyde) to the physician to be included in the physician's exam.

Frequency of medical examinations is at the discretion of the physician, if the examination resulted from a potential overexposure to hazardous substances. If the examination resulted from an exposure to an OSHA-regulated substance, examinations will be at least as frequent as the period set in the OSHA standard for each particular substance. Medical evaluations provided for required respirator use will be performed at a frequency determined by the physician.

6.4 Physician's Written Opinion

The physician is required to submit a written opinion to the principal investigator and the Chemical Hygiene Officer. This opinion should not reveal any specific findings or diagnoses unrelated to the chemical exposure. The written opinion must include the following information:

- Results of the medical examination, including any test results;
- Any medical condition, revealed during examination, which may place the worker at increased risk as a result of the chemical exposure or use of personal protective equipment;
- Recommendations for further medical follow-up; and
- A statement that the worker was informed of the medical examination results.

6.5 Cost and Scheduling

All required medical examinations and consultations must be provided to laboratory personnel at no cost, without loss of pay, and at a reasonable time and place.

7.0 EXPOSURE MONITORING

Regular environmental or worker exposure monitoring of airborne contaminants is not usually warranted or practical in laboratories, since chemicals are typically used for a relatively short period of time and in small quantities. However, air monitoring will be conducted if:

- There is reason to believe that exposure levels for a substance routinely exceed either the action level (AL) or permissible exposure level (PEL) set by OSHA.
- Workers suspect or report that they have been overexposed to a chemical in the laboratory.
- A particularly hazardous substance is used on a regular basis (several times per week), for an extended period of time (3-4 hours at a time) or in large quantities. Use of particularly hazardous substances in this manner should be reviewed with the principal investigator and Chemical Hygiene Officer. EH&S is available to provide technical assistance, upon request.

Monitoring will be conducted in accordance with established sample collection and analytical methodology for the chemical exposure being evaluated. If initial monitoring indicates that worker exposure is above the AL or PEL, the periodic monitoring provisions of the relevant OSHA standard will be met.

Upon receipt, results of personal monitoring will be made available to workers, in writing within 15 days, either individually or by posting in an appropriate location accessible to the affected workers.

8.0 RECORDKEEPING

8.1 Records

Harvard University will maintain accurate and complete records concerning the following:

- Medical examination and consultation;
- Exposure monitoring;
- Training;
- Fume hood evaluations; and
- Laboratory inspections.

8.2 Retention and Storage

Medical examination and consultation records, including test results and physician's written opinions, are to be maintained in an appropriate confidential manner by the laboratory's department. These records are to be kept, transferred and made available for at least the duration of the worker's employment plus thirty years. These records shall be maintained in accordance with [29 CFR 1910.1020](#) "Access to Employee Exposure and Medical Records".

Employee exposure records, including sampling results, MSDSs or other chemical-specific information, are to be maintained in the laboratory's department files. These records are to be kept, transferred and made available for at least 30 years. These records shall be maintained in accordance with 29 CFR 1910.1020. Exposure monitoring records generated by EH&S will be also maintained in the EH&S central files.

Training records, are maintained in the laboratory's department files. These records are maintained for a period of 3 years. Records of training conducted by EH&S will be maintained in the EH&S central files.

Fume hood certification records for certifications conducted by department vendors are maintained in the laboratory's department files and updated annually. These records are maintained until the next certification is performed. Records of fume hood evaluations performed by EH&S are maintained in the EH&S central files.

Laboratory inspection records are maintained in the laboratory's department files. These records are maintained until the next inspection is performed. Records of inspections conducted by EH&S will be maintained in the EH&S central files.

9.0 PLAN EVALUATION, REVIEW AND UPDATE

9.1 Plan Evaluation and Inspections

In order to evaluate the implementation status and effectiveness of the Chemical Hygiene Plan, laboratory personnel, laboratory supervisors, Chemical Hygiene Officers, or Environmental Health and Safety will conduct inspections at least every two years to review laboratory safety practices and check safety equipment.

Inspection checklists are available for the various campuses at:

1. Cambridge
 - a. General Lab: www.uos.harvard.edu/ehs/ih/general_lab_audit_form.pdf
 - b. Biosafety: www.uos.harvard.edu/ehs/biosafety/biosafety_audit_form.pdf
2. Longwood
www.uos.harvard.edu/ehs/longwood/HLC_Lab_Safety_Assessment_Checklist.pdf

Use of these inspection checklists is strongly recommended to document the results of these inspections. If an alternative checklist is utilized, a copy should be included in Part III of this document.

EH&S will also perform annual fume hood certifications. These certifications will assess the adequacy of air flow in the hood by determining average face velocity, air flow pattern and direction and extent of turbulence (if any). Details of the fume hood evaluation procedures and documentation are contained in Part II of this document.

9.2 Plan Review and Update

The laboratory Principal Investigator or designee shall review annually and, if necessary, update laboratory-specific safety procedures in Part III when particularly hazardous substances are introduced into or removed from the laboratory or when experimental procedures involving particularly hazardous substances change. Environmental Health and Safety will review annually and, if necessary, update this Chemical Hygiene Plan. Changes to the plan will be based on regulatory changes, changes in university-wide safety practices, feedback from laboratory personnel and results of laboratory inspections.

10.0 TOXIC SUBSTANCES CONTROL ACT (TSCA)

10.1 Introduction

The purpose of the Toxic Substances Control Act (TSCA), administered by the U.S. Environmental Protection Agency (EPA) is to ensure that the human health and environmental effects of chemical substances are identified and adequately addressed prior to production or transport of those substances.

Chemical substances regulated by TSCA include:

"Any organic or inorganic substance of a particular molecular identity including any combination of such substances occurring, in whole or in part, as a result of chemical reaction or occurring in nature *and* any element or uncombined radical."

Regulatory requirements under TSCA can include:

- Required testing of environmental and health effects;
- Pre-manufacture notifications;
- Prohibition of use or distribution of chemicals;
- Record keeping of "significant adverse reactions" to chemicals;
- Reporting of information supporting the conclusion of substantial risk from a chemical;
- Certification of TSCA applicability for imported chemicals; and
- Notification to EPA of chemical exports.

Exemption from certain TSCA requirements may be available for some chemicals and laboratory activities such as:

- Pesticides regulated by FIFRA;
- Tobacco and tobacco products regulated by ATF;
- Radioactive materials regulated by NRC;
- Foods, food additives, drugs, cosmetics or devices regulated by FDA; and
- Chemicals and activities meeting the Research and Development Exemption.

All laboratory activities must be evaluated annually for TSCA applicability. Each laboratory or research group should perform an annual TSCA Applicability Determination as described in the TSCA Implementation and Compliance Guide. Appropriate laboratory supervisors should read the TSCA General Fact Sheet and TSCA Roles and Responsibilities section of the TSCA Implementation and Compliance Guide. Applicable TSCA requirements and specific implementation and compliance processes should be incorporated into the next revision of laboratory or activity specific Chemical Hygiene Plans.

10.2 Research and Development (R&D) Exemption

Any chemical substance which is manufactured or processed (used) in small quantities and solely for purposes of scientific experimentation, analysis or research under the supervision of a technically qualified individual is considered an R&D substance, exempt from many of the TSCA requirements. To maintain exemption status, laboratories engaged in research and development must comply with the following TSCA requirements:

- Use of specific grant funding contract language;
- Certification of chemical imports;
- Notification of chemical exports;
- Labeling and information provision with inter-facility chemical shipments;
- Recording of alleged significant adverse effects to human health or the environment; and
- Reporting of substantial risk information.

Chemical substances that are not used for research and development or laboratories that do not comply with the exemption requirements noted above are subject to significant additional requirements. See the TSCA Implementation and Compliance Guide for Laboratories for more detailed information and compliance guidance for Harvard laboratories or contact EH&S for assistance.

11.0 CHEMICAL FACILITY ANTITERRORISM STANDARD (CFATS)

In order to comply with the Chemical Facility Antiterrorism Standard (CFATS), a regulation issued by the Department of Homeland Security, Harvard University maintains an inventory of the specific chemicals listed in the regulation. Individual lab groups are responsible for maintaining inventory amounts of the chemicals in the system of record for their campus/location. Prior approval by the School/EH&S is required for any procurement of a material exceeding 25% of a Standard Threshold Quantity (STQ) for the Chemical of Interest (COI). Information on the requirements of CFATS can be found at www.uos.harvard.edu/ehs/ih/cfats.shtml

12.0 CONTROLLED SUBSTANCES

The US Drug Enforcement Agency (DEA) and the Massachusetts Department of Public Health (DPH) regulate the use of controlled substances, or common drugs of abuse. Researchers who use these drugs for their research are required to comply with these regulations, which address licensing, recordkeeping, proper disposal and secure storage requirements. Information about Harvard's controlled substance program can be found at www.uos.harvard.edu/ehs/ih/controlled_substances.shtml